Assessing construction project performance in Ghana : modelling practitioners' and clients perspectives

DOI:
10.6100/IR658375

Document status and date:
Published: 01/01/2009

Document Version:
Publisher's PDF, also known as Version of Record (includes final page, issue and volume numbers)

Assessing Construction Project Performance in Ghana: Modelling Practitioners' and Clients' Perspectives.

PROEFSCHRIFT

ter verkrijging van de graad van doctor aan de
Technische Universiteit Eindhoven, op gezag van de
rector magnificus, prof.dr.ir. C.J. van Duijn, voor een
commissie aangewezen door het College voor
Promoties in het openbaar te verdedigen
op dinsdag 22 december 2009 om 14.00 uur

door

William Gyadu-Asiedu

geboren te Asamankese, Ghana

Dit proefschrift is goedgekeurd door de promotoren:

prof.ir. F.J.M Scheublin

Copromotor:
dr.ir. E.L.C. van Egmond-de Wilde De Ligny
en
prof.dr. C.C.P Snijders

Members of the Doctorate Committee

prof. Ir. F.J.M. Scheublin, Technology Universiteit Eindhoven (Supervisor, core committee)

dr.ir. E.L.C. van Egmond-de Wilde De Ligny, Technology Universiteit Eindhoven (Co-supervisor, core committee)

prof.dr. C.C.P Snijders, Technology Universiteit Eindhoven (Co-supervisor, core committee)

prof. dr. J. Lichtenberg, Technology Universiteit Eindhoven (core committee)

prof. dr. George Ofori, National University of Singapore (core committee)

prof. dr. Gerhard Girmscheid, ETH Zürich (core committee)

prof. dr. E. Badu, Kwame Nkrumah University of Science and Technology (core committee)

AKNOWLEDGEMENTS

I thank the Lord God Almighty for the strength and ability He gave me throughout this research. He made everything possible. Secondly, I express my profound gratitude to my supervisor and co-supervisors prof. Ir. F.J.M Scheublin and dr. Ir. E.L.C van Egmond–de Wilde de Ligny and C.C.P Snijders respectively, for their time and devotion throughout all these years with an express desire and commitment to ensure the successful completion of this research. I pray that all their investments in this research shall not be in vain. I also express my profound gratitude to all my core committee members: prof. dr. George Ofori, prof. dr. Gerhard Girmscheid, prof. dr. J. Lichtenberg and prof. dr. E. Badu. Their encouragement and support in diverse ways are very much appreciated. I also thank dr. Peter Erkelens for sacrificing part of his precious time to read through part of my work and offer useful suggestions. I am grateful to dr. Theo Arentze for his willingness to assist me anytime I Call on him.

I express my profound gratitude to prof. Kwasi Nsiah Gyabaah, the Rector of my Polytechnic, for his tremendous support for me and my family throughout this research. He went the extra mile to ensure the safety and comfort of my family while I was away studying and ensured, when it became necessary, that my wife joined me in the final year of this research. I am also very grateful to Jan van Cranenbroek, my hardworking financial administrator, for his efficiency and magnanimity. To ensure that I progress smoothly with my studies, he was always ready to meet with me to address all concerns bothering not only finances, but also other administrative issues. I thank Bianca, my secretary for her support for this work. She was always ready to attend to my needs regarding her duties towards me, and gave me a lot of education about how things work in the university. I am also grateful to Ingrid, Anja, Mandy, Annemiek and Jolanda who are secretaries on my floor (Vertigo 8). They assisted me willingly in all respects and were always ready to open their doors to me even though they were not directly responsible for me. They made me realise the benefits of being close to them.

In addition, I remember my late friend Tobias Mufurukit for the immense support he gave me within the two years that we cooperated. May his soul rest in perfect peace. Many thanks also go to my good friend Erik Blokhuis for his help in giving the work a better presentation. I would not forget, Marloes Verhoeven, who was always willing to assist me in any way possible. I thank, Ana Pereira Roders for her warm encouragements in difficult times. I appreciate the efforts of Stephen Agyefi and M.M. Sabai for their willingness to assist in proof reading part of the thesis. I thank all the members of the Phd network, who in one time or the other lent a helping hand.

Finally, I thank the Gemeente van Christus in Eindhoven for their love and support throughout my stay in Holland. I pray for God's blessing for all the members.

DEDICATION

I dedicate this work my wife, Adwoa Siebe

and

to my children: Nana Akua Asabea, Nicholas, and Obiri

and

to my mother, Abena Asabea

SUMMARY

Assessing Construction Project Performance in Ghana: Modelling Practitioners' and Clients' Perspectives

Several countries at various levels of socio-economic development have recognised the need and importance of taking measures to improve the performance of their construction industry. One of the means to this end has been to ensure performance efficiency in construction project execution. As has been widely acknowledged, this requires a deliberate process of continuously monitoring the performance of projects based on relevant indicators. To this end, several models have been proposed in literature assess projects under the broad headings of *critical success factors* and *key performance indicators.*

However, these objectives are faced with several drawbacks. These has to do with the difficulty in developing a realistic and agreed set of indicators due to the very nature of the industry; the number of indicators necessary to be a complete picture, and lend relevance and accuracy to the overall result will be very large; the difficulty in collecting and processing the required raw data for estimating the indicators, especially in developing countries; and the need to amend or adapt these criteria and indicators for each country and, even project situation due to the dynamic nature of the factors in operation in the construction industry. At the core of these problems is the fact that most of the existing models emphasise the use of lagging measures instead of leading measures. Worse, they do not emphasise continuous assessment of the project, and finally, these models do not pay attention to needs of the clients as initiators of the project.

This research purposed to pre-empt the need for undertaking construction project performance in Ghana based on relevant indicators, as a means of helping to bring about improvements in project executions. Focusing on Ghana, a developing country, this thesis aims at providing a framework within which the industry can learn from best practices elsewhere. Specifically, this thesis provides a means by which construction project performance could be continuously assessed with measures that reflect the perspectives of both practitioners and clients. It also takes into consideration the particular circumstances of the project.

In addressing the problems, it was necessary to work within a paradigm shift in the following regard:

(i) moving away from expecting "project autopsy reports" towards "project health reports" (ii) moving away from the considering the outcomes of a project in terms of success/failure dichotomy into project performance results in identifiable criteria (iii) acknowledging the uniqueness of every project and the contingency factors which calls

for contingency measures of assessment. Further, this thesis adopted the concept of the project as a 'temporary organization'. This enabled the adoptions of the relevant organisational theories and improved practices from the business world into the project situation. Finally, the clients' perspective of project performance was considered.

Thus, the research builds on the existing performance measurement frameworks (including success/failure measurements) to develop a contingency- based model for assessing construction projects in Ghana, using multiple measures. Undertaking three sets of empirical research in Ghana within a space of eighteen months with practitioners and clients simultaneously, it was possible to determine the measures that currently reflect practitioners' views on project performance on one hand and those of the clients on the other. Together, the thesis showed how these measures represent a *shared perspective* of project performance in Ghana

Based on the above results, a contingency-based assessment tool was designed which could be used to assess construction project performance throughout its life cycle. This tool will allow the identification of factors at play and provides information that will facilitate project management decision. Above all, the tool documents all relevant occurrences and documentations of challenges and decisions which is invaluable for learning and improvements both on the current project and for future projects.

TABLE OF CONTENT

LIST OF TABLES

LIST OF FIGURES

PART 1 THEORETICAL RESEARCH

CHAPTER 1: General Introduction

1.1. Introduction

This chapter provides the general introduction to the thesis. It begins by discussing the subject matter of the research by highlighting the main issue under exploration and providing a background to explain it. This aspect culminated in the problem statement of the research. The next main section addresses the purpose of the thesis by explaining the main aim and objectives of the research. It also outlines the key research questions which guided the inquiry. The next section indicates the scope and limitation of the thesis. It describes the key elements considered in the study and the geographic area to which the study is confined. It then indicates the limitations of the study in terms of time and those relating to data collection. This is followed by briefly addressing the scientific relevance, applicability, societal relevance and use and the methodology of the research. Finally, the organisation of the research was described.

1.2 Assessing Construction Project Performance

The subject matter of this thesis is assessing construction project performance. The focus is on how to determine, through performance measurement, that an on-going project is succeeding or failing to achieve the objectives for which they are being implemented. This is borne out of the global quest for the improvement, in the performance of the construction industry in general and project performance in particular. The subject of performance measurement or assessment has become a matter of concern to several countries at different levels of socio-economic development which have realised the need to improve the performance of their construction industry (Ofori, 2000, Beatham et al., 2004). Discontent with the state of their construction industries, governments in developed countries are supporting various initiatives for improvements (Ofori, 2000). Following the Latham (1994) and Egan (1998) Reports, the UK construction industry in particular has resorted to using several performance measures to address improvement concerns of the various aspect of the industry (Beatham et al., 2004). With regard to the global concern of the development of the construction industry, the use of performance measures to achieve this aim by most developed countries has been underscored (Ofori, 2001). In the quest for improvements in the construction industry performance by these countries, this research posits that improvements in the performance of the project as a key component and the livewire of the construction industry should be given due attention. This is to be considered alongside the improvements of the other components of the industry as explained in chapter 2. However, this research focuses on the project and its performance assessment.

Undesirable project performance results across several countries have been well documented in the literature review. Identified in various forms as low productivity, delays, cost overrun, poor quality and so on, poor project performance has been noted as the bane of construction industries of several countries, particularly, developing countries (Makulwasawatudom et al., 2003; Mutijwaa and Rwelamila, 2700; Le-Hoai et al., 2008). Developed countries also have their fair share of the problem, though, as indicated by Kakegg et al. (2005) and "Benchmarking the Government Client stage 2study (1999)". In addressing the problem, most developed countries have resorted to the use of measures to assess project performance. This has led to the modelling of indicators and criteria in which performance could be measured as well as the factors that influence performance (Shenhar et al., 1997, 2002; Atkinson, 1999, 2000; Belasi and Tukel, 1996 and so on). This development is seen as positive because performance assessment in the form of monitoring and controlling is central to effective project management (PMI, 2004).

Studies on these models show that each of them are designed to address different aspects of project performance; for example, strategy, people, design, process, project, project manager, organisational culture and so on (Beatham et al, 2004; Shenhar et al, 1997; Ankrah, 2007; Ahadzie, 2007).

This result is rooted in the central position of construction project within the industry. Being at the centre of the construction industry, project performance is affected by all aspects of the industry in the same way that the industry is affected by project performance. Thus, issues bothering on project performance are expected to have diverse focus. As Neely et al. (2002) notes, all the various models add value.

In the developing countries, however, little evidence exists to show that concerted efforts are being made by governments in this regard despite acknowledgement by several countries of the existence of project performance inefficiencies. Therefore, the World Bank (1994) advises that it is time developing countries did things differently, to reverse the inefficiencies within their construction industries.

In the developed countries where these various models are developed, there are growing fears that the various models designed to assess the performance of projects cannot help to accomplish the performance improvements for which they were intended (Shenhar et al., 2002; Atkinson, 1999; Beatham et al., 2004). This is proven by the fact that undesirable project performance results continue to plague even the construction industry of countries where project performance assessment has received prominent attention since the past two decades; for example, in UK, (Benchmarking the Government Client stage 2study, 1999). In addition, a key feature of the models is that they attempt to measure the success or failure of project and hence most of their assessment measures are “lagging” indicators, reporting performance after they have occurred. Yet, there is still a disagreement between project management researchers as to what constitute project success and how it is to be measured (Murray et al., 2002; Kakegg et al., 2005). Still, it has been acknowledged that most of the existing models are not usually made to be part of a complete assessment system (Dvir et al., 1998; Beatham et al., 2004; Takim and Akintoye, 2002). Finally, most of these models address only client satisfaction as a criterion among the rest and not the perspective of the client as an important stakeholder (Takim and Akintoye, 2002). This is limiting in its recognition of the important role of the client in ensuring best practice and improvements as underscored by Latham (1994). Yisa et al. (1996) confirmed this when the note that one of the consequences of the many changes in the construction industry is that “construction firms are moving closer to their clients who are themselves becoming more sophisticated and are often now the driving force for improvements in the construction process”. Finally, these models do not take into consideration the development satisfaction of the client (Rowlinson, 1999; Njoh, 1993).

1.3 Statement of the Problem

An undesirable project performance result is one of the main problems affecting construction industries everywhere and mostly developing countries. In developed countries efforts are being made to use project performance assessment to monitor and control projects to ensure favourable outcomes. Yet, to date, there has been little, if any, research in developing countries aimed at promoting improvements in project performance through assessment. There is therefore the need to emulate developed countries’ approaches of ensuring improvements in project performance. However, in order to determine the most effective and realistic application of the existing models in any developing country, it is imperative that a study be done to determine to what extent these models are relevant in each country. In addition it is important to determine to what extent these models can be useful in addressing the specific problems confronting the construction industry of each country.

1.4 Aim and Objectives

The aim of this research is to determine a means by which construction project performance can be assessed at any stage of the project execution with measures that reflect the perspectives of the client and practitioners as well as the particular circumstances of the project and within different socio-economic settings. The importance of the aspect of continuous assessment is underscored by the PMI (2004) that continuously monitoring of a project provides the project team insights into the health of the project and highlights areas that require attention. Addressing the perspective of clients alongside those of the practitioners is aimed at promoting a shared perspective and responsibility between them and reduce, if not eliminate, the frequent dispute that exist between clients and practitioners on the state of the projects. Finally, the research focused on building measures of performance assessment that are to be of relevance to Ghanaian construction industry, being the case study.

To achieve this aim, the following specific objectives were pursued:

1. To review existing literature on project performance problems and the existing performance measurement frameworks being used to address them.
2. To identify practitioners' and clients' criteria for measuring construction project performance in Ghana
3. To identify the factors influencing project performance in Ghana.
4. To propose an assessment tool based, on the research, usable to assess construction project in Ghana

1.5. Research Questions

The inquiry was aided by trying to address these main questions:

1. How does clients' perspective of project performance in the construction industry compare with those of the practitioners' in Ghana?
2. How can the perspectives of project performance of both clients and practitioners be organised into a framework or tool for assessing project performance in Ghana?

The main questions were answered with the help of the following sub-set of questions:

- What are the most important measures for practitioners in Ghana with regards to assessing project performance?
- What are the factors perceived by practitioners in Ghana as the most influential on project performance?
- What are the most important measures for clients in Ghana regarding assessing project performance?
- What are the factors perceived by clients in Ghana as the most influential on project performance?

- How do practitioners’ measures compare with clients’?

1.6 Scope and Limitation

The research is focused on construction project performance and its assessment. The key elements addressed are clients’ perspective and practitioners’ perspective of project performance in Ghana. With regard to the clients, the research focused only on public clients (government). This is because in addition to the government being the major client in Ghana, the researcher proposes a front-ended project management approach to project execution, using the proposed assessment tool as an intervention to the existing problems facing project execution in Ghana. Thus, it is hoped that focusing on the government as a policy maker in the industry will help it in gaining the required attention it needs for its implementation. A major limitation of this research was that time constraint did not allow the testing of the assessment tool. This is because the tool will require between six months to twelve months to test on a live project in Ghana.

1.7 Scientific Relevance

The scientific objective of the project is seen in the process of generating knowledge in a systematic order; particularly, in the aspect where clients’ and practitioners’ perspectives differ. It is also seen in testing and arranging them in a manner that can form a basis of further studies and research. This means that we want to know: (i) what are their expectations on perspectives and (ii) how do these expectations compare with one another (similarities and differences). This activity includes the following**:**

1. The development of appropriate theoretical framework for the research which has implication for other project management research.

2. The testing and verification of empirical and other data, concepts and models from other countries in a different environment (Ghana)

3. The contingency-based model for building measurement for assessing project performance

4. The contingency-based performance assessment tool

1.8 Applicability, Societal Relevance and Use

The assessment framework developed will provide a means of assessing, reporting and documenting the project health across its life cycle at agreed phases. Consequently, the issue will no longer be only about the declaration of a project to be successful or not, but one which will describe the project's performance at relevant stages as, for example, "good", "very good", " bad", " poor" or " challenged" and so on. In addition, it will provide a means by which it will be determined, at each relevant stage, the dimension or criterion in which poor performance or better performance is occurring and which factors are at play or dominating. This will empower users to predict the possible outcome of the project based on prevailing conditions so that the problem of "fire fighting, intuitive and ad-hoc approach to project management could be minimized. This will be made possible by the inherent ability of the tool to encourage and facilitate the necessary front-end management activities. Moreover, the ability of the framework to systematically document projects' 'lives experiences' will provide a wealth of information on several projects which will become case histories from which learning and improvements and developments in project executions can be gained. This will certainly contribute to the overall improvements, developments and sustainability of the construction industry of the particular country.

Practically, the tool would be useful to practitioners in that it will facilitate their project supervision and management in general. It will also assist clients to estimate the level of satisfaction of performance not only of the project but also of the professionals, whose services they engage for project execution. Specifically, practitioners will be better equipped to appreciate the client's vision and hence perspectives regarding their undertakings and be in a better position to satisfy them.

1.9 Methodology

The form of the research questions indicated above dictated the choice of mixed-methods. It will be noticed that the two main research questions are exploratory in nature while all the sub-questions are inherently confirmatory. Hence the challenge was to address two kinds of questions in two surveys to be run parallel within one project. Mixed methods were chosen because of its qualities to address the specific context of the research as explained above in line with the position of Tashakkori and Teddlie (2003). This in general embodied the use of both qualitative (interview and open-ended questionnaires) and quantitative approaches in the data collection processes in each case as appropriate and demanded by the questions being answered. These are fully explained in chapter 4.

1.10 Organisation of the Research

The research is organised in three parts and eight chapters. The first part is the theoretical part comprising the first three chapters. It begins with chapter 1 which introduces the whole thesis, highlighting the subject, purpose, scope and research outline.

After this introduction, Chapter two focuses on the literature review and it addresses problems confronting construction industries of several countries and the quest for improvements through performance measurement. The chapter also explains the need to decompose the construction industry into its component parts and address the improvement needs of each component separately so that aggregated performance improvement will represent the improvement of the industry of every country. This argument is also supported in the chapter by looking at the industry as a system with sub-systems and super-systems. Finally, the chapter focused on the project as a central component within the industry and part of the sub-system. The chapter adopts the consideration of the project as a temporary organisation and reviewed existing literature on problems with project execution as documented in several countries. It then highlighted efforts by countries to address these problems by performance assessment. Existing project performance frameworks were then reviewed and their associated problems identified. The chapter ends by discussing the Ghanaian construction industry and relating its problems with those of other countries.

Chapter three is devoted to the development of the theoretical framework of the research. It begins by highlighting the various concepts of organisational management and performance management as a basis for a paradigm shift from those governing some of the present performance assessment frameworks. It then proceeds to establish that construction project performance is a business issue and thereby reviews some relevant business performance measurement framework as a means of learning best practice. With this background, the chapter proceeds to highlight the key theories that will underpin the theoretical framework. These are the contingency theory, the nascent theory of the temporary organisation and the environmental theories of the firm. Together, these defined the theoretical framework which climaxed the chapter.

Chapter 4 begins the second part, which is the empirical part. This comprises the next three chapters. The chapter describes the research method used. It describes the pilot surveys and the results which were used to develop the questionnaire for the main survey. The chapter ends by providing a contingency-based model for building criteria for assessing construction project performance. This model is borne out of the data collection and analyses procedures used in the research.

Chapter 5 address the result of the main surveys. This chapter concludes by highlighting the models that represent practitioners' and clients' perspectives of project performance in Ghana.

Chapter 6 describes the analysed results within the context of the construction industry in Ghana. This chapter also serves the purpose of linking the theoretical framework (chapter 3) and the field surveys and its findings (chapters 4 and 5) together and relate them to the Ghanaian situation. Because it deals with the Ghanaian construction industry context, it also relates to part of chapter 2.

The third and final part of the thesis comprises chapters 7 and 8. Chapter 7 describes the assessment tool. This tool responds directly to the main aim of the research. It describes the elements of the proposed assessment tool and its implementation strategy. It details out the implementation procedure of data gathering through the assessment procedure. This chapter connects to the contents of the literature review in chapter 2 and builds on the paradigm shifts proposed in chapter 3.

Finally, Chapter 8 concludes the thesis. It summarises the deliverables of the project and the contributions it has made to knowledge and practice. It mentions the accomplishments and the limitations of the research and thereby indicates areas of further research.

Figure 1.2 is a diagrammatic representation of the structure of the thesis showing the linkages between the chapters.

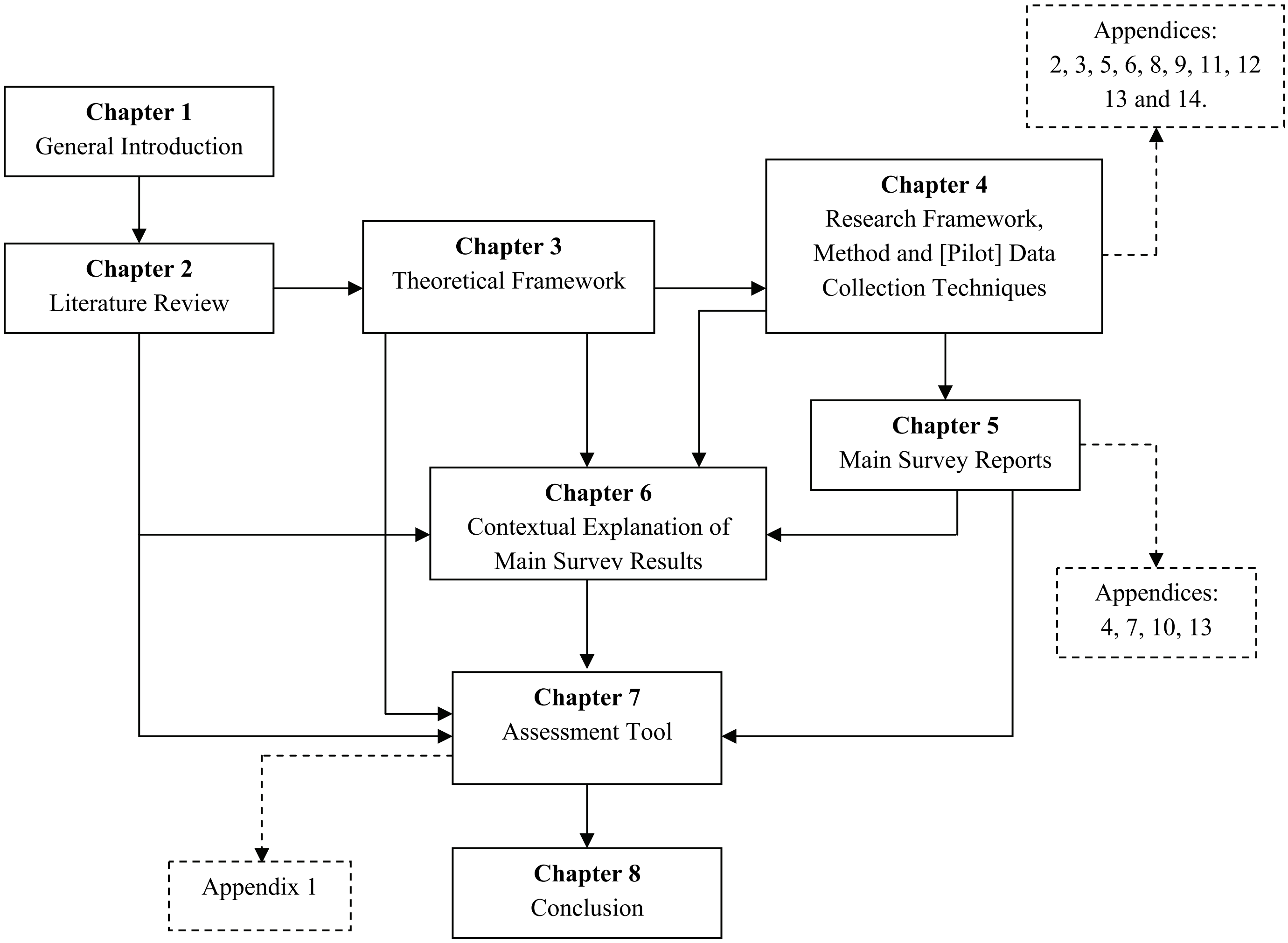

Fig.1.1 Structure of the Thesis showing the linkages between the chapters

CHAPTER 2: Literature Review

2.1 Introduction

This chapter discusses the use of project performance assessment for purposes of improvements as a means of influencing a countries' construction industry development agenda. It begins by highlighting the quest by construction industries everywhere to improve their performance and develop their industry. The need for developing countries to emulate these examples is also addressed. This is followed by a review of the role of performance measurement in the development of construction industries. Problems identified with the existing approaches prompted a discussion on the need to decompose the industry into its component part and focus on each part with relevant measures. In addition, it was shown that research into the industry should consider the industry as a system with its sub-systems and super-system. This consideration, the author believes, will provide a basis for studies into the industry through its components. With this background, the chapter proceeds by concentrating on the project as the main focus of this research. The problems confronting project execution in several countries (particularly developing countries) are then discussed. This was followed by a discussion on the use of project performance assessment as a managerial means of addressing these problems. Some notable models were analysed and key problems with the approaches being used were identified. Finally, the Ghanaian construction industry was discussed in the light of all the foregoing. It was realised that Ghana needs to follow the path being taken by the developed countries and address the numerous problems confronting its industry; within a paradigm shift, though.

2.2 Global Quest for Construction Industry Development

Generally, the built environment is known to constitute more than half of the national capital investment, account for the consumption of more than half of all the raw material taken and, and consumes between 40% and 50% of a country's energy (Du Plessis, 2002 pi). According to the World Bank (1994), developing countries invest $200 billion a year in new infrastructure -4 percent of their national output and a fifth of their total investment. Regarding its socio-economic significance, the industry contributes about 50 per cent of all investments in capital goods in many countries (Zawdie and Langford, 2000). Even though the precise linkage between infrastructure and development is still open to debate, the World Bank (1994) Report asserts that infrastructure capacity grows in tandem with economic output: "a one percent increase in stock of infrastructure is associated with a one per cent increase in gross domestic product (GDP) across all countries". Contributing to the debate, Lopes et al. (2000) provided evidence, based on a study on data from 15 countries spanning 22 years, that “there is a critical level of construction value added (CVA)/GDP (at 4-5%) below which a relative decrease in construction volume corresponds directly to a decreasing growth in GDP per capita”. Commenting on the socio-economic significance of infrastructure projects, Zawdie and Langford (2000) observes that good infrastructure projects can help enhance growth process by raising productivity, alleviate poverty by responding to the needs of the poor for better health, education, housing, transport, and water and power supply services.

Against this background, several countries at various levels of socio-economic development have recognised the need and importance of taking measures to improve the performance of their construction industry in other to meet the aspirations of its developmental goals (Ofori, 2000). This is in line with the agreements reached and reported by the CIB Task Group 29 (1999). According to Ofori (2000), the report agreed that “construction industry development is a *deliberate process* to improve the capacity and effectiveness of the construction industry in order to meet the demand for building and civil engineering products, and to support sustained national economic and social development objectives (CIB, 1999)”. At that meeting, the report continued, it was agreed that construction industry development promotes: (a) increased value for money to industry clients as well as environmental responsibility in the delivery process (b) the viability and competitiveness of domestic construction enterprises. This has become necessary because of the poor performance of the construction industry due to problems and challenges including those having to do with its structure characterised by fragmentation, institutional weakness and resource shortages (Ofori, 2000; Beatham et al., 2004; Latham, 1994; Egan, 1998). In the developing countries these problems are even bigger, compounded by lack of adequate resource and institutions to address them. These, together with the threat on the environment, have led to the call by various countries to work towards improvements in, and sustainability of, the construction industry. Where, sustainable development has been defined as the “development that meets the needs of the present without compromising the ability of the future generations to meet their needs” (The Brundtland, 1987).

2.2.1 Construction Industries in Developing Countries

However, as Ofori (2000) notes, most of these topical issues which have implications for construction industry have so far only been discussed within the context of the industrialised countries and is yet to be considered seriously in the developing countries. Considering the investments levels of the construction industry and the development needs of most developing countries, the time is overdue for these matters to be given prominence. This is also because, despite the relatively high investment in infrastructure in developing countries, the World Development report (1994) highlights the less corresponding impact these have had on the people in these countries. Hence, the report indicated that the infrastructure's future challenges should be dealt with by tackling inefficiency and waste –both in investment and delivering services. The report indicated that the poor performance of those managing the delivery and maintenance of these infrastructures provides strong reasons for doing things differently. Indeed, Agenda 21 for sustainable construction in development countries puts construction at the centre of how the future is to be shaped, and the sustainability of this future (Du Plessis, 2002 pi). In particular, developing countries were well advised to avoid the development mistakes of the developed world and to take steps to intervene on behalf of sustainability today than to wait and change things after they have occurred (Du Plessis, 2002 p1). Even though the research does not cover sustainable construction, this advice is seen as another reason why developing countries should make efforts to deliberately address the many problems that confront their construction industry, particularly, in the area of project performance.

2.3 The Role of Performance Measurement in the Development of Construction Industry

Ofori (2001) posits that the absence of measurable targets in the development programmes to guide and assess, at intervals, the success of their implementation is a possible reason for lack of progress and the persistence of problems in the construction industry. Following a deliberate process of continuously monitoring the performance of the construction industry everywhere based on relevant indicators is, thus, at the core of the quest to develop, improve and sustain the industry. This research sees this as an important aspect of the global agenda for construction industry development and its sustainability. More importantly, the author believes that this goal could be better achieved if the approach takes into consideration the very peculiar nature of the industry as outlined by Hillebrandt (1984): (i) the nature of the final product, (ii) the structure of the industry and the organisation of the construction process, (iii) the determinant of demand, (iv) method of price determination. Koskela (2000a) summarised it as: "one-of-a-kind production, site production and temporary product organisation". This peculiarity in itself poses the first challenge regarding the quest of its development.

However, in the industry's quest for development through performance assessment, the research notes a central problem. In the majority of cases, attempts at using indicators to track and monitor the improvements in the construction industry have been to address the problem en bloc. Beatham et al (2004) notes five problems with this approach in relation to construction companies:

1. They focus on post-event lagging key performance outcomes at a very high level that offered little opportunity to change and were not used by businesses to influence managerial decisions.

2. The key performance indicators were not aligned to the strategy or business objectives of construction companies.
3. They were designed for cross industry benchmarking purposes, but due to a lack of certainty in the data, problems with different procurement routes and lack of validation of results, this level of benchmarking is not thought to be viable.
4. The key performance indicators do not provide a holistic, company-wide representation of the business.
5. They are not incorporated into a Performance Measurement system (PMS).

It is the position of this research that the objective of improvement in the construction industry would be better achieved if the industry is rightly divided into its major component parts, that is, *clients*, *construction firms*, *practitioners* (consultants, project managers), *products, the material suppliers* and *consumers/the publics* and the other *stakeholders*. These will need specific indicators of measurement for monitoring and evaluation to accomplish specific purposes of interest. Table 2.1 illustrates key components of the industry and list of authors who are focusing on these components. Consequently, the performance of the construction industry of any country will be the aggregation of the performance of its components. Thus, the improvements in the construction industry of any country as measured by its performance at any time should be represented by the aggregation of the improvement of its components; and that the overall development of the construction industry of any country at any time should be represented by the aggregation of the developments of its components.
Towards these end, the critical issues to address are:

1. How to assess the performance of each of these components for their effective management over time.
2. How to assess and manage the performance of the construction industry on the basis of the results of the performance of its components.

Table.2.1 Focus of Performance Measurement for Components in the Construction Industry

Construction Industry Components	**Actors/Items**	**Primary Focus of KPIs during project implementation**	**References**
Clients	Government, Private companies, Real Estate Developers private individual etc.	Ensuring the fulfilment of needs/ motivations for the project; other expectations during developments; value for money and benefit of usage etc.	Mbachu, 2003; Sharma, Egemen and Mohamed, 2006; APCC, 2002.
Contractors	Civil Engineering contracts, Building contracts etc.	ROI, productivity, Client satisfaction, good relationship management with practitioners, marketing, learning, innovations etc.	Kagioglou et al.,2001; Love and Holt, 2000; Kaplan and Norton, 1986; Neely et al., 2002.
Practitioners/Consultants	Architects, Quantity Surveyors, Project Managers, Service Engineers, Structural/Civil Engineers	fulfilment of client's objectives, project objectives, innovation, competency, productivity, competency etc.	Apostolou, & Mentzas, 1999. Ahadzie, 2007, Nkado, 1998; PMI (2004).
Projects	Buildings, Roads, Dams, Bridges, Tunnels, etc.	Expecting Healthy life cycle in all their set criteria e.g. cost, time, quality, Managerial, environmental, and social impacts etc., and successful completion to the satisfaction of the client and approval of the supervisors, project managers	Shenhar et al, 1987; Slevin and Pinto, 1987; Atkinson, 1999; Chan and Chan, 2004; Vandevelde et al, 2002.
Products	Buildings, Roads, Dams, Bridges, Tunnels, etc. In addition, major prefabricated building components	Expecting Healthy life cycle including post commissioning, price, quality and durability, social, environmental, community, productivity benefits, functionality etc., usage, demolition, re-cycle etc.	Todd (2008); Chung, 999 Ziimring, 2008.
Material Suppliers/Building Merchants	Manufacturers of building materials, importers and distributers etc.	Ensuring business trust, timely delivery of quality materials, and receipt of payment, satisfying contractors etc.	Agapiou et al., 1998; Bertelsen, 1997, Villagarcia et al, 2000.
Consumers/ the Publics/other stakeholders	Renters, Mortgagors, buyers, beneficiaries etc., the publics, government departments, government agencies, international organisations; all those involved in execution.	Expecting Quality products, good price and good product features etc; Ensuring that their specific interests and requirements are met from the relevant parties	Newcombe, 2003; Shen, G.Q.P (2006)

2.3.1 Construction Industry as a System

Hall and Fagen (1956 pp. 18-28) define a system as: "a set of objects together with relationships between the objects and between their attributes". Objects are parts or components of a system for example: clients, practitioners, contractors, projects and so on. They are unlimited in variety. Attributes are the properties of objects, in construction projects, the success factor; indicators etc represent the attributes of the objects. The last key word in the definition is "relationships". This is what "ties the system together". It is in fact these relationships that make the notion of the "system" useful. The relationships that exist in the components parts of a construction system are indispensable for its success and growth.

Using system thinking, the construction industry of any country as a system can be represented at three levels as shown below:

- **System Level**: the system itself i.e. the construction industry as a social system.
- **Subsystem level (objects)**: all that belong to the system, each component and assembly e.g. projects, firms, personnel etc.
- **Super-system level:** everything that does not belong to the system but interacts with the system, or produce influence upon functioning of the system e.g. the natural, social, economic, political and competitive environment.

In this regard, the construction industry is a composite system of distinguishable parts. It is characterised as one which comprises many interacting parts such that a change affecting any one part usually, has the potential of affecting the other in an unpredictable manner. It is also a pluralistic industry because groups (components or constituents) within the system have diverging interests and aspirations (Figure 2.1).

It is therefore important that studies into the mechanisms within the industry should be carried out with this system concept in mind. This will provide a framework within which the construction industry could be studied by considering each part of the whole in-turn and will provide the opportunity for a more detailed and comprehensive analysis and solutions. It will also provide a means by which the nature of the interactions and impact of one part on the other be identified. The current study focused on the sub-system, specifically the project. In chapter 3, the notion of the industry as a system was used during the development of the theoretical framework in which the project was separated into internal and external environments characterising the factors impacting on it respectively.

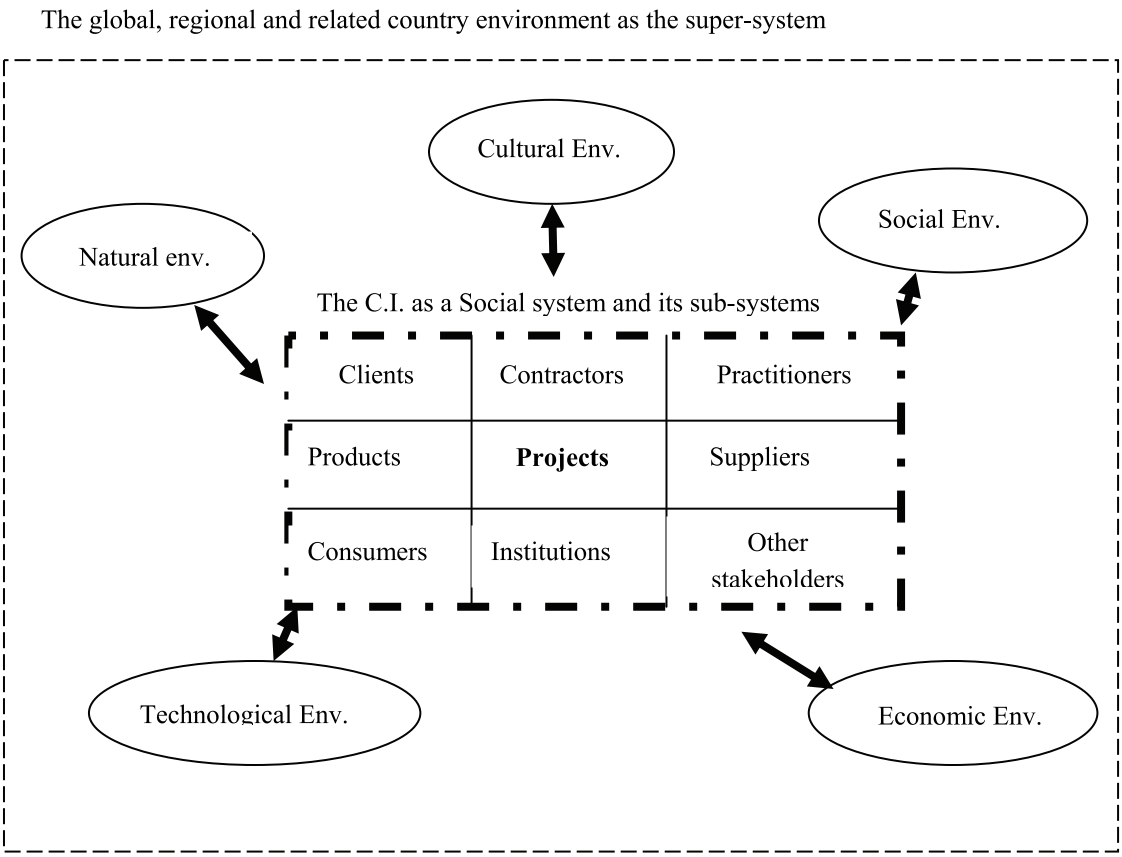

Fig.2.1 The Construction Industry as a System
[Showing the C.I. as a social system with its sub-systems; the super-system comprises the social, economic, natural, technological and cultural environments and the interactions of these system components. Note the position of the project at the centre of it all].

2.4 The Project as a Temporary Organisation

Turner (1993 p.9) defines a project as *"an endeavour in which human, material and financial resources are organised in a novel, to undertake a unique scope of work, of given specification, within constraints of cost and time, so as to achieve beneficial change defined by quantitative and qualitative objectives"*. His definition emphasises "organisation of resources" and "uniqueness" of the scope of work". The PMI (2004 p.5) defines a project as *"temporary endeavour undertaken to create a unique product, service, or result"*. It highlights the word 'temporary' in three aspects: (i) every project has a definite beginning and a definite end; (ii) the opportunity or market window is usually temporary; and (iii) the project team, a working unit, seldom outlives the project –usually disbanded after the project. Another key word from this is that a project creates a unique product, service or results. In addition, it acknowledges that a project is characterised by "progressive elaboration", that is, it develops in steps.

Referring to Cleland and Kerzner's (1985) definition of a project as "a combination of human and non-human resources pulled together into a temporary organisation to achieve a specified purpose", Turner and Müller (2003) realise that this definition addresses the project both as a *temporary organisation,* and a *production function* and an *agency of assigning resources*. Reviewing Turner's (1999) definition, they observe that a project has three essential features: it is unique, it is a novel process and it is transient. These features, they note, create three pressures: (i) they are subject to *uncertainty*: there is no guarantee that plans will deliver the required project outcomes or desired beneficial change; (ii) they create a need for *integration* of the resources to do the project, between different parts of the project, and of the project into the business; (iii) they are undertaken subject to *urgency* of delivery within the desired timescales. Quoting from Turner's (1999), they suggest that "it is these three pressures that are special to project management, not the management of *time, cost* and *quality*, which is shared with routine operations management". They note the need to consider other relevant dimension to the project, that is, *as agency of change, agency of resource utilisation* and *agency for uncertainty management* as contained in the definitions of other authors (for example: citing, Barnes, 1989; Anderson et al., 1987; Turner, 1993). Consequently, they define a project as: *"a temporary organisation to which resources are assigned to undertake a unique, transient endeavour managing the inherent uncertainty and need for integration in order to deliver beneficial objectives of change".* In a related development, Shenhar and Wideman (1996) conclude that there is lack of consensus among practitioners on terms "Project" and "Project Management".

However, Anagnostopoulos (2004), reviewing works by several authors in this regard conclude that it is fruitful to consider projects as "temporary organisations" (referring to Packendorff, 1995 and Lundin Söderholm, 1995; Turner and Müller, 2003 and Söderlud, 2004). The research agrees with Turner and Müller (2003) and considers the project as a temporary organisation. This allows the project to be analysed from the perspective of organisational theory. It also calls for a focus on the '*organising'* aspect of the project as it relates to human endeavour. The focus is mainly on ensuring good performance throughout the *process*. This thesis posits that managing the project successfully depends largely on actions and inactions of the key stakeholders within this temporary organisation.

2.4.1 Problems in Project Execution

The unique characteristic of the construction industry is epitomized in the project. This has meant that every project is different, a situation which emanates from the project's own characteristics, that is, its type, its size, its geographic location, personnel involved in the project, those emanating from the other subsystems within the industry, and also those from the super-system. Hence project execution is inherently risky and the lack of appropriate approach to addressing these risks has led to a lot of undesirable results in project execution in the construction industry of most developing countries.

Most of the problems militating against the achievement of the desired effect on the construction industry of any country have to do with the project execution challenges, namely, the difficulty in achieving the main objectives of the project. Traditionally, this is seen in the failure of the project to achieve its cost, time, quality and other targets due to inefficiencies in the execution process. This ultimately, causes client dissatisfaction.

In the next section, the existing literature on the main problems affecting project performance especially, in developing countries are discussed. In addition, it established the need to consider the human risk factors as key to addressing the problems.

The problems of Low productivity, Delays and Cost Overruns in Project Execution

A common problem that affects project performance in the industry is low productivity. For example, Makulwasawatudom et al (2003), identifies 23 critical factors influencing the construction productivity in Thailand. Ten of these were found to be critical*: lack of material, incomplete drawing, incompetent supervisors, lack of tools and equipment, absenteeism, poor communication, instruction time, poor site layout, inspection delay, and rework*. A research by Mutijwaa and Rwelamila (2007) showed that the South Africa Infrastructural Department (SAID) is under pressure to improve performance, that is, to deliver projects on time, on budget and to higher standard of quality. They attributed the problem to lack of skilled workers in these infrastructure departments (ID) and called for the need for a project manager in all these offices to coordinate the many on-going projects. Further, they observe that the infrastructural departments do not know whether they are (i) achieving desired results (ii) meeting their customer's success criteria and (iii) achieving their desired return on investment. Hence, they propose a means of assessment to evaluate progress as a means of addressing these questions. Secondly, they recommend such IDs to be project-oriented organizations (POO).

Other project-related challenges have to do with the twin chronic problems of cost and time overruns. These problems are not limited to developing countries alone. According to "Benchmarking the Government Client stage 2 study (1999)", UK, benchmarking study conducted in 1999 of 66 central government departments' construction projects with a total value of £500 million showed that three quarters of the projects exceeded their budgets by up to 50% and two thirds had exceeded their original completion date by 63%. According to Yisa and Edwards (2002) despite the development of new alternative and less adversarial contractual arrangements, the industry continues to be affected by problems of project time and cost overruns and consequently, client dissatisfaction (drawing from Latham, 1994; Egan, 1998). Different countries identify different factors as critical in this regard. In Botswana, Chimwaso (2000) research into the factors of cost overrun and came out with four related factors: *variations, re-measurement of provisional works, fluctuation in the cost of labour and materials and contractual claims, that is, claims for extension of time with cost.* In the case of time overruns, Zhang et al. (2003) identify 8 factors that cause delay in project executions in China: *factors related to the contractor, the design team, the project, labour, client, material, equipment, and other factors.* In the midst of the booming infrastructure development and urbanisation in Vietnam, Le-Hoai et al (2008) established that cost and time overruns top the list of problems of project implementation. Using factor analysis techniques, they obtained 5 main factors out of a list of 21, namely: *poor site management and supervision, poor project management assistance, financial difficulties of owner, financial difficulties of contractor, design changes.* Significantly, they compared their results with results of similar research from 8 other countries as shown in table 2.2.

Table 2.2 Comparison of factors causing time and cost overruns from eight countries (Le-Hoai et al, 2008)

Countries	Major causes				
	1	2	3	4	5
Vietnam (Le-Hoai et al., 2007) (1)	Poor site management and supervision	Poor project management assistance	Financial difficulties of owner	Financial difficulties of contractor	Design changes
Malaysia (Sambasi and Soon, 2007) (2)	Improper planning	Site management	Inadequate contractor experience	Finance and payments of completed work	Subcontractors
South Korea (Acharya et al., 2006) (2)	Public interruptions	Changed site conditions	Failure to provide site	Unrealistic time estimation	Design errors
Hong Kong (Lo et al., 2006) (2)	Inadequate resources due to contractor/lack of capital	Unforeseen ground conditions	Exceptionally low bids	Inexperienced contractor	Works in conflict with existing utilities
UAE (Faridi and El-Sayegh, 2006) (2)	Preparation and approval of drawings	Inadequate early planning of the project	Slowness of the owner's decision-making process	Shortage of manpower	Poor supervision and poor site management
Jordan (Sweis et al., 2007) (2)	Financial difficulties faced by the contractor	Too many change orders from owner	Poor planning and scheduling of the project by the contractor	Presence of unskilled labour	Shortage of technical professionals in the contractor's organization
Kuwait (Koushki et al., 2005) (2)	Change orders	Financial constraints	Owner's lack of experience	Materials	Weather
(3)	Contractor	Materials	Financial constraints	Change orders	Weather
Ghana (Frimpong et al, 2003) (1)	Monthly payment difficulties	Poor contract management	Material procurement	Inflation	Contractor's financial difficulties
Nigeria (Aibinu and Odeyinka, 2006) (2)	Contractors' financial difficulties	Clients' cash flow problem	Architects' incomplete drawing	Subcontractor's slow mobilization	Equipment breakdown and maintenance problem

(1): Delay and cost overruns; (2): Delay only; (3): Cost overrun only

These results are corroborated by other results from East and South African studies as shown by Rwelamila et al. (2000). Significantly, Kaliba et al. (2009) studied 13 on-going projects in Zambia and found out that 5 of them went beyond schedule and budget, 4 went beyond schedule, 1 exceeded the cost and was still incomplete after 10 years, 1 has exceeded the scheduled completed time by 5 years and is still incomplete, and 2 have failed to commence since 2001. This scenario is a common feature in most developing countries, especially in Africa. The same issues are also prevalent in some developed countries too, as shown by Klakegg et al (2005) for the construction industry in Norway. The foregoing suggests that most of the factors that cause delay also cause cost overruns. In addition, it is also found that the same factors were ranked differently in different countries. In a related development, Faniran (1999) provided another dimension to the delay factor issue. In the same country, that is Nigeria, he found out that depending on whether a contractor is using quantitative techniques (for example, bar chart, Critical Path Network or Pert analysis) or not, different rankings of the same identifiable delay factors emerged, that is, from the contractors' point of view (Table 2.3). These differences in the rankings of the same factors in different countries, and even in the same country, shows that these factors are themselves, moderated by other factors. It suggests that the factors that affect the efficient execution of construction project everywhere are themselves impacted on by other external and, sometimes, intermediate factors prevailing in those countries and during the cause of project implementation. It also shows that each factor should be taken seriously and treated as of equal relevance. They are, thus, contingency factors and what may be the most important factor today may not necessary be a critical one on the next project or in the near future.

Therefore, the perceived importance attached to a factor by contractors, consultants, clients or even the public should be considered in such a way as to reflect the specific circumstances of the project.

Table 2.3 Different Rankings of Delay Factors due to differences in the Technology in use (Faniran, 1999)

Delay Factor	Ranking (Severity Index)	
	Contractors using quantitative planning techniques	**Contractors not using quantitative planning techniques**
Finance	1(100)	3(60)
Weather	2(85.7)	1(80)
Design changes	3(71.50	9(40)
Equipment failure	4(71.5)	5(60)
Sub-contractors	5(71.5)	6(60)
Material shortage	6(71.5)	2(80)
Labour supply	7(527.2)	4(60)
Contractual dispute	8(42.9)	11(40)
construction errors	9(42.9)	8(40)
Industrial disputes	10(28.6)	7(40)
Off-site fabrication	11(14.3)	10(40)

The Effect of Human Risk Factors

Thevendran and Mawdesley (2003), define human factors as follows: "Individual, project team and organizational factors, which influence the behaviour of people and the climate at work, in a way which can increase or decrease the efficiency of a construction project". They divided human factors into 13 major categories which are labelled core factors. These were further grouped as Positive, Negative and Mixed Factors. They classify human factors affecting construction into three distinct groups:

i. Individual core factors: Capability; Knowledge; Stress; Motivation; Emotional; Culture

ii. Project team core factors: Management; Supervision; Task; Communication and Coordination

iii. Organisational core factors: Policies; Standards; Systems& Procedures.

According to Thevendran and Mawdesley (2003), there is a generic acknowledgement that human factors are unequivocally the single most important element that can affect project performance. Quoting from other sources, they attributed most construction industry disasters to human risk factors, for example, the collapse of the Quebec Bridge (Schaub & Dickison, 1982) and the collapse of Heathrow Express Tunnel (Masurier, 2002). They conclude from Oldfield and Ocock (1997) that about 80% of all project risks may be human related, noting that even the minor effects of human factors can have a substantial contribution to or influence on the implementation of construction projects on a day-to-day basis.

This research observes that apart from issues bothering the natural environment, for example, 'weather', all the above factors that cause low productivity, cost and time overruns, and so on, as listed in tables 2.2 and 2.3, can be related to human risk factors. It is thus imperative that any approach to addressing the problems of project performance and its improvement be related the human elements.

2.5 The Use of Performance Assessment in Ensuring Favourable outcomes

The PMI (2004) recommends five distinct but interrelated project management process groups: *initiation, planning, execution, monitoring* and *closing process groups.* Significantly, the body of knowledge acknowledges that "the integrative nature of the project management requires the monitoring and controlling process group interaction with every other process group (p 40)". In other words, monitoring and controlling is central to project management processes.

Monitoring and controlling is "the process necessary for collecting, measuring, and disseminating performance information, and assessing measurements and trends to effect process improvement" (p 61). When this is done continuously, the body of knowledge suggests, it will provide the project team insight into the health of the project and highlights any areas that require additional attention. The main activities in monitoring and control, according to the guide, include:

- Monitoring the ongoing project activities against the project management plan and the project performance baseline
- Influencing the factors that could circumvent integrated change control so that only approved changes are implemented.

In particular, the measurement and evaluation of performance are central to control posing four basic questions (Shaw, 1999):

- What has happened?
- Why has it happened?
- Is it going to continue?
- What are we going to do about it?

The first question can be answered by performance measurement. The remaining ones will depend on the information from assessing the performance of the project for management to take decisions and actions. The information about what is really happening is vital for the project management team and other stakeholders to determine with considerable certainty what to do. Thus, assessing the performance of project throughout its lifecycle is one of the major ways of achieving the objectives of the project and to ensure better performance. In addition, it is a means of ensuring improvements in executions. Improvements in project execution within a construction industry will them be one of the key indicators of a construction industry of a country. Within the construction sector, mostly in the developed countries, various frameworks exist for the measurement of project success or failure. This also includes which factors are influencing the performance of the projects. The next sections outline some of the common frameworks in literature.

2.5.1. Criteria for Assessing Project Performance

[NB: The criteria in which project success/failure has often been assessed have also been called key performance indicators and even dimensions (e.g. Betham et al., 2004; Atkinson, 1999, Chan and Chan, 2004; Shenhar et al, 2002). These are used interchangeably at this stage of reviewing literature based on how the authors referred to them. However, a uniform definition was adopted for this research as shown in chapter 4].

Several authors, within the multidimensional construct of project performance have proposed different criteria or indicators based on empirical research. While some focused on using these measures as strategic weapons, others emphasised the proper delineation of the measures and groupings into classes that will make tracking and management reasonable.

Shenhar et al's (1996, 1997) model is based on the principle that projects are undertaken to achieve business results and that they must be "perceived as powerful strategic weapons, initiated to create economic value and competitive advantage, and project managers must become the new strategic leaders, who must take responsibility for project business results.". In their opinion, "projects in future will no longer be just operational tools for executing strategy –they will become the engines that drive strategy into new directions." The second premise is about the existence of project typologies, on the slogan "one size does not fit all". They propose that project success should be considered in four dimensions: *project efficiency, Impact on the customer, Business success, and Preparing for the future.* These are to be assessed on the basis of four project types: *Low-tech, Medium-tech, High-tech, and Super-high tech projects.*

Vandevelde et al. (2002) summarized various works on project performance measurement which are based on the multidimensional, multi-criteria concept. In all, they identified seven dimensions: *respect for time, respect for budget and technical specification, knowledge creation and transfer, contribution to business success, financial and commercial success*. They merged these seven dimensioned model into a **three-polar model** namely, *process, economic and indirect poles*.

Atkinson (1999) separates success criteria into *delivery* and *post-delivery* stages and provides a "square route" to understanding success criteria*: iron triangle, information system, benefits (organisational) and benefit* (stakeholder community). The 'iron triangle', has *cost, time* and *quality* as its criteria (for the delivery stage). The post-delivery stages comprise: (i) The Information system, with such criteria as *maintainability, reliability, validity, information quality* use; (ii) Benefit (organisational): *improved efficiency, improved effectiveness, increased profits, strategic goals, organisational learning* and *reduced waste;* (iii) Benefit (Stakeholder community): *satisfied users, Social and Environmental impact, personal development, professional learning, contractors profits, capital suppliers, content project team* and *economic impact to surrounding community*. This model takes into consideration the entire project life cycle and even beyond. It thus lends itself for continuous assessment.

Lim and Mohamed (1999), as reviewed by Chan and Chan, (2004), modelled project success measurement into '**micro viewpoint:** *completion time, completion cost, completion quality, completion performance, completion safety;* and **macro-view** points: *completion time, completion satisfaction, completion utility, completion operation*. A key feature of this model is that it proposes only lagging indicators and gives no room for continuous assessment and monitoring. Below each view point are list of "factors" for measurement.

Chan and Chan (2004) concentrated on construction projects, and, based on previous works (particularly of Shenhar et al 1997; Atkinson, 1999; and Lim and Mohamed, 1999), proposed a 15 key project indicators, key performance indicators (KPIs), comprising both objective measures: *construction time, speed of construction, time variation, unit cost, percentage net variation over final cost, net present value, accident rate, environmental Impact assessment (EIA) scores;* and subjective measures: *quality, functionality, end-user's satisfaction, client's satisfaction, design team's satisfaction, construction team's satisfaction.*

Patanakul and Milosevic (2009) grouped their measurement criteria into three: (i) criteria from organisational perspective: *Resource productivity, Organisational learning* (ii) criteria from project perspective: *time-to-market, Customer satisfaction* and (iii) criteria from personal perspective: *personal growth, personal satisfaction*.

Sadeh et al (2000) proposed a division of project success into four dimensions. These are: *Meeting design goals, benefit to end user, benefit to the development organisation, benefit to the defence and national infrastructure*, in that order. Finally, Freeman and Beale (1992) provided *technical success, efficiency of project execution, managerial and organisational success, personal growth, completeness, and technical innovation* as the main success criteria. Figure 2.4 is a summary of the proposed measures discussed. In effect, these authors are emphasising the need to strategically assess project in dimensions that will facilitate its management for good performance. Taking from the often quoted adage of performance management: "if you cannot measure, you cannot manage", it is also true that: if you cannot measure appropriately, you cannot manage appropriately. Table 2.4 summarises the key areas being addressed by these authors.

In a related research, Beatham et al (2004) describe various sets of key performance indicators existing currently following the Latham Report (2004) and the Egan Report (1998) as shown in table 2.5. A significant point to note is that each of these performance measures is made to specifically focus on an aspect or a component of the industry.

Table 2.4 Summary of Multi-measures for Assessing Project Performance

Freeman & Beale (1992)	**Lim and Mohammed (1999)**	**Atkinson (1999)**	**Sadeh et al., (2000)**
Technical success, efficiency of project execution, managerial and organisational success, personal growth, completeness, technical innovation, commercial, manufacturability	Completion time, completion cost, completion quality, completion performance, completion safety; completion satisfaction, completion utility, completion operation	Cost, time, quality, impact on customer, business success, benefit to many stakeholders involved with the project (users, customers, project staff, contractors and so on) Benefit to the organisation : (improved efficiency and effectiveness, increased profits and soon), the information system:(maintainability, reliability and son)	Meeting design goals, benefit to end user, benefit to the developing organisation, benefit to the defence and national infrastructure, overall success
Shenhar et al., (1997; 2002)	**Vandevelde et al., (2002)**	**Chan and Chan (2004)**	**Patankul and Milosevic (2009)**
Project efficiency, impact on the customer, business and direct success, contribution to business, future perspective	Respect for time, respect for budget and technical specification, knowledge creation and transfer, contribution to prestige, respect for innovativeness, contribution to business success, financial and commercial success	Quality, Functionality, End-user's satisfaction, client's satisfaction, design team's satisfaction, construction team's satisfaction, construction time, speed of construction, time variation, unit cost, Percentage net variation over final cost, Net present value, accident rate, environmental Impact assessment (EIA) scores.	Resource productivity, Organisational learning, Time –to-market, Customer satisfaction, personal growth, personal satisfaction.

Table 2.5 Performance Measures Launched by Organisations in UK construction Industry (Source: Beatham et al., 2004)

Name	*Indicators*	Focus
The Construction Best Practice Programme (CBPP) construction industry KPIs	Client satisfaction –product and service, profitability, productivity, defects, safety, predictability – time and cost, construction time and construction cost (for 1998) [*by 2000, CBPP has 38 KPIs classified within seven criteria: time, cost, quality, client satisfaction, change orders, business performance and health and safety*].	The construction industry sector
The Association of Consulting Engineers (ACE) consultants KPIS (2001)	Clients satisfaction –overall performance, value for money, quality, time delivery, health and safety awareness, training, productivity, and profitability	The construction industry sector
Respect for People (RFP) KPIs (2002)	Employee satisfaction, staff turnover, sickness absence, safety, investors in people, working hours, pay, training, diversity and travelling time	People
The Construction Industry Research and Information Association (CIRIA) (2000)	Understanding clients needs, design process, integration of design with supply chain, internal cost/time management, risk, re-use of design experience, innovation and client/user satisfaction [these are criteria under each of which is about five to eight indicators]	Self-assessment in design organisations
The Major Contractors Group (MCG) Benchmarking Club	Mobilisation period, predictability –construction cost, change orders –co value/weeks to date, change orders – co value/contract cost, no. of snags at practical completion, no. of defect during defect liability period and accident frequency period.[now stopped]	Project
Design Quality Indicator (DQI)	A questionnaire-based measure using a range of indicators under three main headings: build quality, functionality and impact.	Assessing design quality of buildings
Satisfaction of service (SoS) KPIs	Cost management and reporting, programme management and reporting, planning, flexibility, communication, team working, innovation, managing the environment, managing safety and after care service.	Customer focused

2.5.2 Factors that Influence Performance

The factors that influence the success/failure of the project have received similar attention from a number of authors. Also referred to as critical success factors, the researchers have been focusing on the product, project or business unit level (Dvir et al, 1998). The classical proposition is that organizations must develop a set of strategic strength areas that are important to the environment and industry in which they operate. With reference to Pinto and Kharbanda (1996), Torp et al (2004) agrees that identifying critical success factors and potential pitfalls in project at the front-end (knowing beforehand as much as possible and how to respond) will help project teams to minimise fire fighting, intuitive and ad hoc approach in managing uncertainties. Several others have developed various frameworks for success factors, mostly highlighting project management in general (Sayeles and Chandler, 1971; Martin, 1976; Baker et al, 1983; Celand and King, 1983; Hughes, 1986; Morris and Hough, 1987; Pinto and Slevin, 1987; Tukel and Rom, 1995, Pinto and Kharbana, 1995; Belasi and Tukel, 1996). These works, together with Mengesha's (2004) influenced Torp et al.'s (2004) observation that there is gradual shift in focus over time from purely technical issues towards organisational and management issues. Significantly, they identify progressive emphasis on such issues as *top management support, organisational issues, stakeholder management, coordination* and *human relations.* They established from the case study evidence that there is a relationship between critical success factors and potential pitfalls in the projects; that lack of critical success factors are considered potential pitfalls and vice versa. This is in line with De Wit, (1988) that "the presence of critical success factors does not guarantee success but their absence is likely to lead to failure". Table 2.6 is a compilation of the success factors based on Torp et al. (2004) and Belasi and Tukel (1996).

In their contribution Shenhar et al (2002) propose that "different factors influence the success different kinds of projects and that future scholarship of project management must adapt a more project specific approach to identify the exact causes of project success and failure". Based on information collected on 127 projects executed in Israel, they identified three different types of success factors: *factors which are independent of the project characteristics, factors which are solely influenced by uncertainty* and *factors which are solely influenced by scope*.

Belassi and Tukel (1996) provided a framework for grouping project performance factors (they called them success factors) into factor groups under each of which are several other factors which are viewed as the indicators for measuring a particular factor group. These are: *factors related to the project, the project manager, the project team, the clients' organisation* and *the external environment,* In addition, the provided an intermediate set of factors called *system response* (Table 2.7). The strength of the framework lies in the fact that it opens itself up to several other factors that could be relevant based on the context of the project. In addition, it shows that with the five factor groups appropriately distinguished, one can even expect an entirely different set of factors under the groups. This provides a means by which Shenhar et al's (2002) position of looking at success factors as contingency factors could be appropriately considered. Belassi and Tukel (1996) also spoke of their framework helping project managers to understand the intra- relationships between factors in different groups. Shenhar et al (2002) acknowledge this in their work with reference to Murphy et al (1974), who, in their study of 646 projects, used path analysis to show that success factor influence each other. In relating to this position, the scope of this research covers the linkage between the identified factors and the indicators of assessment. It, however, supports the argument that to be successful in achieving the goals of enterprise project management, performance measurement, and thus management, should of necessity identify the linkages and interactions between factors-factors, factors-measures that exist in the system surrounding the project. In this regard, it could be possible to deploy effective project management through the project as a temporary organisation and also to ensure good monitoring and controlling of those critical factors that could impact on the project performance in identifiable criteria. In conclusion, this researcher adopts the framework of Belassi and Tukel (1996) in inquiry into the relevant factors that affect project performance in Ghana.

Table 2.6 Selected Summary of Critical Success Factors from literature (Based on Belasi and Tukel, 1996; Mengesha, 2004 as quoted in Torp et al., 2004)

Source	**Critical Success Factors (CSFs)**
Sayles & Chandler, (1971)	Project manager's competence; scheduling; control systems and responsibilities; monitoring and feedback; and continuous involvement in the project
Martin (1976)	Clear goals; selection of project organizational philosophy; general management support; organize and delegate authority; and selection of project team
Baker, Murphy and Fisher (1983); Empirical	Clear goals; goal commitment of project team; on-site project manager; adequate funding to completion; adequate project team capability; accurate initial cost estimates; minimum start-up difficulties; planning and control techniques; task-social orientation; and absence of bureaucracy
Cleland & King (1983)	Project summary; operational concept; Top management support; Financial support; logistic requirement; facility support; market intelligence; project schedule; executive development and training; manpower and organization; acquisition; information and communication channels; and project review
Morris & Hughes (1987)	Project objectives; technical innovation uncertainty; politics; community involvement; schedule duration urgency; financial contract legal problems; and implementation problems
Pinto & Slevin (1987)	Project objectives; top management support; project planning; communication with client; human relations; technical tasks; client acceptance; project control; communication and problem handling
Pinto & Khabanda (1995)	Mission at the forefront; early & continuous client consultation; technology; scheduling system; project team; top management support and continual 'what if?' approach.

Table 2.7 Performance Factor Groups (from Belassi and Tukel, 1996)

Performance Factor Groups	Factors
Factors relating to the Project manager	Ability to delegate authority, ability to trade-off, ability to coordinate, perception of his role & responsibilities, competence, commitment
Factors relating to the Project Team members	Technical background, communication skills, trouble shooting, commitment
Factors relating to the Project	Size and value, uniqueness of project activities, density of a project, life, urgency.
Factors relating to the organization (firm)	Top management support, project organisational structure, functional managers' support, project champion
Factors relating to the external environment	Political environment, economic environment, social environment, technological environment, nature, client, competitors, sub-contractors.

2.6 Problems with Existing Performance Assessment Models

Despite the existence of several assessment models meant to ensure improvements in project performance, several authors have found some short comings with them and expressed the doubt whether the true objective of assessment would be achieved. This has to with the measures in use, the paradigm within which they are being considered, and the nature of the models.

2.6.1 The Problems with the success/failure definition

A major problem found with the present paradigms of project performance measurement is the lack of consensus on what constitutes success or failure of the project. Various authors have expressed concern about the definition of success and failure. Quoting from Morris and Hough (1996), Murray et al, (2002) indicate that the definition of a success or failure of a project is not always an easy one. Project management theories have not always agreed on a universal definition of what is meant by a project success (Pinto and Slevin, 1988; Shenhar et al, 2002). Consequently, the factors causing success (or failure) have been similarly defined in restricted dimensions by various authors.

Murray et al (2002) notes from literature that projects are often termed a technical success despite being behind schedule and over budget. Conversely, projects may be ahead of

schedule and within budget but still be a technical failure. This position is corroborated by Willard (2005) who provided the following examples showing the various means by which success have been declared (Table 2.8).
Within a certain context, Ludin and Söderholm (1995) comment that a project could be considered a success in the sense that it has successfully passed through all the sequences of the standard stage: *concepts, development, implementation and termination.* Notably, Murray et al (2002) reiterated Morris and Hough's (1987) discussion as to whether one should study project successes and failure. "To some extent", they conclude, "it would seem that Murphy's Law is at work: *'what can go wrong will go wrong'* ".
In their contribution, Klakegg et al (2005) acknowledge this lack of consensus on what success is and how to measure it as a fundamental but often unresolved issue in investment projects. They opined that "success is to apply the right amount of result amount of resources to do the right things at the right time". Significantly, they admit that what the right thing may be, for government projects, is for the decision makers to agree, and should reflect relevant needs in society as expressed for instance in public international agreements.
One of the results of this disagreement is the inherent assumption that the two are dichotomous. That a project either ends up successfully or it failed. This thesis sees a problem with this success/failure dichotomy of a project and proposes that with regard to construction projects, success or failure should not always be considered in absolute terms, especially, when using multi-measures to assess a project. There is, therefore, the need for a paradigm shift in the basic assumptions underlying project assessment, especially, regarding construction. This issue is further discussed in chapter 3.

Table 2.8 Different ways of declaring project success and Failure [Woodward (2005) as quoted in Willard (2005)]

Project	**Project Management Evaluation**	**Project Management Assessment**	**Use Assessment**
Sydney Opera House	10 years time overrun, $93 Million cost overrun	Failure	Success; due to its iconic position
2002 Olympic Winter Games	Turn a $100million deficit into $400 million surplus by securing additional funds	Success	Success; due to Profitability
Batu Hijau Copper Concentrator	$100 million under budget, 1month ahead of time	Successful	Success; Faster ramp-up than expected, producing cash flow exceeding 200% of budget within a year after star-up.
Project Orion	Well managed	Success	Failure; stock price fell since its introduction based on wrong market speculation

2.6.2 Problems with the Performance Assessment Procedure

Despite the promise performance assessment hold for improving project performance, certain problems have been identified with the present procedure being used. This has to do, especially, with the kinds of measures being used, the models not designed to be part of an assessment system and the minimum attention given to clients.

Problem with the Kinds of Measures in use

A problem with the various models is that most of the measures are only capable of reporting on performance after they have occurred. According to Beatham et al. (2004), a conference of leading representatives from an array of design and construction companies note that a major problem with the Key Performance Indicators (KPIs) of the Construction Best Practice Programme (CBPP) was that they do not offer the opportunity to change; and that they are designed as a post results, “lagging” KPIs. A closer observation of the other KPIs discussed reveals a similar situation (BQF/CPN, 2001). Beatham et al. (2004) describes two variants of KPIs as measures of assessment under “lagging” or “leading” measures: key performance outcomes (KPOs) and *perception measures*. KPOs could be used to assess sub-process and give indications for change in the next sub-process. In this way they could be considered as leading indicators. Perception measures can be used at any stage and can be leading or lagging measures. For example, if client satisfaction is measured after completion, it is considered a lagging measure. However, if client satisfaction is measured at various stages during the project, then it is a leading measure. Parmenter (2007) chose to designate them as *key results indicators* (KRI): which tells you how you have done in perspective; *Performance indicators*: which tells you what to do; and *Key performance indicators* (KPI): which tells you what to do to increase performance dramatically. Of calling them *lagging* and *leading* measures he prefers to consider them as *past -, current* – and *future* measures. Clearly, the nature of construction project execution indicates that little improvement can be obtained from measures that give “post- mortem” reports. This problem is directly linked with the lack of consensus on what project success is and when it should be determined. If current and leading measures are used, it indicates a continuous progressive assessment of project which offers opportunity for improvement. If lagging measures are used it indicates that the project is completed before we know of its status. Hence, Pinto and Slevin (1987) propose that because of the difficulty in accurately deciding when projects ‘success’ should be determined, the project manager would be advised to make periodic assessment throughout the project’s life...... as practical method to monitor project success”. In related development, van Egmond (1999) asks whether the “required targets of the construction output quantitatively and qualitatively are being reached in reality”.

With regard to the success factors, Shenhar et al. (2002) showed that a major problem with research on critical success factors is the universalistic approach being used, assuming that all projects is made of a universal set of functions and activities. Further, their analysis indicated

that the list of project success factors varies with project type, and that project managers must carefully identify those factors that are critical to their particular project. Hence they conclude that "project success factors are indeed contingent upon the specific project type –that is, the list of project success factors is far from universal".
The fact that differences exist in the factors that causes delays and cost overruns across various countries, and the fact that where similar factors are found to exist they are known to impact differently on time and cost show the contingent nature of critical success factors. Shenhar et al. (2001) summarised this in the statement: "one size does not fit all". This also calls for a shift from the Universalist approach to project measurement to a contingency-based approach.

The Models are often not a part of a Performance Measurement System

Another problem identified is the fact that performance measures are often treated in isolation by most of the models. Research has not linked the factors of "success/failure" to the criteria (Dvir et al., 1998; Shenhar et al., 2002, Takim & Akintoya, 2002), hence it has not been easy determining, predicting or influencing project performance during the construction phase of the project. In particular, Takim and Akintoya, (2002) highlights this as a gap in addition to the need to assessing performance of stakeholders throughout the project phases. In construction projects, this gap has prevented construction project performance measurement to be considered as a complete system. According to Beatham et al. (2004) performance measurement must be part of a system, which reviews performance, decides on actions and changes the way in which business operates. A difficulty in effectively ensuring the required changes across the project stages may exist if the present state of indicators cannot be related to a specific factor or factors influencing them. Mian et al. (2004) with specific reference to construction, maintain that as the factors that affect the health of the human body needs to be monitored and controlled for good health, so must those critical success factors that affect the project "health" be treated. To do so requires an effective way of linking the factors to the "symptoms" (criteria and indicators) of the project health. There is thus the need to go beyond the development of stand-alone models of KPIs or CSFs into creating a holistic system of assessment in which the KPIs are linked with the CSFs.

"Clients Satisfaction" Measurements is limited in scope and Function

Another problem is that most of the performance measurement models discussed above which referred to clients or customers refer only to client satisfaction, customer satisfaction or end-user satisfaction (see Tables 2.4 and 2.5). Such measures render the client role in the project execution passive. This is in contrast to recent developments in construction where the client is seen as initiator of improvement, innovation and even, sustainable construction. However, the relative important role played by the client in the implementation process of a project has been well acknowledged (Bennet et al, 1988; Latham, 1994; Yisa et al, 1996). The performance of the project throughout the phases is to a large extent the function of the client's disposition towards it. This is because the client may, in the course of the project (a) ensure consistent funding (a) delay funding (c) divert funding or (d) stop funding altogether, causing delay or abandonment of the project. In other cases, the client could have inconsistent and erratic wishes authorizing variations here and there throughout the project life to the great frustration of consultants, the project manager and the contractor. The appointment of a consultant and subsequently, a contractor is, thus, by no means a foregone conclusion.

With regard to improvements required in the industry, Latham (1994 p4) emphasised the need of the government as a client to "deliberately set out to use their spending power…… to assist the productivity and competitiveness of the industry, in addition to obtaining value for money generally in the long term". In addition, he proposes that a government department "should take the lead to ensure best practice and drive for improvements are implemented throughout the public sector...", and also, that leading clients "have a substantial role to play in setting demanding standards and insisting upon improvements". " Ultimately", he continued, "they have the most to gain from ensuring the implementation of best practice". Yisa et al. (1996) note that public clients are gaining more autonomy in project execution and are placing emphasis on *speed, value-based services* and *cost-time-quality* performance for a particular project. This implies that clients are also concerned about development satisfaction, not completion or use satisfaction alone. This indicates that their involvement in the building process is increasing.

If such roles are attributable to the modern client, it calls for an assessment that goes beyond a mere client satisfaction as is being considered –it requires the assessment of a whole perspective of the client of project performance as represented by a number of criteria and indicators. In other words, client satisfaction, if it will have to be considered, should be a declaration by the clients after they have considered the achievements of all the criteria and indicators that represent their perspective of project performance at the appropriate stage of the project. Not by practitioners or consultants.

Another reason for having a different focus on clients in assessing performance has to do with the different types of clients existing in the construction industry. For example, Melville and Gordon, (1983 pp 8-16) identified six kinds of clients. These are: (i) the individual client *(ii)* the committee cli*ent*: *For example*, *sports clubs, tenants associations, charitable or religious organisations*; (iii) the company client: *the Lay and the Informed or Expert*; (iv)the local authority client: acting for and on behalf of the government; (v) the central government: *Most of the capital investments in a developing country are undertaken by the central government* (Ofori, 1999 &2001); and (vi) nationalised institutions of the government. In another research, Mbachu (2003) categorises clients into two broad bases. One is based on characteristics of the client system: nature of organisational entity, source of project finance, construction industry experience, level of knowledge of the construction industry, frequency of project development, complexity of client organisation, type of business activities, purpose group of buildings mostly procured and procurement interests. He grouped these into three distinct classification based on the nature of clients: public, individual (Private), and

Corporation clients. The second one is needs-based categorisation of clients: similarity of overall needs preferences and development needs preferences. Mbachu (2003) notes two categorisation of clients' needs: observable (latent) and observable (stated and non-stated but expected) needs (Mbachu, 2003 pp 38-40). By way of synthesis from the foregoing, it is possible to propose a model by which a typical client in the construction industry could be identified according to which of the parameters is applicable to them. This goes to prove that all clients are not to be treated the same way regarding what gives them satisfaction: a client is not just a client. Figure 2.2 illustrate the identification of a typical client in the industry according to their needs and characteristics. By this model it also possible to appreciate that the client type could be categorised differently based on the present needs and characteristics. The obvious differences that distinguish one from the other inevitably will lead to each of them having a peculiar way of looking at project performance, have different expectations, and hence a different perspective. Identifying this perspectives and meeting the specific expectations is what can account for their true satisfaction. The foregoing illustrates that the assessment of client satisfaction as a criteria is simply inadequate in reflecting their true needs, expectation and functionality. Supporting this view, Ryd (2004) pointed out that a "good understanding of the 'client's situation'" –"which demands effective means of working within the construction and management processes" –is the "basis for being able to satisfy the needs of the client". Hence Hill et al. (2007) propose the creation of a "shared mind" or "shared vision". Applying this to the present situation would mean a developing a "participatory model" (Kennedy, 2003) in which both the perspectives of the now "active-Client" and the Practitioners will be represented to ensure a better assessment of the performance of the project to facilitate comprehensive project management and real client satisfaction.

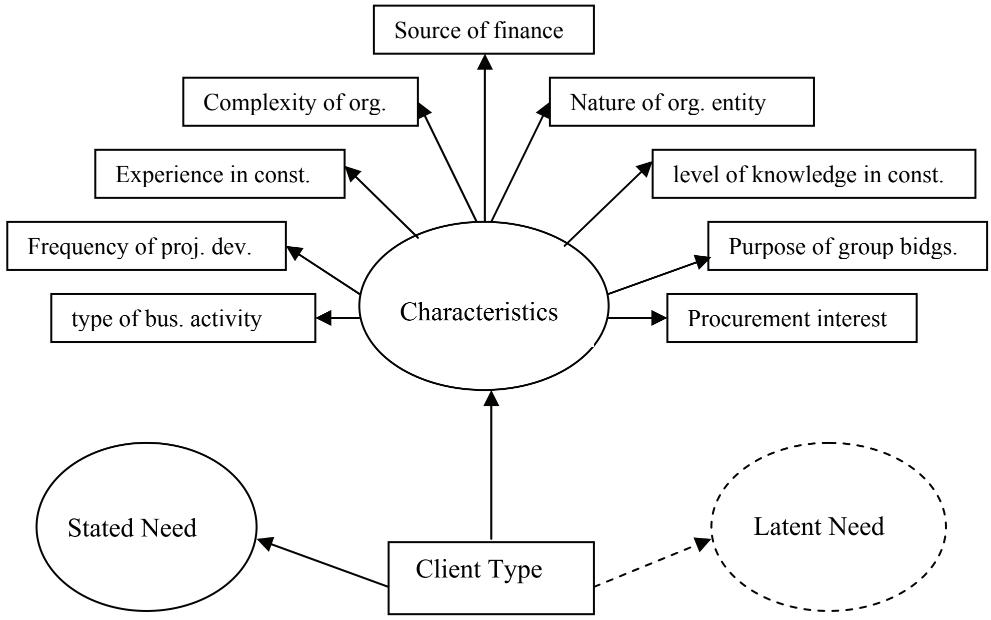

Fig. 2.2 A Model for Identification of clients according to Needs and Characteristics
(Based on Melville and Gordon, 1983; Mbachu, 2003)

2.6.3 Summary

The above discussions have shown that the construction industry everywhere needs to take a deliberate effort to improve its performance and develop. Researchers have shown that performance assessment provides a means of improving performance. The position of this thesis is that this could be better achieved if efforts are made to identify the component parts of the industry and focus on the improvement on each part so that the sum of the parts will represent the whole. Focusing on project as a key component of the industry, problems militating against project performance in several countries, especially, developed countries were reviewed. In addition, the role of performance assessment in addressing these problems was highlighted. Later, problems with the models of performance assessment were also discussed. Specifically, the following have been discussed in this chapter:

i. That construction industries across the world (particularly, in the developed countries) have seen the need to take deliberate steps to improve and develop.

ii. That developing countries need to do the same.

iii. The discussion have also pointed out that the best way to ensure the goal of improvement in the performance of the industry everywhere is to decompose the industry into its component parts and focus on the performance improvements of the component parts of the industry.

v. In addition, the industry should be considered as a system at three levels (the system, the sub-system and the super-system) so that the behaviours and the significance of the intra-level and inter-level interactions can be studied.

iv. The research focus on project as a key component of the industry and a sub-system of the industry. It considers the project as a temporary organisation so that existing theories of the organisation could be applied to the project situation.

v. The common problems of project execution in the construction industry across the world, particularly in the developing countries, are well discussed. These are mainly low productivity and failure to meet set targets.

vi. Following the acknowledgements of these problems, performance assessment of the project is considered as one the means to ensure that events conform to plans, and to promote improvements in project performance. The existing literature on models highlighting the measurement paradigms and types of measures were discussed.

vi. Problems of the existing models are identified, namely, the types of measures used, the fact that the models are not made to be part of an assessment system and the fact that clients perspective are not considered.

The last part of this chapter is devoted to the Ghanaian construction industry and its relationship with the on-going discussion.

2.7 The Ghanaian Construction Industry

Typically, a construction industry of any country could be seen as having two main sets of features which make it unique from all others. The first one is the peculiarity of the construction industry which distinguishes it from other industries. The second being the peculiarities of each country’s construction industry as defined by its socio-economic level, technological level, culture, institutional and legal frameworks. The first one has been generally addressed in the preceding sections. This section, therefore, focused on the second aspect. It discusses the set-up of the industry, its project execution situations and how efforts are required at improving performance through systematic measurement and management.

2.7.1 The Construction Industry Set-up

The key stakeholders in the construction industry in Ghana are clients, professional consultants and contractors.

Clients

In Ghana four main clients are distinguishable: the Government (being the major client), Real Estate Developers, Investors and Owner occupiers. Between 2000 and 2008 the government of Ghana identified construction as a priority sector for foreign and private investment as part of its vision to promote the private sector as the engine of growth. According World Bank (2003) as provided by Anvuur and Kumaraswamy (2006), an approximate annual value of public procurement for goods, works and consultant services amount to US$600 million. This represent about 10% of the country's GDP. This amount forms part of the bulk of the expenditure of all government agencies, namely, the Ministries, the Assemblies, Departments, Institutions and other agencies. Procurement of contracts must strictly follow the rules and regulation of the national procurement law as stipulated in the Procurement Act, 2003 (Act 663). The main procurement arrangement is the traditional competitive bidding. The government as a client is represented by the Ministry of Road and Transport (for road works) and the Ministry of Water Resources, Works and Housing in giving out projects.
The Real Estate developers are also the other group of clients who undertake large investment in building. Usually, these take loans and undertake speculative buildings for sale. Their performance is usually influenced by the lending situations in the country. An interview with the head of the Ghana real estate developers association (GREDA) in 2007 revealed that they expect extra assistance from the government to support them in their quest to contribute to solving the housing problem in the country. In particular, they expected the government to have involved their association in its on-going affordable housing programme. Investors are usually financial companies who decide to invest excess capital in building construction. The social security and national insurance trust (SSNIT) is one of the leading investor in housing in Ghana. Owner occupiers are individuals who decide to build heir houses to live in. It has been the tradition of Ghanaians to buy lands from the chiefs (the chiefs are the custodians and owners of land in Ghana, not the government) and hire skilled workers to build their houses for them. This tradition has been entrenched mostly because successive governments failed to meet the housing expectations of individuals. Some of these owner occupiers also rent out extra rooms in their houses for income. Therefore, some of these owner occupiers are able to progress to the level of being private investors. The owner occupiers, thus, constitute the largest number of clients in Ghana –almost every Ghanaian is a potential owner occupier. They, usually, do not engage professional consultants.

Professional Consultants

Professional consultants who are regularly engaged by the government and other clients are Architects, the Quantity Surveyors (QS), Geodetic Engineers (GE), Structural Engineers (St.E), Electrical Engineers (EE) and Services Engineers (SE). Geodetic Engineers are often called when it is about roads construction. All these professional are regulated by their professional institution, namely, Ghana Institution of Architects (GhIE), Ghana Institution of Surveyors (GhIS) for the QS and GE and (GhIE) for the rest respectively.

Contractors

Contractors in Ghana are grouped into eight categories (A, B, C, S, D, K, E and G) according the type of works they undertake. These are (i) Roads, Airports, and Related Structures (A); (ii) Bridges, Culverts and other Structures (B);
(iii) Labour based road works (C); (iv) Steel bridges and structures: construction rehabilitation and maintenance (S); (v) General building works (D); (vi) General civil works (K); (vii)Electrical works (E); and (viii) Plumbing works (G). In each category, they are grouped into 4, 3, 2 and 1 financial classes in increasing order (Vulink, 2004). In addition, Dansoh (2005) notes a combined category of AB for road contractors. According to Dansoh (2005) Class 4 contractors can tender for contracts up to $75,000; class 3 up to $200,000; class 2 up to $500,000. Class 1 take contracts of all amounts.
The research focused on projects undertaken by category D contractors, together with categories E and G being usually engaged as sub-contractors to this main contractor for general building works. Categories E and G contractors act as main contractors when the work is of a specialised nature. The industry is dominated by large number of small- and medium-sized firms, that is, classes 3 and 4, especially in the categories D groups, E and G. This is mainly because such firms are able to register with as little equipment as possible. Mostly, they are sole proprietors, (few cases of partnerships), and are characterised by high attrition rate. This is because they are highly influenced by the boom and slum nature of the industry in Ghana. They are the least organised and because they lack the resources to employ and retain very skilful labour, their performance is usually below expectation and they have often by accused of producing 'shoddy' works. Because there are often more jobs within their financial class than those above their limits, and because they form the largest group, their performance impacts greatly on the performance of the industry. Because of this, the classification by the Ministry has been criticised as being too general and obsolete with the registration criteria, list of contractors and monetary thresholds not regularly updated (Eyiah and Cook, 2003; World Bank, 1996).
The two upper classes (D_1 and D_2) are more organised and hence more stable, taking on both bigger and smaller works. However, these firms (especially the D_2 firms) do not always employ the very qualified workers. The Ghanaian-based foreign contractors are able to do this and hence performance better. Vulink (2004) notes that because of the poor performance

of Ghanaian local contractors most of the nation's major projects are usually awarded to foreign contractors. Assibey-Mensah (2008) attributes this to the "non-businesslike culture" with which indigenous firms operate in Ghana.

Construction Procurement

Following the procurement law, construction activities in Ghana (government projects) are organised essentially as a tripartite arrangement between the client, professional consultants and the contractor. The clients, upon taken a decision to build, calls on the chief consultant, usually, the Architect and the other consultants. They provide professional advice to the government during the briefing stage. They then provide design, appoint the qualified contractor, supervise the execution and advice for payment and finally, conclude the project. Table 2.8 describes the usual process of project procurement in Ghana using the traditional system.

Table 2.9 Procuring a Public Construction Project in Ghana

Stakeholder	**First Action**	**Second Action**	**Third Action**	**Fourth Action**	**Fifth Action**
Client	Conceptualise	Initialise	* * * * *	* * * * *	Use the product
Practitioners (consultants)	* * * * * *	Design client's concepts	Manage the project	Manage the project	* * * * *
Contractor	* * * * * *	* * * * * *	Execute the project	Complete the project	* * * * *

* Stakeholder has no active role here.

This has meant that after the initialisation stage the client's role is often limited to expecting the finished product. The consultants, led by their team leader (usually, the Architect, Quantity Surveyor or Civil Engineer depending on the project, or project manager where applicable) traditionally become not only the managers of the project ensuring that the right thing is done by the contractor but also the sole judge assessing and giving the verdict as to the state of performance and satisfaction of the project to the client.

2.7.2 Problem in the Ghanaian Construction Industry

Reviewing the works of Crown Agents (1998) and Westring (1997), Anvuur and Kumaraswamy (2006) the performance of the construction industry in Ghana is poor saddled with several problems ranging from contract administration, through complex and lengthy payment procedure, delayed payments to that of project execution. Table 2.9 summarises the myriad of problems they noted and their sources. It is noteworthy that clients' delay in payment to service providers (contractor and practitioners) also affects payments of salaries and wages of their staff. This is because sometimes this delays run into several months and thus, these employers find it difficult to continue paying their staff. The unskilled labours of the contractors form the largest group and the lack of guaranteed income, despite their commitment to work, shows an unpleasant side of the industry that is seen as one of the largest employer of labour. Because of the representation of construction workers in the working population of the country, such situation reflects on the socio-economic life of ordinary Ghanaians. The reverse is also true. This could be likened to a period of freeze on government projects. To some extent, in Ghana, there are practical reasons to subscribe to the argument that construction industry is a regulator of the economy Ashworth (2004).

Table 2.10 Problems Militating against the Performance of Ghanaian Construction Industry (Based on Anvuur and Kumaraswamy, 2006)

Authors	Problem	Causes
Westring (1997)	Delays and cost overruns	Extensive post-award negotiations, delays in the preparation of technical specifications and drawings, delays in evaluation, an extensive system of controls, reviews and approvals, and land ownership disputes,
Westring, 1997; World Bank, 1996;2003	poor quality	Service providers cutting corners to limit losses or abandoning the work altogether.
Eyiah and Cook, 2003; Westring, 1997	Delays	Long process of payment to contractors and suppliers – "over thirty steps from invoice to receipt of payment cheque", over-centralised.
World Bank, 1996; 2003	Insecurity of funding for projects	Fiscal constraints and poor procurement practices resulting in delayed payments and arrears to contractors and consultants; accumulated interest on late payments and the frequent price changes due to extensive renegotiation; difficulties by contractors and consultants in processing claims
Dansoh, 2005; Westring, 1997.	Contractual and procurement issues	Lack of respect for contract with neither party expects contracts to be fully binding; ad hoc approaches to economic-sizes project; difficulties in long-term strategic planning by contractors; poor monitoring and control of procurement.

2.7.3. Addressing the Problems

Most of the above corroborates the finding of Frimpong et al's (2003) works on Ghana as documented in Table 2.2. In essence, there is not much difference between the problems militating the Ghanaian construction industry, regarding project execution and performance, and those of other developing countries. The main difference, however, is that Ghana is yet to take the necessary steps to address the problems.

As discussed above, the UK construction industry, following the Latham (1994) and Egan (1998) report, responded to the challenges posed by the situation by using measures to address the problems in specific areas of the industry. According to Ofori (2000) several other countries have also made some deliberate attempt to improve their construction industry. They have formed dedicated agencies to administer the continuous improvement of the industry. Examples of these are listed in Table 2.9.

Table 2.11 Agencies formed to administer continuous improvement in various countries (Based on Ofori, 2000)

Country	Agency	Long-term plans
UK	The Construction Industry Board (Industry Initiative)	Latham, 1994; Egan, 1998
Malaysia	Construction Industry Development Board	
Sri Lanka	The Institute Of Construction Training And Development	
Tanzania (Miles and Neale, 1991)	National Construction Council Of Tanzania	
Singapore	Building Construction Authority	Construction 21 Steering Committee
Hong Kong	-	
Australia	-	Australian Procurement and Construction Council, 1997
Southern African Countries	-	Formation of construction industry development agencies to co-ordinate efforts and pool resources where necessary.

The Norwegian 'Quality-at –Entry' Regime

The approach by the Norwegian government in ensuring good project implementation is giving special consideration at this stage because of the lessons that can be learned and also because of its implications for this research. In the year 2000, the Norwegian Ministry of Finance introduced a mandatory quality scheme called "Quality-at-entry regime" (2004; Klakegg et al., 2005; Samset et al., 2006). This was to address the frequent cost overruns in public investment projects (Torp et al., 2004). The scheme involves the prequalification of external consultants to perform quality assurance of large public projects, that is, those exceeding Euro 60million (Klaggeg et al., 2005). In parallel, the ministry initiated a research program designed to study the effects of the regime and focus on front-end management of major public projects. In 2005, the regime was revised and extended to include two separate analyses:

1. Quality Assurance of the choice of concept (QA1): This is aimed at helping to ensure that the choice of concept is subject to a political process of fair and rational choice (Samset et al., 2006). As a basis for decision the responsible ministries are now required to explore at least two alternative concepts in addition to the zero alternative (doing nothing) by preparing the following documents:

- **"Needs analysis** that would map all stakeholders and affected parties and assess the relevance of the

anticipated investment in relation to their needs and priorities.

- **Overall strategy** that should specify on this basis consistent, realistic and verifiable immediate and

long term objectives.

- **Overall requirements** that need to be fulfilled, for instance functional, aesthetic, physical, operational

and economic requirements.

- **Alternatives analysis** that defines the zero-option and at least two alternative concepts, specifying

their operational objectives, essential uncertainties, and cost estimates. The alternatives should be
subjected to a full socio-economic analysis. (Samset et al., 2006)".

The consultants' role is restricted to reviewing the professional quality of underlying documents constituting the basis for decision (Klakegg et al., 2005; Samset et al., 2006). Based on the consultants review, the Prime Minister's Office takes a decision based on two main considerations: whether the project is worth planning (If not, it is terminated), and which alternative concept should be chosen, If it is worth planning.

2. Quality Assurance of the Cost Estimate (QA2): This is the basis for control and management of the chosen project performed at the end of the pre-project phase. The aim is to provide the responsible ministry with an independent review of decision documents before Parliamentary appropriation of funds. "This is partly a final
control to make sure that the budget is realistic and reasonable, and partly a forward-looking exercise to identify
managerial challenges ahead (Samset et al., 2006)".

According to Torp et al (2004), one part of this quality assurance scheme is identification of critical success factors (CSF) and Potential Pitfalls early during the front-end assessment. The external consultant is expected to point out these, among other things, to help achieve the following objectives:

i. To minimize surprising variations during project implementation.

ii. To help project teams to minimize fire fighting, intuitive and ad hoc approach in managing uncertainties and changes encountered during project implementation (drawing from Pinto & Kharbanda, 1996).

iii. To ensure successful project completion. They believe that there are certain major factors whose influences are considerable to project performance such that, taken them into consideration at the planning stage will enhance the successful completion of projects.

2.7.4 Implications for Ghana

Indications are that there is no indication that Ghana has acknowledged the severity of the problems confronting its construction industry, let alone addressing it. Alluding to this, Ahadzie (2009) called for the need of construction industry development agenda (CIDA), making specific reference to how CIDA objectives have helped some major countries. Clearly, the thesis supports the call for such an agenda, and posits that any efforts at bringing about developments in the Ghanaian construction industry should be linked with improvements in project execution and performances. This is because, the key problems confronting the industry have almost always being a problem confronting project execution in the first place (refer Table 2.2). A lot of lessons could be drawn from developed countries, especially, regarding ensuring good project performance. In particular, the Norwegian example is worthy of emulation. Front-end management and assessment of public investment projects, adopted and adapted o the Ghanaian situation, may have a lot to offer in addressing most of the problems affecting public projects.

This thesis thus proposes front-end management approach to addressing project execution inefficiencies through the performance assessment and management with measures tailored to the on-going project. In particular, it endorses a continuous assessment of the project throughout its life cycle within a performance measurement system. Again, following developments in other countries, especially in UK, following the Latham's report, it considers clients' perspective (not merely satisfaction criteria) as well as those of practitioners' in a performance assessment.

2.8 Conclusion

The foregoing has shown that most of the problems confronting the construction industry everywhere are project execution related problems. Developed countries have sought to employ the use performance measures to monitor and control projects within the broader context of their respective construction industry's development agenda. With regard to the construction industry in Ghana, there is the need to begin addressing project performance problems through performance assessment as an important management tool, if the industry aims at improving. Ghana, thus, has the benefit of building on such models and focusing on the relevant ones. However, the problems identified with the existing models calls for a paradigm shift in the approach of determining the assessment measures before these objectives could be achieved. In addition, there is the need to adopt a whole new approach of using these measures to assess project performance.

The next chapter provides a basis for the paradigm shift and follows it up with a theoretical framework within which investigations can be conducted in Ghana on the basis of experiences from the developed countries.

CHAPTER 3: Developing the Theoretical Framework

3.1 Introduction

In chapter 2, the need for a change in paradigm for project success/failure measurement was underscored. This chapter begins by highlighting some key concepts which provide the basis of the change in paradigm required. On the basis of considering the project as a temporary organisation, the chapter explores the relationship between project performance and the performance of other organisations, specifically, business organisations. A case for construction project performance as a business issue was made. This provides a reason for which lessons can be drawn from performance measurement concepts in the business world. In the process, four key performance measurement frameworks from business organisations were briefly identified and related to the project situation as a 'temporary organisation'. Next, the theory of the project as a temporary organisation was explored in detail. In combination with other theories of the organisation a theoretical framework was developed which guided empirical investigation into performance measurement in Ghana.

3.2 Reviews of Concepts leading to a paradigm shift in Performance Assessment

This section is devoted to reviewing some key concepts which supports the need for a paradigm shift in the approach of assessing construction project performance for improvement purposes.

3.2.1 Arguments for multidimensional, multi-criteria concept of Performance measures

As indicated in chapter 2 performance theorists are propagating the need to use multi-dimensional criteria or a balance scorecard to assess the performance of a business or a project (Kaplan & Norton, 1992; Shenhar et al, 1997; Van develde et al, 2002). Atkinson (1999) calls for a break from the 50-year old tradition of measuring project performance (success and failure) in terms of the "iron triangle" i.e. cost, time, and quality. The use of multi-dimensions or multi-criteria in assessing project has been well acknowledged in project management literature (Cooper and Kleinschmidt, 1987; Pinto and Slevin, 1988; Pinto and Mantel, 1990; Freeman and Beale, 1992; Dvir and Shenhar, 1992, Lipovetsky et al, 1997). In particular, Pinto and Mantel (1990) provided an empirical justification for a multidimensional construct of project failure, encompassing both internal efficiency and external effectiveness aspects. They established that critical factors associated with failure depend on how failure is defined and also how organisations make judgment on the matter. They suggested that future research on project failure must take into account a variety of contingency variables, such as the type of project, and the stage of the project in its life cycle. The strength in using multi-measures to assess project is also rooted in the fact that several factors often combine together to result in the performance or non-performance of a project. Ojiako et al. (2008) confirmed that: “there is no single project factor that will, in its entirety, influence the chances of a project failing or succeeding; rather, project failure or success occurs through a combination of events occurring on a continuous basis”.

In the business world, this has also been noted. Writing under the topic “performance measurement manifesto”, Eccles (1991) submitted that “the leading indicators of business performance cannot be found in financial data alone. Quality, customer satisfaction, innovation, market share –metrics like these often reflect a company's economic condition and growth prospects better than its reported earnings do. Depending on an accounting department to reveal a company's future will leave it hopelessly mired in the past”. The paradigm shift that occurred thereafter is that most managers began “changing their company's performance measurement systems to track non-financial measures and reinforce new competitive strategies”. According to Eccles (1991), this has been made possible and economically feasible by new technologies and sophisticated databases. “Industry and trade associations, consulting firms, and public accounting firms that already have well-developed methods for assessing market share and other performance metrics can add to the revolution's momentum –as well as profit from the business opportunities it presents”. Eccles hopes that when one leading company can demonstrate the long-term advantage of its superior performance on quality or innovation or any other non-financial measure, it will change the rules for all its rivals forever.

3.2.2 Project Performance: Moving from “Autopsy” Reports to “Health” Reports

According to Beatham et al (2004) the present practice of project success/failure measurement encourages the measurement of project performance with “lagging indicators” and leads us to expect project “autopsy reports”. This, however, does not offer opportunity for change and improvements as expected from assessment in the first place. If the concept of organisational learning, as explained bySenge (2006), could be of benefit to the on-going project, and if lessons learned from a completed project could provide a guide for future projects, then it is the case that assessment should cover its entire “life story”. The question here is, whether the success or failure of a project is of any relevance to the project after they had occurred? To correct these, such measurements should always be aimed at giving opportunities to change and, always leading to improvements in performance. This suggests, then, that the assessment of a typical construction project should be done:

i. throughout its life cycle,
ii. with the intention of declaring the true state at any point in time,
iii. in order to ensure that the necessary objectives are achieved,
iv. to ensure improvements in those areas where success in not being achieved.

This calls for the determination of what is happening to the project in all its aspects throughout its life cycle and be able to predict performance based on real-time information (Russel et al., 1997). Indeed, Mian et al (2004) noted that as human health is maintained by identifying and monitoring those factors which have the potential of influencing it, so must those critical factors be monitored which have the potential of influencing the project's health; and "this approach", they opined, "is applicable to all phases of the construction projects and many construction procurement methods". In that article "project health" was said to be synonymous to "project performance". In a related article Humphreys, et al (2004) identified some parallels between construction project health and human health:

- State of health influences performance;
- Health often has associated symptoms;
- Symptoms can be used as a starting point to quickly assess health;
- Symptoms of poor health are not always present or obvious;
- State of health can be assessed by measuring key areas and comparing these values to established norms;
- Health changes temporally;
- Remedies can often be prescribed to return to good health; and
- Correct, accurate and timely diagnosis of poor health can avoid *(prevent)* small problems becoming large.

Willard (2005) proposes that project could be declared "challenged", "failed", "successful". Within this framework, it is possible to describe a project's "health" in several ways depending on the conditions of its "health": *frustrated, disturbed, paralysed, distressed etc* towards the undesirable end; and then, expressions like *healthy, improved, progressing, and satisfactory,* towards the desirable end. Success itself could be qualified, for example, *very, quite, extremely, somewhat successful* and so on, based on technical definitions ascribed to them. Hence project management writers have used the term "project performance" interchangeably with success/failure and "performance measurement" with "success/failure measurement" (De wit, 1988, Mian et al, 2004; Beatham et al, 2004). This has been followed by the use of such terms as "performance Indicators" or "Performance measures". The term "Performance" is thus the key word in this research used to represent how a project is succeeding in achieving its set goals and objectives by continuous assessment.

This research, focusing on construction projects within its life cycle and appreciating the required continuous monitoring and evaluation during the implementation period, prefer the use of the expression "project performance" to represent the overall state of the project based on the degrees of success or failure at any stage. Ojiako et al. (2008) also prefer to use the same expression. By this consideration, performance will be assessed in multi-criteria; and in various degrees on a continuum ranging from excellent performance (very successful) to poor performance (overall failure) in specific criteria or dimensions. This calls for the identification of the key sets of principles, measures, indicators as would be necessary for the measurement of the performance of projects. The quest towards what constitute a successful project is, thus, directly linked with the greater quest for improvements in project performance.

3.2.3 Project Success and Failure considered within the "Two-Factor" theory

One of the causes of the difficulty in reaching consensus on the definition of project success or failure lies in the fact that these two have been treated as a dichotomy. This research takes the view that the two are not mutually exclusive and that they could, in fact, exist together across the stages of the project life cycle. Also called the 'Hertzberg's Hygiene-motivation' factor, the 'Two-factor' theory can be used to explain the relationship between project success and failure from the point of view of their underlying factors. Proposed by Hertzberg et al. in 1959, this theory indicates that the factors leading to 'satisfaction' are separate and distinct from the factors that lead to 'dissatisfaction'. Hence satisfaction and dissatisfaction can exist independently and simultaneously so long as the factors producing them exist. It postulates that the opposite of "Satisfaction" is not "Dissatisfaction" but "No Satisfaction", and the opposite of "Dissatisfaction" is not "Satisfaction" but "No Dissatisfaction" (Robbins, 2005). Applying this theory to the project situation then puts the success and failure question into a dual continuum, rather than a dichotomous, situation. We can speak of "success", "no success", "failure" and no "failure" of aspect of a typical project within the phases of its life cycle based on the influencing factors. With regard to the influencing factors, De Wit (1988) posits thus: "factors affecting project success or failure are usually good indicators of pre-conditions of success or failure". He considered them to be analogous to Hertzberg's hygiene/ motivation factors in that the presence of success factors does not guarantee success but not identifying them (their absence) is likely to lead to failure.

Therefore in the project situation, the factors that lead to success could, sometimes, be separate and distinct from the factors that lead to failure i.e. the absence of those success factors should not always be seen as the only causes of failure. Hence there could be a condition for a project in which assessment will result in "no success" without necessarily implying "failure". In practice, this is realised by using multi-measures to assess projects. In such a situation a project could fail in some criteria but perform very well in others. In assessing a construction project thus, a fundamental theory to embrace is that the absence of success does not necessarily indicate a failure and vice versa. This position is explained by considering the various interest groups (stakeholders) within a typical construction project with diverse focus, expectations and what is of essence to them across the project life cycle.

3.2.4 Contingency Theory

An impression created by project management practitioners and underscored by the Project Management Body of Knowledge (PMBOK) is that project management knowledge is applicable to all sorts of industries and environments (Engwall, 1992; Packendorff, 1995). Packendorff (1995) contends that such a view positions project management as a field of study which is held together by conceptions of process rationality in which differences in

outcome and process are disregarded in favour of alleged similarities. This difference clearly does not only exist between industries but also within the same industry, in the case of projects. Indeed, the lack of agreement as to what factors affect project success as acknowledged by project management researchers (for example, Pinto and Slevin,1987), has been blamed on the assumption by project management researchers that “a universal theory of project management can be applied to all projects (Dvir et al, 1998)”.
Classical contingency theory suggests that different external conditions to an organisation require different organisational characteristics, and that the effectiveness of the organisation is contingent upon the goodness of fit between structural and environmental variables (Shenhar, 2001). This class of behavioural theories posit that there is no one best way to organize a corporation, to lead a company or to make decisions (Fiedler, 1964; Vroom and Yetton, 1973). Alluding to this, Shenhar (2001) posits that “one size does not fit all”, and talks of an organisation concept project management. This falls in line with the philosophy of the project as a “temporary organisation” (Packendorff, 1995; Lundin Söderholm, 1995) and so on. Consequently, due to the realisation of the several “non-constants” surrounding project situations and its procurements, as illustrated in chapter 2, the research chose as it primary theoretical drive, the contingency theory as applied to project management, particularly, regarding performance measures.

3.3 Construction Project Performance and Business Performance

This section further explains the relationship between construction project and business organisation as a means by which best practice performance could be studied. Further, it highlights some key performance measurement frameworks in the business world which are of relevance to this research

3.3.1 Construction Project Performance Assessment as a Business Issue

Defining performance as being on-time, on-budget, and meeting quality expectations, Kashiwati (2002) concluded that construction is a business issue and not an engineering technical issue: “a layman can identify whether the contractor finished on time, on-budget, and whether the owner’s expectations were met”. Thus, he opined that solving a business issue with technical specifications will not lead to performance. Further, he suggested that performance specification should include owner’s requirement, and the *method* of identifying the best performance. The concept of project performance as a business issue was given a further support by Dinsmore (1999) in his book “Winning in Business with Enterprise Project Management”. He explains that business prosperity depends on the efficient management of projects. According to him, this is achieved by adding value to the business and that “value is added by systematically implementing new projects –projects of all types, across the organization”. He referred to this as managing organisations by project (MOBP) and later *enterprise project management* (EPM) in which all business endeavours need to be well focused and result-oriented. This will enable organisations to apply project management to target strategic corporate needs, rather than merely accomplishing specific, isolated projects (Dinsmore, 1999 pp.ix, x). Dinsmore (1999 pp.x and 6) outlines reasons why organisations are becoming "projectised", the relevant ones (to this research) of which are listed below:

- This allows organisations to perceive themselves as dynamic organisations composed of countless projects simultaneously being managed to completion.
- An organisation's success depends on new projects, as opposed to excessive concentration on "business as usual".
- The time-to-market squeeze companies experience demands that projects be completed on time, within budget, and meet the required quality standards and customer requirements.
- Quantum leaps in bottom-line effectiveness come from new initiatives, and that calls for project management.
- With project management in place, companies tend to improve customer satisfaction, market penetration, and financial results.

Projects, thus, are seen by businesses as product lines or portfolios.

3.3.2 Some Relevant Business Performance Frameworks

In addressing the issue of construction project assessment, the research also draws from business performance measurements, especially, those which provide measures that resonate with the construction project situation. Four of such relevant frameworks are discussed. The first one is the "Results and Determinant framework (Fritzgerald et al.,1991)" which deals with performance measurement of the service sector and it is based on the premises that there are two types of performance measures in any organization: those which relate to the results (*competitiveness and financial performance*) and those which relate to the determinants of the results (*quality, flexibility, resource utilization and innovation)*. The strength of this distinction by the framework lies in its emphasis that results obtained are a function of past business performance with regard to specific determinants. Results, they explain, are 'lagging' indicators whereas determinants are 'leading' indicators.

The second one is the "Strategic Measurement Analysis and Reporting Technique (SMART)" by Lynch and Cross (1991). Also called the "Performance Pyramid", a key feature of this framework is that it makes explicit the difference between measures that are of interest to external parties –*customer satisfaction, quality* and *delivery* and those that are of primary interest within the organisation –*productivity, cycle time and waste* (Neely et al, 2000). This model satisfies an important requirement of performance measurement system (PMS) in that it "links the performance measures at the different hierarchical levels in a company, so that each function or department strives towards the same goals" (Tangen, 2004).

The third is "the Balanced Scorecard (BSC) by Kaplan and Norton (1992)". The BSC is probably the most popular PMS among the emerging models for performance measurement in business and other organisations. This model allows top management to take a quick but comprehensive view of the business from four important perspectives which provide answers to the following (Kaplan and Norton, 1992; Tangen, 1992):

- How do we look to our shareholders (*Financial Perspective*)?
- What must we excel at (*internal business perspective*)?
- How do our customers see us (*the customer perspective*)?
- How can we continue to improve and create value (*innovation and learning*)?

By combining financial measures and non-financial measures in a single report (it emphasizes that both must be part of the information system for employees at all levels of the organisation), the BSC aims to provide managers with richer and more relevant information about activities they are managing than is provided by financial measures alone. The BSC provides managers with the instrumentation they need to navigate to future success (Kaplan and Norton, 1996 p2). It provides them with a comprehensive framework that translates a company's vision and strategy into a coherent set of performance measures (Kaplan and Norton, 1996 p24). The BSC, exhibits the following four characteristics which provide a footing for the approach to assessing performance of projects contemplated in this research (Table 3.1).

Table 3.1 Mapping the characteristics of the BSC to the project performance assessment characteristics

The BSC (Kaplan and Norton, 1996)	**Useful application in the project situation**
It translates an organisation's mission and strategy into a comprehensive set of performance measures that provides the framework for strategic measurement and management system.	To translate the expectations of the stakeholders (clients and practitioners) of a project into a comprehensive set of performance measures that provides the framework for strategic measurement and management system.
It retains an emphasis on financial measures as well as including the performance drivers of these financial objectives.	To use all the relevant contingency measures (including financial ones) that will reflect the strategies, visions and expectations of the stakeholders, particularly clients.
It measures organizational performance across four balanced perspectives: financial, customers, internal business processes, and learning and growth.	To measure the performance of the project across all relevant measures including financial, internal business process, environmental and social impacts in the perspectives of key stakeholders, in this case clients and practitioners; and to use the assessment process to provide learning and growth.
It enables companies to track financial results while simultaneously monitoring the intangible assets they need for future growth (Kaplan and Norton, 1996 p2).	To enable the project management team to monitor and control all aspects of the project through the relevant contingency measures

The last framework to consider is the Performance Prism (PP) by Neely et al. (2002). The PP is underpinned by three fundamental premises (Neely et al, 2002 p. xi):

- It is no longer acceptable (or feasible) for organisations to focus solely on the needs of one or two of their stakeholders –typically shareholders and customers –if they wish to survive and prosper in the long term;
- An organisation's strategies processes and capabilities have to be aligned and integrated with one another if the organisation is to be best positioned to deliver real value to all of its stakeholders;
- Organisations and their stakeholders have to recognise that their relationships are reciprocal. Stakeholders have to contribute to organisations, as well as expect something from them.

It is a three dimensional model made into a prism shape, with the top and bottom facets as *stakeholder satisfaction* and *stakeholder contribution* respectively. The three sides are *Strategies, Processes and Capabilities*. Thus, the PP consists of five interrelated perspectives on performance that pose specific vital questions:

- Stakeholder Satisfaction –who are our key stakeholders and what do they want and need?
- Stakeholder Contribution –what do we want and need from our stakeholders on a reciprocal basis?
- Strategies –what strategies do we need to put in place to satisfy the wants and needs of our stakeholders while satisfying our own requirements too?
- Processes –what processes do we need to put in place to enable us to execute our strategies?
- Capabilities –what capabilities do we need to put in place to allow us to operate our processes?

The framework, according to Neely et al (2002 p160), has been designed to be highly flexible so that it can provide both a broad and a narrow focus as required. If only a part of the aspects of the performance management is required, such as a single stakeholder focus or a particular business process agenda, then the PP can be applied to designing a measurement system and appropriate measures (and their attendance metrics) that address that context. It is also, equally, capable of supporting broad corporate or business unit performance management improvement initiatives too (Neely et al, 2002 p160).

Unlike the Balanced scorecard, the Performance Prism starts with stakeholder satisfaction not strategy.

Organisations stakeholders are likely to be a combination of a number of the following (Neely et al, 2002 p166):

- Investors (principally shareholders, but other capital providers too);
- Customers and intermediaries;
- Employees and labour unions;

- Suppliers and alliance partners;
- Regulators, pressure groups and communities.

The PP takes the view that these and their satisfaction criteria should form the basis of performance measures designs. “To derive measures from strategy”, posit Neely et al (2002 p164), “is to misunderstand fundamentally the purpose of measurement and the role of strategy”. Significantly, they opined that performance measures are designed to help people track whether they are moving in the direction of their intended destination and to help them establish whether they will indeed reach their set destination. Strategy, however, is not about destination; but about the route you choose to take. Essentially, it is about how to reach the desired destination (Neely et al, 2002 p164). They, thus, conclude that the starting point for deciding what measure to be used should not be “what is the organisation’s strategy?” But instead: “who are the organisation’s stakeholders and what do they need?” Hence in the PP, the first perspective on performance is that of the stakeholder satisfaction.

The PP framework has the most appeal to project management in general and this research in particular. Applying the PP concept to the project situation, there will be *quid pro quo* relationship through which the management of a project will be effectively enhanced in the following ways:

i. Clients’ contribution to the project performance will be as equally important as their satisfaction. Therefore, clients will be expected to live up to their roles.

ii. Practitioners’ maximum contribution and commitment to the project will be seen as the necessary means for ensuring good performance and thus, merit their fees and satisfaction.

iii. All other stakeholders on the project e.g. employees, contractors, end users, beneficiary community etc., will recognise this relationship. This relationship in the project situation is illustrated in Figure 3.1 with the client at the centre dealing with a number of stakeholders.

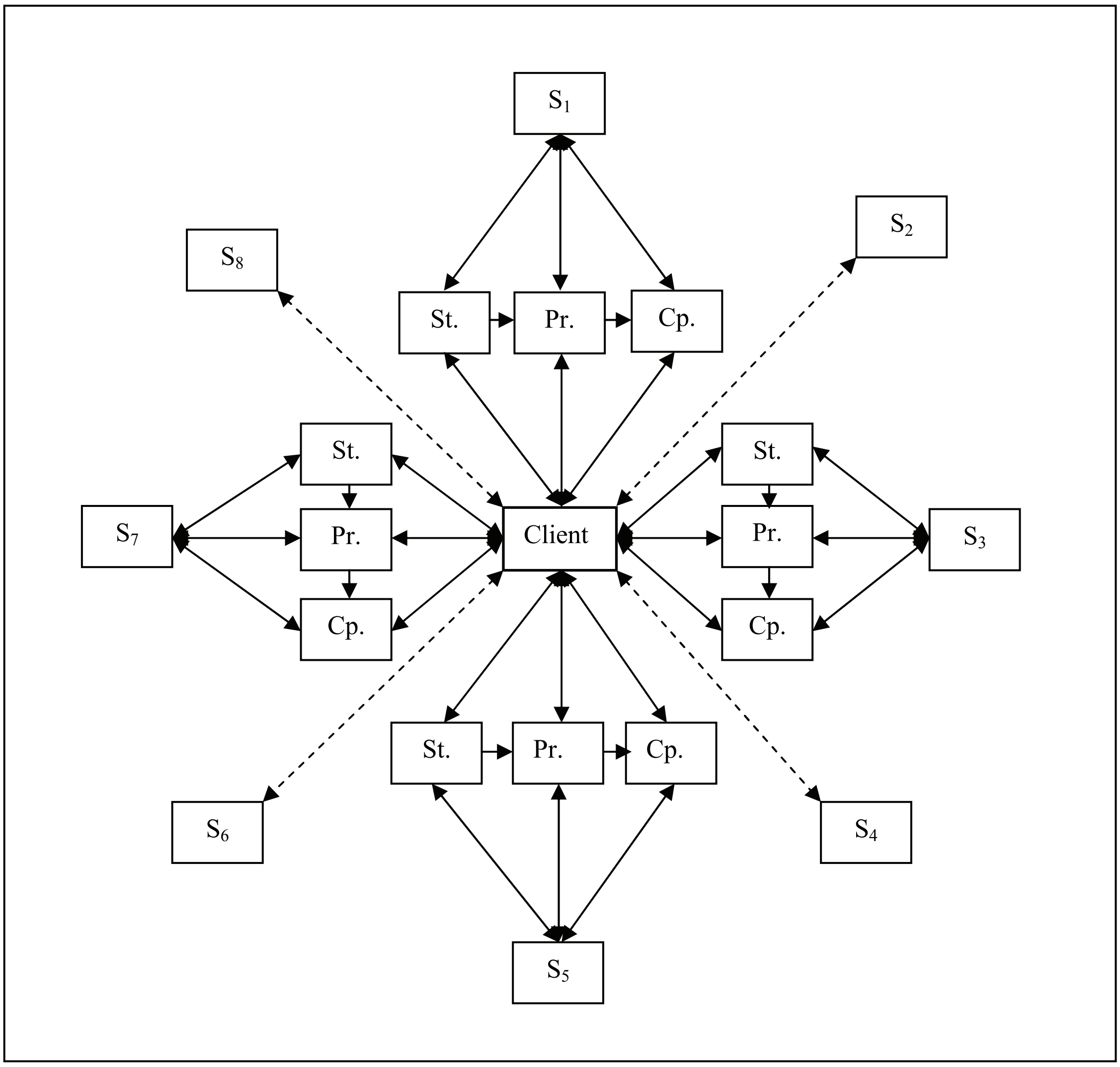

Fig. 3.1 Translating the Performance Prism into the project situation: Client at the centre.
[NB: S_1, S_2............S_8 : Other stakeholders; St: strategy; Pr: processes; Cp: Capabilities]

Significantly, the BSC and the PP in particular touches on three key aspects which relate very much with the basis of the theoretical framework of this research. These are:

i. Strategies: this relates to motivation, expectation and culture;

ii. Capabilities (knowledge): this relates to people, learning, technology, practice, and infrastructure;

iii. Processes: this relates to actions.

The trend shows that the concepts of measurement, whether in the project situation specific (as a temporary organisation) or in business enterprises (as a permanent organisation) are adopting multiple measures to address several dimensions. On the grounds that performance measurement (whether for projects or organisation) is a business issue, and that the project is a temporary organisation, it is practicable to adopt and adapt some of the concepts and even measures from the other organisations to the construction project situation. More importantly, the concepts and philosophies behind these models hold a lot of promise to the construction projects (especially, in the case of the balanced scorecard and the performance prism). Neely et al (2002p161) believe that there is no one "holy grail" or one "best way" to view business performance. And that all the various frameworks "can exist because they add value" (Neely et al., 2002 p159).

Regarding the adoption and adaptation of best practices to the construction industry, Mohamed (1996) notes that the industry lacks consistent methods of measuring performance and data for benchmarking and therefore suggests that before some of these best practices could be applicable to construction, the benchmarking form being applied in the manufacturing sector should be re-dimensioned as:

i. **Internal benchmarking**: this has to do with the firm level performance assessment
ii. **Project benchmarking:** This has to do with the project level performance assessment
iii. **External benchmarking:** Industry level performance assessment

This research is focused on the project benchmarking level. It is the position of this research that such adaptations should also take place within the broader consideration of the construction project as a temporary organisation. The main distinction that needs to be clarified should, of course, be between the production management aspect and the project management aspect of the project being implemented (Koskela and Howell, 2002b).

3.4 Towards a Theory for Project Management

Evidence from literature indicates no sound theoretical basis of project management (Koskela and Howell, 2002a). In relation to this, Anagnostopoulos (2004) attributes the difficulty of most universities to recognise project management as an "autonomous scientific discipline" to its lack of a good theoretical base. He observes that instead of an underlying theory defining a discipline, in its state of maturing, Project Management has a peculiar situation in that establishing standards of the profession has preceded the development of its theory. In a related observation, Söderlund (2002a) observes that the rationale underlying most texts and articles in the *project management journal* considers project management as "a method" for solving complex organisational problems. In addition, the fact that there are diverse schools of thought (Söderlund, 2002b) opines, suggests apparently a discipline yet to define its overall focus and answer the key scientific questions. In his submission, Packendorf (1995) classified projects as a "tool" when it is underpinned by the concepts of *planning, control* and *evaluation*. Hence Koskella and Howell (2002a) conclude that "the underlying theory of project management is obsolete".

Therefore, Judgev (2008) framed the importance of collaboration between academics and practitioners in developing a “good theory” for project management. This, he believes, will prevent the risk of running the discipline in an ‘atheortical’ and ‘ascientific’ way. However, Söderlund (2004) observes that this should not be seen as a sign of confusion. In reality, he saw it as an indication of a discipline that has a potential of continuously evolving into one that would be all embracing and linking to others, and the one that can possibly connect all. Söderlund, (2004) particularly observes the illumination of the cross-disciplinary character of project management research through the combination of different fields of inquiry, as featured in five consecutive research conferences of the *IRNOP* (International Research Network for Organising a project). He conclude that: “project management seems to be a research field with potentials of bringing different disciplines to focus on a focal phenomenon of study, i.e. projects” This is supported by the diversity of theories and perspectives that would define project and project management (Packendoff, 1995).

In developing a theoretical base for this research, the nascent theory of the temporary organisation and its potential as theoretical foundation for project management in general and construction project management in particular was reviewed. In the process the key elements of this nascent theory was adopted as one of the foundations of the theoretical framework of this research.

3.4.1 Towards a Theory of the Temporary Organisation

Lundin and Söderholm, (1995) and Packendorff (1995) propose theories of the temporary organisation (project) within the framework of organisation theory. They argue around the notion that in the temporary organisation, *action* (not decision) plays a leading role. Söderlund (2004) supports this view when he argues that a project theory should focus on “action” and “temporariness”. He argues that (i) theories of projects are conceptualisations and models that explain and predict the structure and behaviour of projects (or temporary organisations), and (ii) that a number of such theories –some complementary and some competing –are necessary and, will further develop the project management field of study. In support of this quest, he proposes that each attempt should address the following key questions:

a. Why do project organisations exist?
b. Why do project organisations differ?
c. How do project organisations behave?
d. What is the function of, or value added by, the project management unit?
e. What determines the success or failure of project organisations?

Koskela and Howell (2002) also derived a theory of project management by augmenting the existing ones with the relevant production and management theories. The theoretical framework of this study is developed following these contemporary conceptualisations and models of the project management alongside the existing project management schools of thought (Sönderlund, 2002). Three main works by Lundin and Söderholm, (1995);

Packendorff (1995) and Koskela and Howell (2002) formed the basis of the adoption of these position as discussed in the next section.

i. Lundin and Söderholm's (1995) Framework of the theory

In structuring their theory, Lundin and Söderholm emphasised on "action" (not decision-making) as a predominant factor in "explaining" the nature of the temporary organisation. They adopted this view based on both theoretical and empirical reasons. The theoretical aspect is based on the fact that literature criticises the assumption that decisions cause action (citing such authors as Thompson, 1967p170; March and Olsen, 1976; Cyert and March, 1992). They propose an alternative theory where decision could come after action, legitimising it, that solutions may be implemented even without there being any problem attached to them. Depending heavily on previous researchers, they concluded that temporary organisations are almost always motivated by a need to perform specific *actions* aimed at achieving immediate goals (Miles, 1964 p443; Goodman and Goodman, 1976 p494; Palisis, 1970).

Putting the action-decision debate within the perspective of construction project specifically, this study sees a direct cyclical connection between the two. The existence of this connection is much more relevant than the order in which they should be considered. Either of them may, thus, comes before the other or follows immediately after it. However, the fact should be appreciated that to begin with either of them has its own implication on the execution of a typical construction project.

With *action* at the centre of their theory, they outline four basic concepts in a theory of the temporary organisation: *Time, Task, Team and Transition.* Following the four basic phases of a project life cycle (i.e. concept, development, implementation and termination as contained in PMI, 1987 pp.1-4), and outlined four sequential actions within these phases, called "action demarcations": (i) *Action-based Entrepreneurialism*: This highlights the action needed by an entrepreneur (a client) to initiate and provide the impetus for a temporary organisation at the first phase. This is done through what they referred to as "mapping by rhetoric" which is the way in which a particular situation is made to appear real, tangible, and less ambiguous to the "listeners". Usually, it is difficult to have opposing views at this stage; otherwise it will mean that the existence of the temporary organization itself is being called in question. The ability to handle the temporary organization's rhetoric is thus of prime importance for anyone trying to influence or govern it. In construction industry, for example, these approaches are institutionalised, governed by "action" and "time" and they imply costs.

(ii) *Fragmentation for commitment-building*: Where the action to key project parameters is specified, i.e. duration, scope, task and definitions and termination criteria, as well as commitment among team members. This also means "de-coupling by bracketing" detaching the temporary organisation from its surrounding, and re-attaching it after termination; and "task definition by partitioning". (iii) *Planned isolation*: This is the phase where predetermined action according to plans is executed. This is to isolate the temporary organisation, and guarding it in order to avoid disturbances to its plans or other threats. “Once the temporary organisation enters this phase it must be managed according to popular opinion, in accordance with action plans, which requires control. (iv) *Institutionalised termination:* This is the final sequencing concept and it about the action taken in the dissolution of the temporary organisation.

The PMI (2004 p23) only speaks of *initial, intermediate* and *final phases* (with the intermediate phase being divisible in to sub-phases) of a project. Therefore it is possible to have part of sequence fragmentation for commitment in the initial phase, with the rest in the intermediate phases.

Key features of this framework are (Lundin and Söderholm’s, 1995)**:**

i. It refers to the Project management body of knowledge (PMBOK)

ii. It explicitly refers to the distinctive features of the temporary organisation (project) and provides a structure for analysing such organisation phenomenon in its entirety.

iii. It aspires to embrace the temporary organisation phenomenon in its entirety

iv. By placing action at the heart of a theory of the temporary organisation, the theory provides a means for the alternative (inaction) by setting boundaries in time, space, scope, tasks etc. Hence, they showed that these theory can as well be concerned with cases “where *inertia,* rather than action, is invoked as a result of an effort to create and execute a project, and when these attacks on the project itself has been successful”. In the framework of this theory, asking why things happened or not happened are both equally justifiable, demonstrating that the theory lends itself to empirical research. This framework is depicted in Figure 3.2.

According to the authors, they have been able to apply the framework in their studies of empirical cases of temporary organizations and thus have face validity.

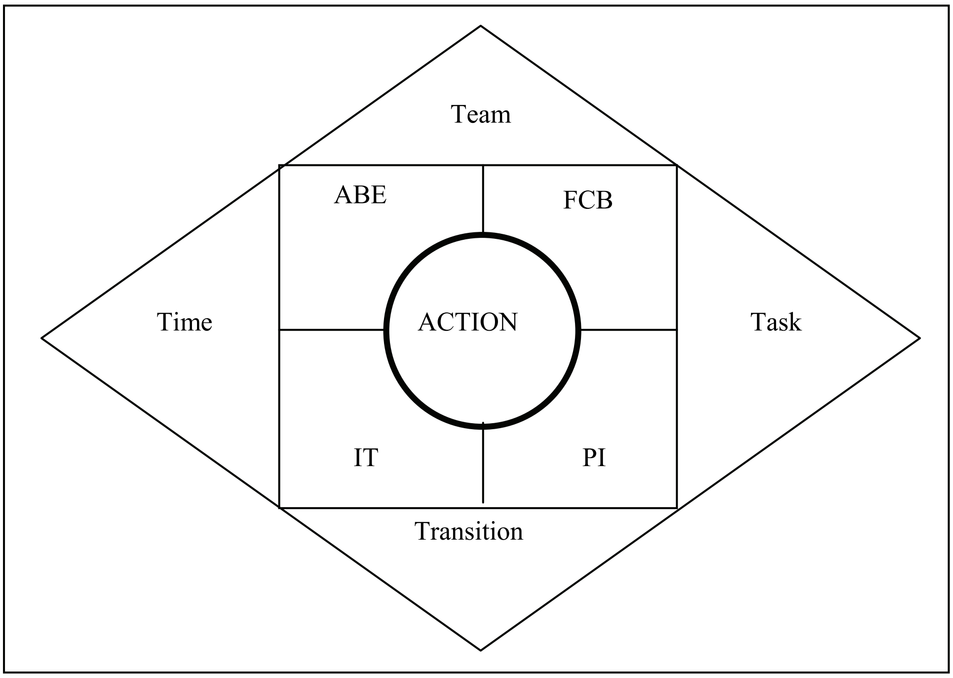

Fig. 3.2 A Model of the theory of the Temporary Organisation [based on Lundin and Söderholm (1995)] (Key: ABE: *Action-based Entrepreneurialism; FCB: Fragmentation for commitment-building; PI: Planned isolation; IT: Institutionalised termination).*

ii. Packendorff's (1995) Framework of the Theory

Considering the theoretical base of project management, Packendorff (1995) proposes two metaphorical theoretical approach to the project management situation along the *development, implementation and termination* stages: the project as a "tool" (the typical traditional project management theory), and the project as a "temporary organisation" (Table.3.2). The "tool" implies the perspectives of the "user" only (e.g. the owner and the manager of the project) while the "temporary organisation" are viewed from several different perspectives. Expatiating on the latter as a point of departure, he identifies some theoretical areas of further research identified with the following common denominators: (i) that different types of projects will require different theories (ii) that extensive empirical fieldwork is required in order to build these theories, and (iii) that a diversity of theories and perspectives will enhance our understanding of projects as compared to the single viewpoint of rational management. By changing the metaphor from "project" to "a temporary organisation", Packendorff effectively proposes a reduction in emphasis on project management concepts such as "planning", or "structure, and a focus on the study of temporary organisation processes, that is, “the deliberate social interaction occurring between people working together to accomplish a certain, inter-subjectively determined task”. The development phase of a project is structured into controllable parts with task specifications. Simultaneously, *expectations* concerning the nature of the project are formed among the project team members, based on their previous experiences or on the rhetorics (including plans and budgets) of the project to come. During the life of the project, this expectations-action-learning "loop" is repeated many times. The assumptions made by this theory argue for a new research proposal, whereby the project is seen as the temporary organization. At the end of the project “learning” is said to have occur, both at the organisational level and at the individual level. This "alternative assumptions" call for studying organised *action* on a basis of “individuals' conceptions” rather than of the structural features of projects. The present study see in this framework and the underlying assumptions as a bridge that links researches in construction project performance management and business (organization) performance management. This is because a key feature of this research is its emphasis on stakeholders (individuals) *conceptions, perceptions, perspectives, expectations* and *actions* as a means of assessing and regulating construction project performance.

Table 3.2 Packendorff’s two metaphorical systems of Project Management (Packendorff, 1995)

Research Focus	**Project Metaphor**	
	The project as tool	**The project as a temporary organisation**
Development	Plan	Expectation
Implementation	Control	Action
Termination	Evaluation	Learning

iii. Koskela and Howell’s (2002b) Framework of the Theory

On their part, Koskela and Howell (2002a, b) declare that the underlying theory of project management (based on the theories of *planning, execution,* and *control*) is not only obsolete but also the cause of the problems of project management. They identified such problems with Project Management as: frequent project failures (as in Kharbanda and Pinto, 1996), lack of commitment towards project management methods (as pointed out by Forsberg et al., 1996) and slow rate of methodological renewal (as found in Morris, 1994). Koskella and Howell (2002a) indicate that “customer requirements are poorly investigated at the outset, and the process of requirement clarification and change leads to disruption in the progress of the project”. In particular, they showed that these underlying theories are based on wrong assumptions and that it is based only on the transformation model of production. Following this, they proposed that the ingredients of a theoretical foundation of project management

should be separated into the theory of the project and the theory of management (Table 3.3). The former relates to the production aspect of the project and is governed by the "transformation", "flow" and "value generation theories". The latter, which addresses the project management aspect and which is the relevant part of this research, highlights three complementary theories. (i) *Management-as-organising*: This is seen as a counterpart to management-as-planning. Management-as-organising, which assumes that human activity is inherently situated, i.e. a response to the situation in question. This means that the agents involved consist of interacting sub-units and are capable of sensing, planning and acting. This allows the structure of the environment to contribute to purposeful acting.
(ii) *Language/Action Perspective*: This states that project execution is facilitated by "two-way communication" not the hierarchical one-way communication in which action is thought to flow from authorisation of a task. The language/action perspective, argues that work in organisations is coordinated through making and keeping commitment. In this view, "orders are understood as strong requests and even here, commitments arise from the promise to follow it". (iii) In addition to the thermostat model, they believe that there should be the *"scientific experimental model"* which addresses learning and improvement. Generally, this treats all operations as a hypothesis testing, rather than those specified as experiments in advance. In this regard, every operation must be specified, that is, hypothesis must be made explicit. When this done, it becomes easy to be able to identify root causes of problems during execution.

Table 3.3 Koskela and Howell's Ingredients of a new theoretical foundation of project management (Koskela and Howell, 2002b)

Subject of theory		Relevant theories	Contributions provided
Project		Transformation	Production is conceptualised as transformation of inputs to output (Starr, 1996; Morris, 1994)
		Flow	*Considerations of time and change (Koskela ,2000)*
		Value generation	*Consideration of the customer (Shewhart, 1931, Cook, 1997; Koskela, 2000; Suh, 2001)*
Management	Planning	Management-as-planning	Assumes that the organisation consists of a management part and an effect or part
		Management-as-organising	*Idea of inherent human (Johnston and Koskela, 2000)*
	Execution	Classical communication theory	One-way communication of the classical communication theory
		Language/action perspective	*Conceptualises two-way communication and commitment (Winograd and Flores, 1986; Lundin and Söderholm, (1995)*
	Control	Thermostat model	Identification and correction of variances to brig performance to standard (Hofstede, 1978)
		Scientific experimentation model	*Learning. Finding causes of deviations and acting on those causes instead of only changing the performance level for achieving a predetermined goal in case of deviation (Shewhart and Deming, 1939). This thus adds the aspect of learning and improvements to control.*

NB: 1 the words in italics highlight those which relates with concept of the project as a temporary organisation discussed above.

2. The bolded sections are the relevant area for this research

iv. Söderlund (2002b)

Söderlund (2002b) reviewed the history of project management together with recent developments as found in literature and conclude that there are seven, strands or schools of thought of project management research. He posits that a typical research under project management can be categorised under one or more of the following schools of thought: *Optimisation, Behavioural, Critical success factor, Contingency, Transaction cost, Marketing and Decision schools* (table 3.4).

Table 3.4 Söderlund's Seven Schools of thought in Project Management (based on Söderlund, 2002)

Schools of Thought	Common advocacy	Major objective	Contributors
Optimisation school	Considers project as analysable task requiring methodical approaches and structured techniques, development of various "work breakdowns techniques".	Efficiency, low cost, and optimal solution.	Cleland and King (1968); Morris (1994); Packendorff (1995); Engwall (1995:88-107) ;Turner (1999)
Critical Success Factor School	The identification of generic factors, in multidimensional and multicriteria, will greatly improve the project implementation process in practice.	Determination of project success/failure through generic criteria and factors	Baker et al (1983); Pinto (1986); Pinto and Slevin (1987, 1988); Pinto and Mantel (1990) Pinto and Prescort (1988, 1990)
Contingency School	Posit that the differentiation of project type, strategic problems and managerial concerns should be acknowledged in existing project management research	Treating each project according their peculiarities and differences	Shenhar and Dvir (1996:608); Dvir et al (1998); Clark and Fujimoto (1991); Wheelwright and Clark (1992).
Behavioural School	Treats project as a "temporary organisation" and Focus on the various behavioural aspects of projects.	Extending the interpretation of project management within organisation theory	Miles (1964); Bennis and Slater (1968); Bryman et al (1987); Lundin and Panckedorff (1994); Lundin and Midler (1998); Packendorff (1995); Lundin and Söderholm, (1995)
Transaction cost School	Conceptualises project as characterised by uncertainty, asset specificity and transaction frequency, discourages continuous relations and routine engagement, in favour of the "decoupling principle".	Analysing the existing form of projects and determining the appropriate governing mechanisms of project transactions (e.g. contract types)	Willamson (1975); Eccles (1981); Winch (1989; 1995); O'Brien et al (1995);
Marketing School	Devoted to the investigation into the management of the early phases of project, the identification of client needs and the formation of project organisations ,	Investigating "strategic behaviours" of companies dealing with projects and to propose a model for supplier-based adaptation strategies in project marketing	Bansard et al (1993); Cova and Holstius (1993); Cova et al (1994); Günter and Bonaccorsi (1996)

3.4.2 Packendorff (1995) and Koskela and Howell (2002b) Compared

A comparison between Packendorff's (1995) and Koskela and Howell's (2002) models reveals that whereas the former considers *planning, control,* and *evaluation* as relating to the project management research focus of *development, implementation* and *termination* respectively, the latter separated the project (production) aspect from the management (of the project). They considered the project aspects within the production management theories of "transformation", "flow" and "value" generating. This aspect relates to the production of the construction product as related to the contractor's activities. In the management aspect, they considered it in the three stages of *planning, execution* and *controlling*. These relationships are illustrated in Figure 3.3.

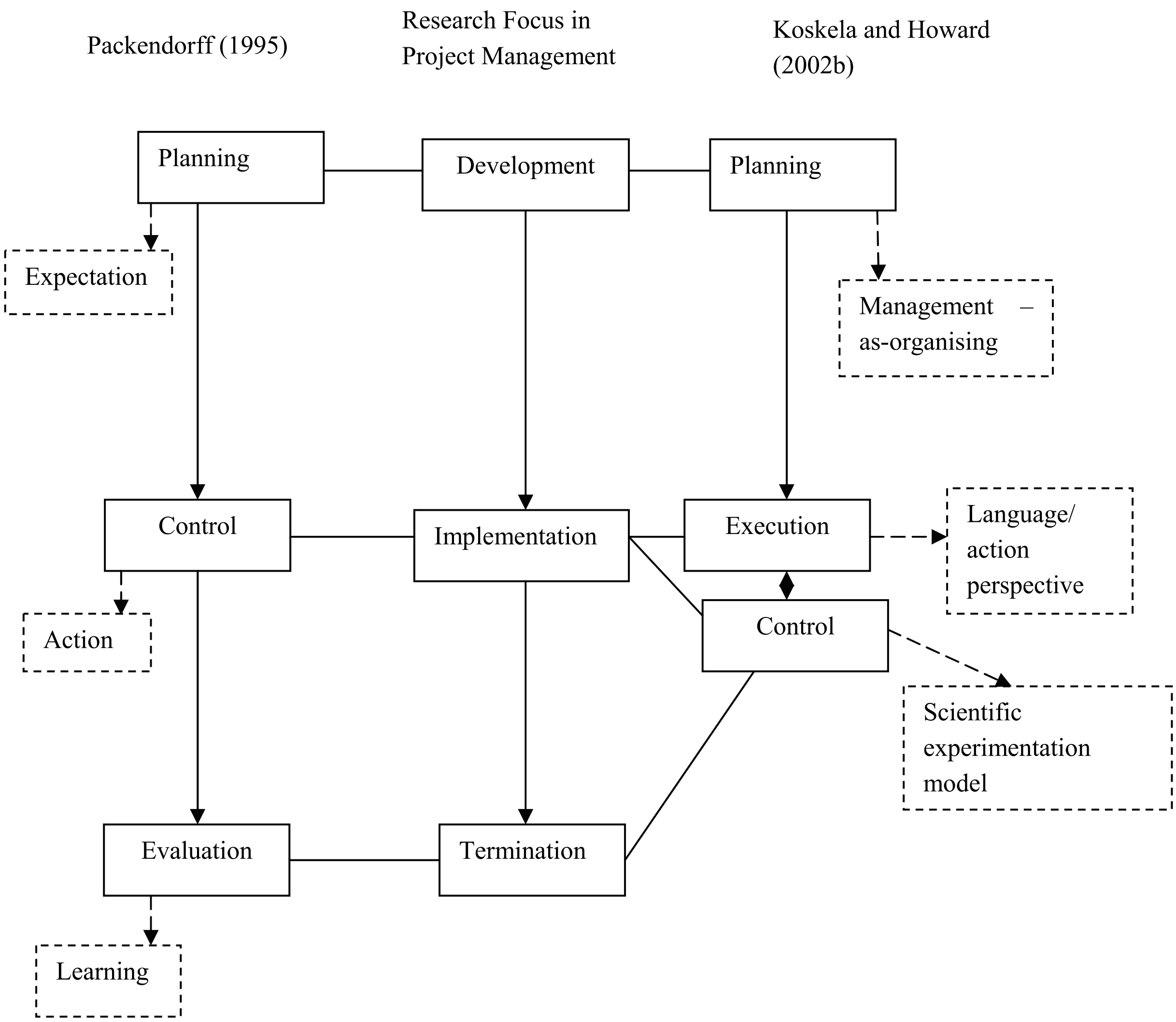

Fig. 3.3 Comparing the Models of Packendorff (1995) and Koskela and Howard (2002b)

By relating control to implementation in his work, Packendorff has effectively considered *execution* as part of *control* with both of them being regulated by "action" as a concept of the temporary organisation. He separated evaluation as a key part of the termination process. Koskela and Howard on the other hand believe that execution and control as an important part of project implementation should each be governed by different concepts: the former being regulated by "language/action perspective" and the latter by "the scientific experimentation model". Significantly, Koskella and Howard's concept of *controlling* also involves *evaluation* as provided by Packendorff. Another similarity is that both approaches emphasise "action" and "learning" within the framework of project management as a human activity. [Note:in Figure 3.3 the aspects of the proposed frameworks are in doted boxes.]
By integrating Lundin and Söderholm's (1995), Pankendorff's (1995) and the relevant part of Koskela and Howell's (2002) models, one can see a possible nascent project management theory which has the potential of governing researches in project and project management. One which allows all the emerging schools of thoughts to be researched within its framework, that is, "expectation of the individual team members (management-as-organising), "Action" at the heart of it all, and "Learning". These three aspects in essence provide the theoretical base of the project as a temporary organisation for this research as explained below.

3.4.3 The elements of the Nascent Theory of Projects: Expectation, Action and Learning

Expectation

This is the "expectations" of project clients, key individuals and team members that emanates from organisation of the project at the initial stages. Packendorff (1995) explains that projects are associated with conceptions (usually based on past experiences of a similar kind) of the nature of their own implementation, conceptions about the task to be solved. In the organisation situation the following have been demarcated in literature. (i) at leadership level: *Profit/financial target, quality and efficiency, strong individuals/ strong team* (Grové, 2008), (ii) at team level: *clear roles /responsibilities, guidance /leadership, goal setting, rewards, mutual understanding, sound communication, dependency/synergy, a need for team skills, decision making authority, resources, organisational support* (Grové,2008; Carr, 1992, Robbins, 1998; Brower, 1995, Margulies and Kleiner, 1995; Wilson, 1996; Field and Swift, 1996; Bettenhousen, 1991), and (iii) at individual level: *culture of support as defined by 'participation, respect, aspirations, opportunity and caring', fun and humour, empowerment/trust, work-life balance* (Grové, 2008).This expectation, when supported by commitment and motivation, evokes action (Brunsson, 1985).

Action

This is the "language/action" described by the coordination of the work, making and keeping promises, performance and declaration of completion, and to address all unforeseen eventualities during execution. *Action* is placed at the centre of project management. This is demarcated into the four sequences in the project life cycles: ABE at the conception phase, FCB, for the development phase, PI for the implementation phase and IT for the termination phase. Wherever, there is an action (or activity) in the project life cycle (especially, construction), it is characterised by the basic concepts of *time, team, task and transition*. Within the macro level of the project, it is also possible to see each of these basic concepts being dominant at one phase or the other: *time* (more prominent at the conception and termination stages), *team* (more prominent at the conception and development phases), *task* (more prominent at the development and implementation phases) and *transition* (more prominent at the implementation and termination phases).

Learning

The "learning" aspect from the whole exercise by the individual participants is made evident when the evaluation aspect is considered more as "scientific experimentation model" rather than a "thermostat model". At the organisation level, Senge (2006) provides five disciplines of the learning organisation, which represent approaches (theories and methods) on which he develops the three core learning capabilities in this wise (the disciplines are in italics): (i) Fostering aspiration (*personal mastery, shared vision*), (ii) Developing reflective conversation (*mental models, dialogue*), and (iii) Understanding complexity (*systems thinking*). He built these on the idea that the fundamental learning units in an organisation are working teams "(people who need one another to produce an outcome (P. xiii)".

3.4.4 Integrating the three elements for a Theoretical Basis for this Research

This research draws from the on-going debate and carefully adopts the above integrated nascent theory of project management as one of its bases for developing a theoretical framework. It also considers it in the lights of the project management schools of thought as provided by Söderlund (2002). These schools of thought are considered the "principal" lines of research focus of project management as a discipline based on the nascent theoretical model. This research observes that the framework opens itself unto other schools of thought, over time. This research however, worked within the *Critical success factor, Behavioural, Contingency and Decision* schools of thought.
In Figure 3.4, *action* is placed at the centre of project management. This is demarcated into the four sequences in the project life cycles: ABE at the conception phase, FCB, for the development phase, PI for the implementation phase and IT for the termination phase.

Wherever, there is an action (or activity) in the project life cycle, it is characterised by the basic concepts of *time, team, task and transition*.

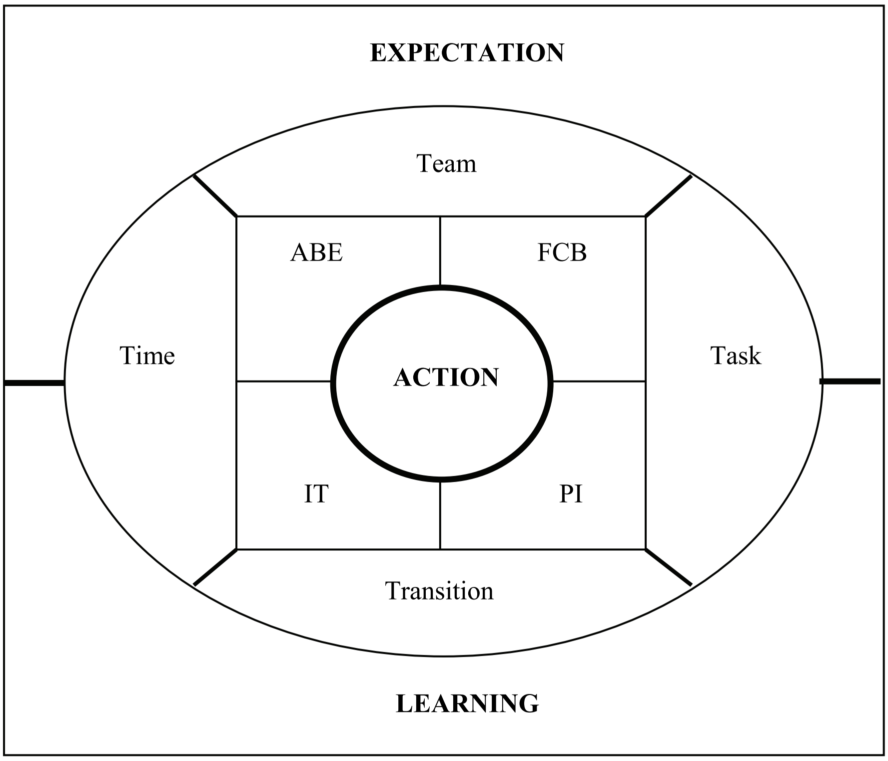

Fig. 3.4 Integrated "Nascent" Theory of the Project for the Research [based on Lundin and Söderholm, 1995; Pankendorff, 1995; Koskela and Howell, 2002]
(NB: ABE**:** *Action-based Entrepreneurialism; FCB: Fragmentation for commitment-building; PI: Planned isolation; IT: Institutionalised termination).*

3.5. Application of Environmental Theories of the firm to the Project

In developing the theoretical framework for this research, consideration was also given to the effect of the environment of the project as a temporary organisation, and how it affects its performance. Once again, lessons were drawn from environmental theories of the firm or organisation. The contribution of this aspect of the theoretical framework for the research is to help in the structuring of the project into its appropriate environments in respect of the changes and uncertainties that characterise them. This is to help in the identification and categorisation of the project factors and indicators according to their environmental conditions.

3.5.1 The Organisations' (Firm's) Environment and the Project's Environment Related

The effect of a firm's environment could be seen in the light of "environmental uncertainties", as operationalised in three basic components: *munificence, dynamism* and *complexity* (McArthur and Nystrom, 1991; Goll and Rasheed, 1997; Hamsal and Agung, 2007).

i. Munificence refers to an environments' ability to support sustained growth of an organisation (Starbuck, 1976; Aldrich, 1979). It has also been defined as "the scarcity or abundance of critical resources available to firms operating within an environment (Dess & Beard, 1984; Jogaratnam and Olsen, 1999). Castrogiovanni (1991) distinguishes three kinds of munificence: "capacity, growth/decline, and opportunity/threat". In the project situation, *capacity* could be related to economic (financial, technology and so on), availability of resources (material, human and plant); *growth/decline* could be likened to economic indicators and their movements during the project life cycle (inflation, price fluctuations, and so on); while *opportunity/threat* could be related to natural environment (weather, political instability etc.) and social environment.

ii. Dynamism describes "the degree of the market's instability over time and the turbulence caused by interconnectedness between organisations", For example, *prevailing competition* (Aldrich, 1979; Mintzberg, 1979). In the project situation this interconnectedness becomes even high when several projects are being undertaken by the same client (in this case, the government). Keat and Hitt (1988) found *dynamism* to be significantly related to performance. Dynamism could be related to the *political, natural (weather) or social environment*. Therefore organisational environmental *munificence* and *dynamism* captures the project's external environmental factors. The factors at play are a mixture of both human and non-human. They are, most often than not, the source of changes that confront project execution and demands quick strategic response.

iii. Complexity describes the degree of heterogeneity and the dispersion of an organisation's activities (Aldrich, 1979; Duncan, 1972; Starbuck, 1976). This is related to the project's internal environment during execution and relate to the processes and structure of its implementation. They describe the contingency factors affecting the project and its performance. Bourgeois (1980) reasoned that complexity remains a relatively constant factor in task environments; and according to McArthur and Nystrom (1991) literature search failed to locate any empirical studies using objective measures of environmental complexity as moderators.

These are non-human factors and barring any variations, and when there is no undue political interference, they will remain constant throughout the project life cycle. According to Goll and Rasheed (1997), “environmental characteristics or properties have major implications for all aspect of management including strategy, structures, process and outcomes”.

3.5.2 The Organisation’s (Firm’s) Strategic Posture and the Project’s Strategic Posture Related

In the light of organisational theory, Strategic posture is defined broadly as a firm’s overall competitive orientation (e.g. Covin & Slevin, 1989), or the composition of the competitive options firms use within their industry (e.g. Dees & Davis, 1984) According to Jogaratnam et al. (1999), literature distinguishes and characterises strategic posture in the following dimensions: *aggressiveness, analysis, defensiveness, futurity, proactiveness, riskiness, and quality service.* They explained that these may be “discerned from the degree of emphasis (or de-emphasis) placed by owners and/or managers on each of the key dimensions”. In the project situation strategic posture is captured by the project management team and the client. Factors at play are therefore purely human as they relate to these people. In essence, the degree of emphasis (or de-emphasis) of the factors relating to members in the management team and clients interact to define the strategic posture of the project as a temporary organisation.

In the main, strategic management research has focused on *strategic consistency* and *strategic flexibility* as a tool to influencing performance based on prevailing environmental conditions. Rumelt (1980) posits that the best strategy should be *consistence* and *consonance*. Others promote both strategic consistency and flexibilities. Abbot and Banerji (2001) acknowledge that due to environmental turbulence and uncertainties, strategic flexibility will ultimately affect positively on performance of the firm, and in this research, the project. Thompson (1967) theorise that the paradox of administration involves the simultaneous searches for consistency and flexibility. Evans (1991) conceptualises strategic flexibility in four dimensions and ‘senses’: *pre-emptive moves (agility and versatility), exploitative moves (liquidity and elasticity), protective moves (robustness and hedging), and correction moves (corrigibility and resilience)*; arguing that each of these dimensions and senses would be relevant responses to environmental uncertainties or pressures. According to Hamsal and Agung (2007), strategic consistency is operationalised in two dimensions: *proactive* and *reactive consistency.* Paradoxical strategies are “a firm’s simultaneous combination between implementing strategic flexibility adaptable to perceived environmental uncertainty, and strategic consistency for maintaining the initial successful strategy over an extended period of time (Hamsal and Agung, 2007)". The implication for project strategies is that it should be possible to adopt the relevant strategic posture to address the endless list of environmental (internal and external) challenges government projects face daily, especially, in Ghana. This provides a framework within which these factors can be identified by their nature so that the management team can address their impacts strategically. Addressing the project environment in the light of the on-going discussions also provide a new research area for strategic project management. The researcher believes that this has both academic and professional implications for construction projects. Figure 3.5 illustrate the relationship between environmental uncertainties, strategic posture and firm performance based on the on the on-going discussion. Figure 3.6 relate the firm environment to the project environment.

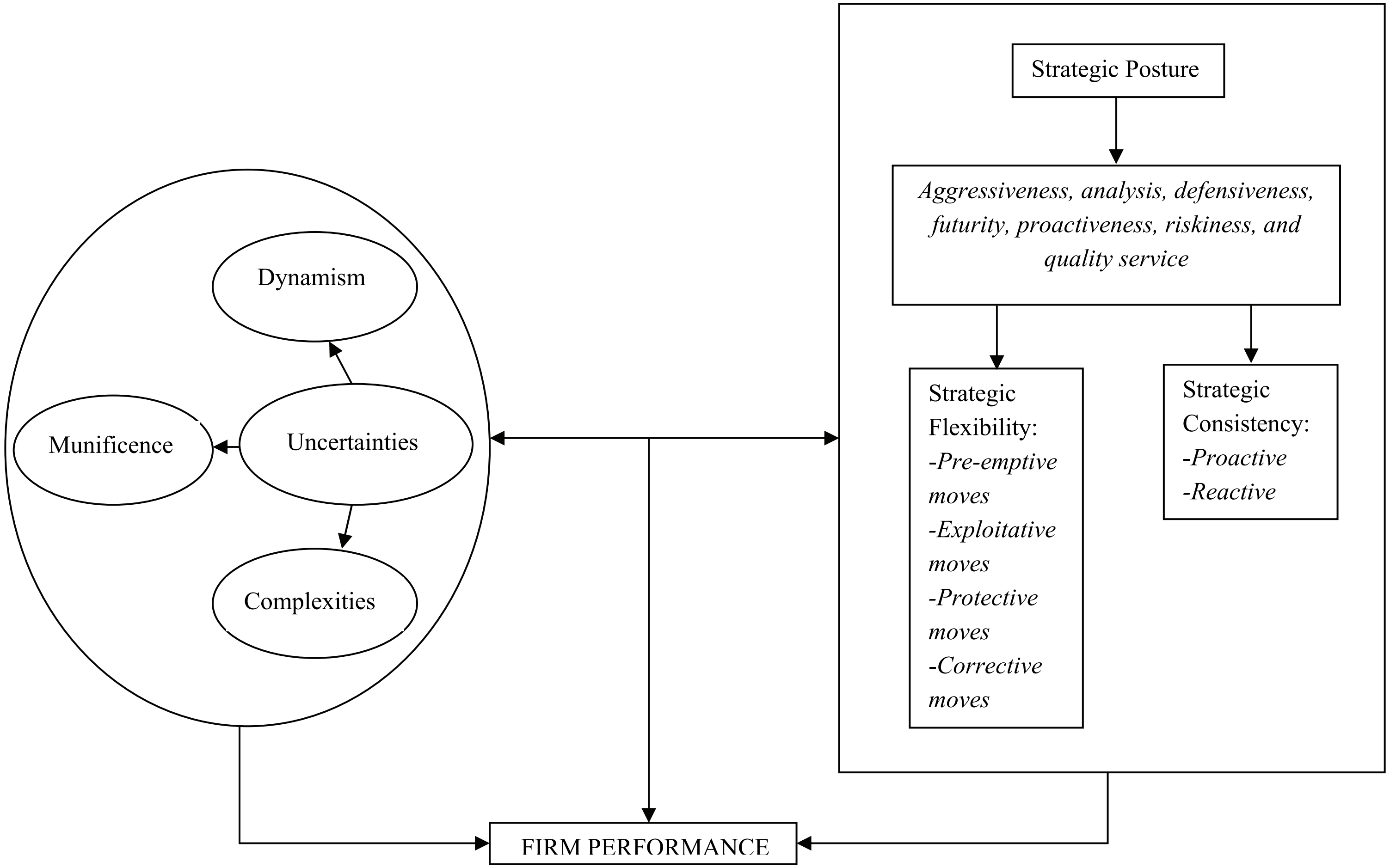

Fig. 3.5 Predicted Relationships between environmental uncertainties, strategic posture and Firm Performance [McArthur and Nystrom, 199i; Goll and Rasheed, 2004; Hamsal and Agung, 2007 and so on].

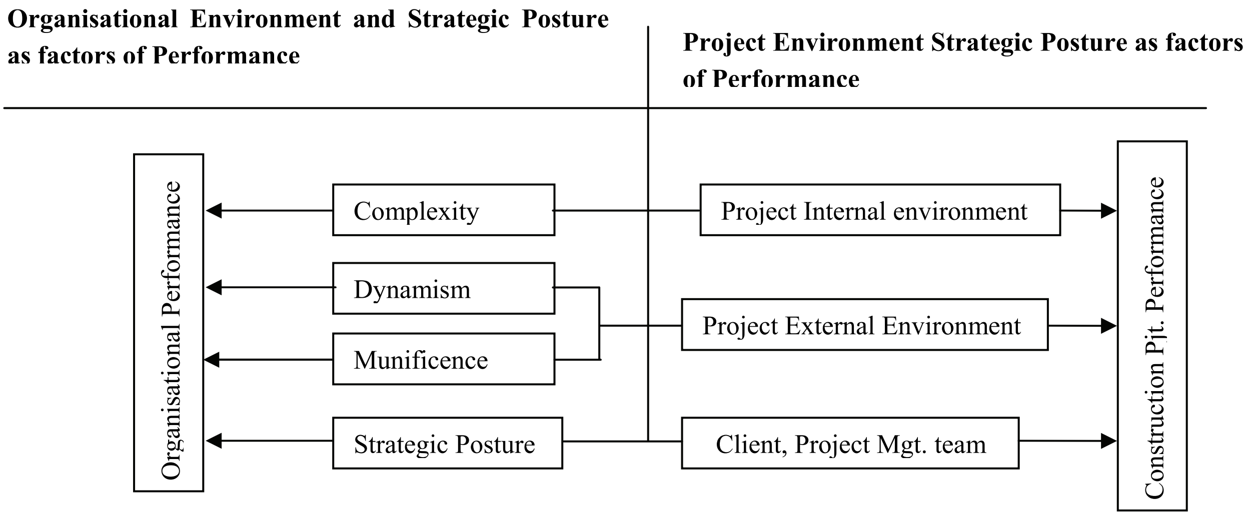

Fig. 3.6 Organisational (firms) and Project environmental factors related

3.5.3 Strategic Posture, the Environment and their effect on Performance

The role of strategic posture of the organisation and the organisation's environment in influencing the organisation's performance has been a topic for several organisation researches. Tosi and Slocum (1984) identify organisation environment as a major source of contingencies faced by a firm. McArthur and Nystrom (1991) provide that environmental munificence, dynamism and complexity interact with strategy to influence performance. They, state: "Advancing technologies, foreign competition, and shifts in consumer wants all generate increased dynamism and complexity. Under these challenging conditions, managers need to change their strategies, rather than merely fine-tuning them, in order to achieve higher performance........Clearly, managers should consider all 3 environmental dimensions when formulating strategies". This has led to the call of rational decision making in the light of uncertainties.

Environmental munificence has been found to be a moderator of the relationship between strategy-making and organisational performance (Goll and Rasheed, 1997). This position is supported by McArthur and Nystrom (1991) whose research on manufacturing firms showed that *environmental munificence, dynamism* and *complexity* interact with strategies to affect performance i.e. they moderate both the type and form of the strategy-performance relationship. Significantly, Bourgeois (1980) reasoned that *complexity* remains a relatively constant factor in task environments (as in project execution); thus *dynamism* would have a larger impact than *complexity* on performance. McArthur and Nystrom (1991) showed that *dynamism* has both moderator effects on performance, whereas *complexity* exhibits a moderator effect but no direct effect. However, a related research in the hospitality industry by Jogaratnam et al. (1999) could not establish the moderated role on environmental *munificence* on the effect of strategic posture on performance. Their results suggested that both *strategic posture* and environmental *munificence* are significant independent predictors of performance. In other words, the lack of the interaction terms emphasises the importance of understanding the significant yet independent additive effect of both *strategic posture* and *munificence*. The import of the foregoing is that the effect of the firm's (also project's) environment and its (also project's) strategic posture on performance has a contingency implication. In the project situation, further research is required to establish the relationship between these terms and the nature of their effect on performance. The present research, drawing from literature, addresses these effects from the general perspective of the independent effect on performance. It was limited to investigating the differential effect of these factors on performance. It however, sees this area as ripe for research in construction project management. In this research, however, it provides a basis for demarcating the project's environment factors into external and internal.

3.5.4 A Theoretical Framework for Project Performance Assessment

This research alludes to the concept of the project as a temporary organisation and adopt it as a nascent theory of project management, i.e. being regulated by *action, expectation and learning*. For efficiency in performance assessment and management, the project environment is separated into internal and external environments. The external environment is affected by contextual factors. Therefore, the research posits that the project situation should be considered within a context with all the relevant contextual factors well acknowledged. These factors i.e. *socio-cultural, socio-economic* and *political, institutional*, defines the external environment of the project. The internal environment of the project is affected directly by factors which affect the implementation process and hence the project performance. These are essentially contingency factors in nature and have been classified into factors related to: *the project, the project manager/consultant, the project team, the client's organisation*. These factors impact directly on the *action, expectation* and *learning* which shape the management of the project. Focusing on the performance of the project thus means that the research is emphasising the *expectation* variable as it interacts with *action* and *learning*. This is expressed in terms of the *criteria* in which performance could be measured or assessed.

The research is based on the fact that even when the same external environment (contextual factors) exists over time within the same country, the project's internal environment varies due to contingency factors defined by client types and their expectation, project location, project team, design and site conditions etc. Hence, the research also posits that project performance assessment measures should be considered within the contingency theory as it applies to the project as a temporary organisation. In the case of construction project in particular where there are several stakeholders, the *expectations* (represented by 'perspectives') will vary for each, at least in terms of the priority, given the same measures. This means that the perspective of each stakeholder is paramount within the action, expectation and learning theories of project management.

Figure 3.7 encapsulates the theoretical framework for this research.

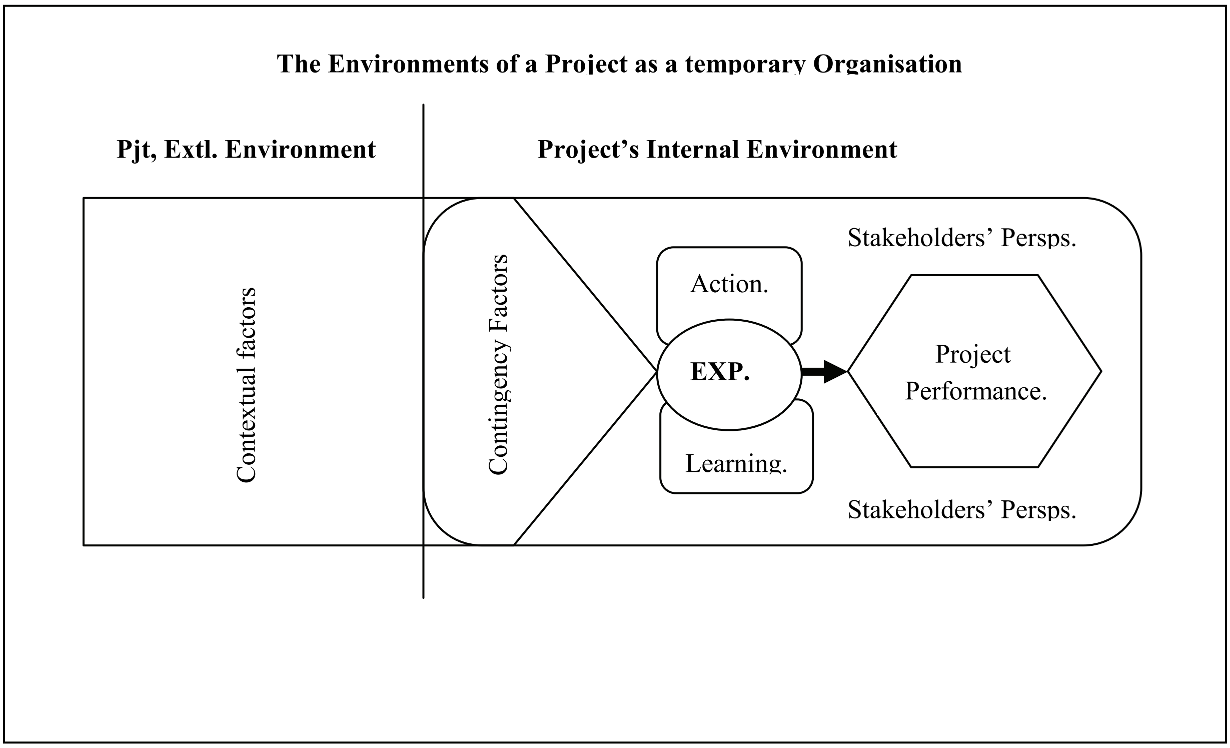

Fig. 3.7 The theoretical Framework for the Research

3.6 Conclusion

Literature has shown that issues relating to project performance should be placed in a context defined by both the internal and external environments of the project. Considering the project as a temporary organisation, it was possible to develop a theoretical framework based on the theory of action, expectation and learning. This position allows other concepts that relate to the permanent organisations and business to be applied to the project situation. In particular, best practices in business performance measurements could be learnt and applied to the construction project situation to ensure improvements. This implies a paradigm shift in project performance assessment in which the assessment of a project should lead to improvements and learning. It calls for using leading, instead of lagging measures, considering the results of project performance not as a dichotomous situation of success and failure but a continuum of several levels of performance, and considering the specific context in which the project is being implemented.

PART 2: THE EMPIRICAL RESEARCH

CHAPTER 4: The Research Framework, Method and Data Collection Techniques

4.1 Introduction

This section is begins with the development of a framework within which empirical investigation was undertaken of the relationship between practitioners' perspective of construction project performance and those of clients. It provides a link between the measures (performance factor groups and dimensions/criteria), as they exist in the practitioners' and clients' perspectives within the context of a selected social, economic and cultural setting. With the framework as a foundation, the chapter continues to explain the two preparatory surveys conducted in Ghana, each for practitioners and clients, as a precursor to the main survey. The surveys together with their results are discussed. Further the processes of filtering and clustering the many measures and sub-measures into manageable sizes for their modelling in the next survey are briefly explained. [During the pilot surveys phase, the main measures were called dimensions while the sub-measures were called criteria. For simplicity during the discussion, main measures and sub-measures were of often used at this stage to distinguish the measures. Later in the chapter, the main measures were named criteria, while the sub-measure became indicators; these were then referred to as such throughout the rest of the thesis.]

4.2 The Background to the Research Framework

This research considers the issue of project performance within the context of the construction industry. It is considered in the light of the effect of the interactions between the various relevant organizations on the project as shaped by human factors. The perspectives of two key stakeholders in project execution in Ghana are considered. The premise is that to determine the true state of a project by assessment, it requires the identification and clear definition of the *expectations* of these stakeholders before commencement if smooth execution and absence of conflict is the goal. The perspectives of these stakeholders are influenced by several factors within the context of the Ghanaian construction industry (see Figure 2.4 for the key contextual factors considered in the research design: *socio-economic, socio-cultural, political and institutional*). In addition, these stakeholders may also have their means of attributing project performance to different factors at play –factors that may have positive, negative or mixed effects on project performance. These distinguish not only individuals, but a group of people from one country to the other. Even though only the project team and organisational core factors were measured, it takes an implicit cognisance of the human core factors at play. These formed an important basis on which clients' and practitioners' perspectives were investigated as shown in this chapter.

4.3 Designing the Questionnaires for the Pilot Surveys

1 Practitioners' Perspective

i. Measures for Assessing Performance.

Table 2.1 provides lists of measures obtained from literature and considered by practitioners as important to assess the success/failure of a project. These form the basis of the pilot surveys on assessment criteria.

ii. Factors that affect Performance

Conceptualising the necessary model for factors that affect the performance of construction project performance, the research drew heavily on works by project success/failure factors researchers as far back as the late 1960s and the early seventies. Table 2.2 in chapter 2 captures a summary of some of the notable ones. The framework of Belassi and Tukel (1996) was adopted for its generality and adaptability and the fact that it fits very well within the contingency theory which regulates the research (Table 2.3).

2 Clients' Perspective (All Clients)

The satisfaction of clients regarding the procurement process is taken to be the perceived performance of the service providers during the implementation period; whilst those of the needs satisfaction are measured with the criteria representing both the observable and the latent needs (Mbachu, 2003). Figure 4.1 shows the perspectives of assessing development satisfaction of the various clients. In addition to meeting specific design goals (cost, time, quality etc.), they are taken to represent the perspective of clients on project performance in this research. In the process, the needs and motivation criteria of each client were identified. Table 4.1 summarises the needs/ motivation of various clients and service providers who must meet their expectations. This initial approach gave a global picture of how all clients in general view project performance, especially, during the development and commissioning phases.

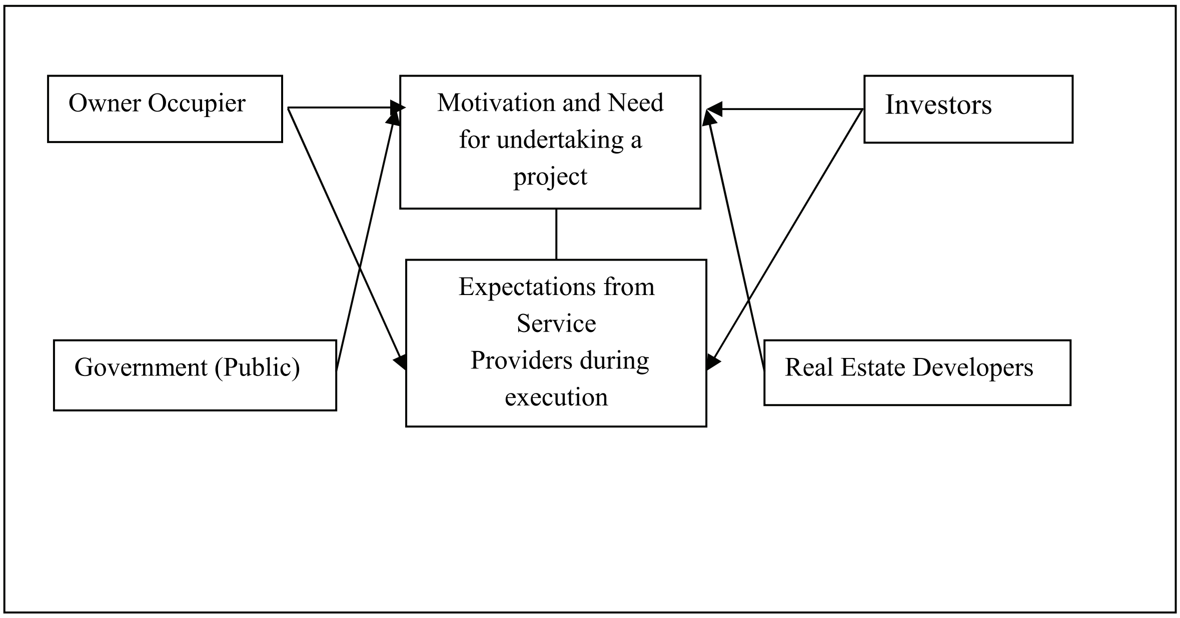

Fig. 4.1 Clients' perspective of project performance (Based on Mbachu, 2003)

Table 4.1 Identifying Clients Perspective by Type (Mbachu, 2003)

Client Type	**Need/Motivation**	**Expectations of these Service Providers must be met**
Owner Occupier	For business expansion, to minimise rental cost in the long-term leasehold, to improve capital assets, to enhance corporate image, to extend infrastructural facilities	Quantity Surveyors
Investors	For business expansion/market share, for diversification, to match fund liability with property asset base, to minimise investment risks and stable investment vehicle, to achieve capital growth/long-term retention of funds against inflation, to achieve desired returns on investment/profitability level, speculative purposes	Architects Project Manager/Lead Consultant
Real Estate Developers	For profit, speculative purposes, to maintain/improve market share, to achieve sales target	Service Engineers,
Government (Public)	To satisfy social need, to regulate economy, to generate income, for prestige/national pride, to satisfy international objective	Contractors

4.4 The Framework: Linking the Research Variables

Figure 4.2 shows how key elements of the theoretical framework relate and interact with the stakeholders and their focus. It demonstrates how each stakeholder takes *action* and *expects* results from the other and thereby provides a means by which *learning* can take place through *understanding complexities*, *aspiration* and *reflective conversation*.

Figure 4.3 illustrate the key concepts used in the empirical investigation and how they relate to each other. Within this framework, a clear distinction is made between the two perspectives being researched into: clients and Practitioners. Within each category, further distinctions were made. In the case of clients, four types of major clients (owner Occupiers, Investors, Government and Real estate developers) were initially distinguished (Mbachu, 2003). This allows inquiry to be made into their individual views. The results provided a basis for comparison with their expectations from practitioners. The final and main research, however, was based on the Government (public) clients only. In the case of the practitioners, the framework allowed the inquiry to be made from five main practitioners in the Ghanaian construction industry (consulting engineers, Architects, Quantity Surveyors, Project Managers and service engineers). This provided a general view of practitioners about the subject under consideration. Later, however, the inquiry focused only on those who usually play managerial roles in building projects: Architects, Quantity Surveyors and Project Managers. The research conceives that the responses that would be provided across board will be influenced by contextual factors and human experiences based on the number of years of practice, organisations they have worked with, projects they have worked on and other features that define the particular socio-cultural, socio-economic, institutional and Political and other external environmental factors.

Finally, the main objective of the research is to establish what will represent the perspectives of each of the stakeholders (clients and practitioners) as well as the resulting shared perspective.

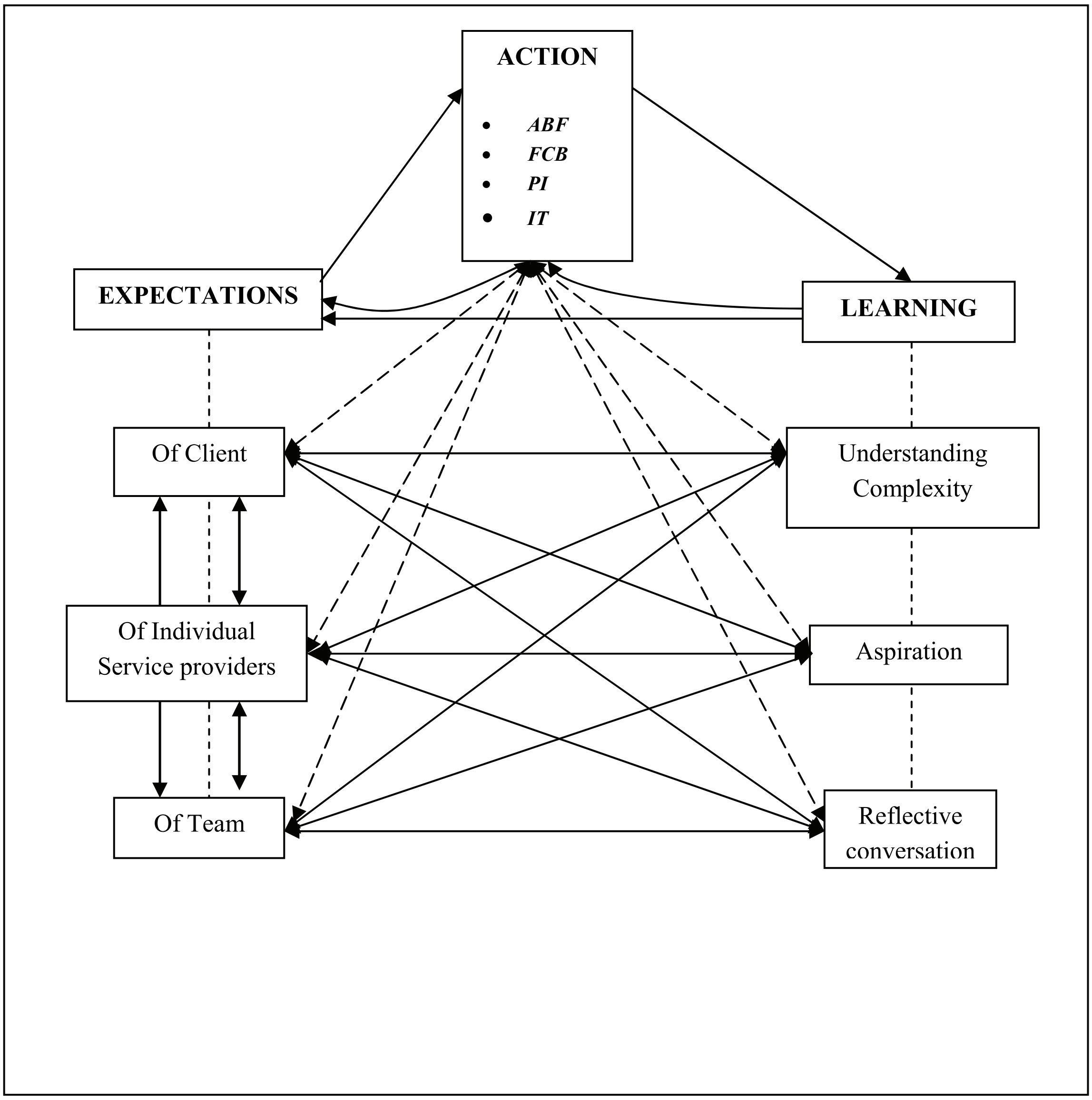

Fig. 4.2 Action, Expectations and Learning as related to the stakeholders

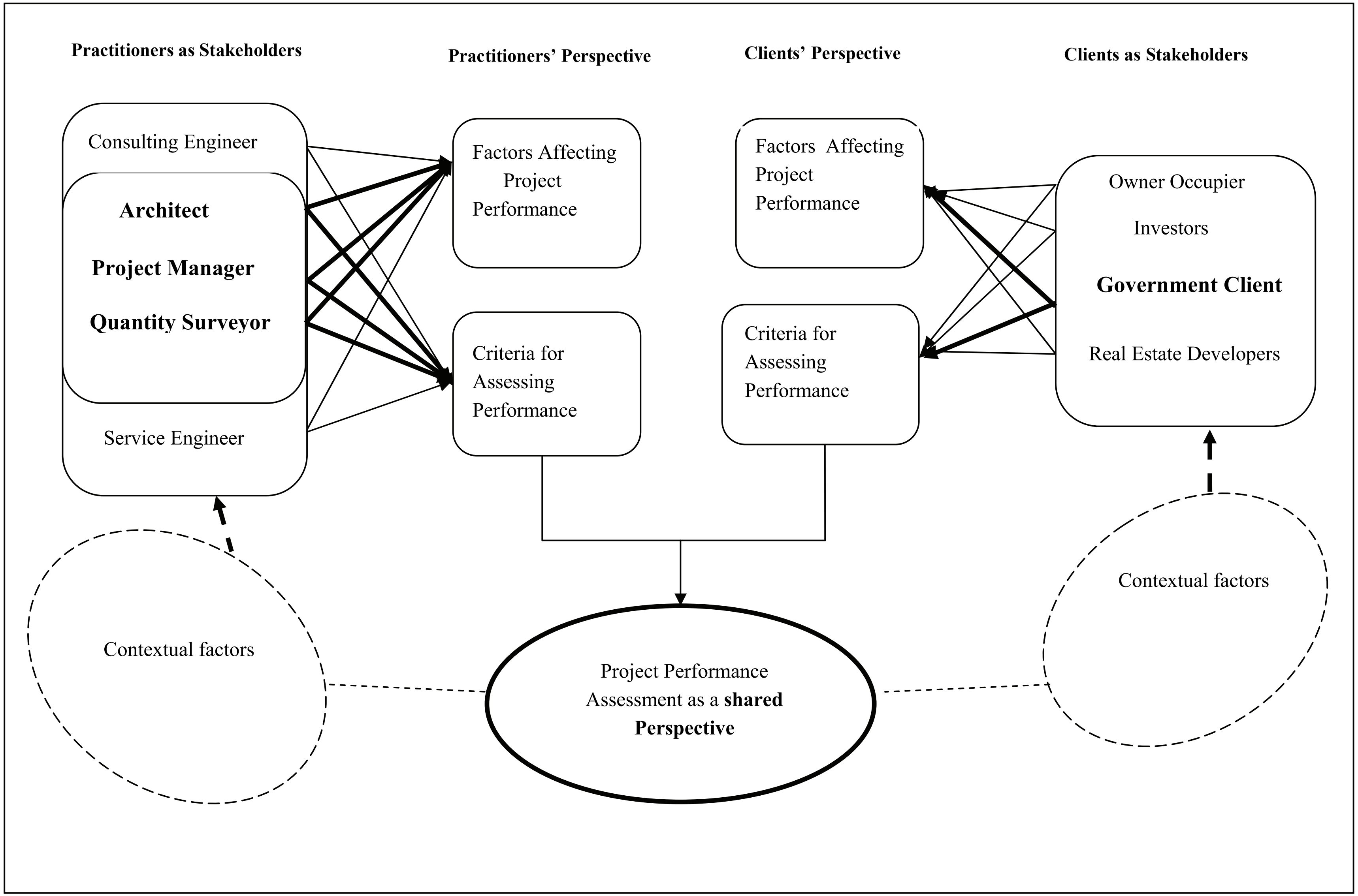

Fig. 4.3 The Research Framework.

4.5 Background to the Research Method and Data Collection Techniques

[NB: The Background to this section explaining the research methodology and the philosophical basis of the approach to the empirical research is attached as Appendix 16]
The method designed for this research falls within the paradigm of multi-methodology, specifically, Sequential Multi-methods and Mixed methods. This approach was chosen because each of the pilot studies involved both exploratory and confirmatory aspects which required both qualitative and quantitative approaches in the research method. The data collection was aimed at inquiry into and identification of two separate perspectives of construction project performance: (i) practitioners' and (ii) clients'. The research followed three sequences. It begun with two pilot studies conducted on practitioners and clients. The third survey was the main surveys for each study. The list of surveys, sample and the responses are listed in Table 4.2.
Tables 4.3 and 4.4 describe the details of the research approaches used in the practitioners' and clients' researches respectively. Figure 4.5 shows the graphic representation of the entire data collection stages. The empirical studies produced two main deliverables:
i. The key measures (criteria, indicators and factors) usable to model project performance in practitioners' and clients' perspectives (shown in Tables 5.1 and 5.5).
ii. A proposed contingency-based models for building the key measures usable for assessing the performance of a project in the client's (Table 4.10) and practitioners' (Table 4.11) perspectives. These models were borne out the key features of the research process and reminisce it.

4.5.1 Sampling Techniques

i. Practitioners Research: A total population of the focused groups was obtained from the professional bodies . 224 firms were isolated from 2036 registered profession (as at 1996) comprising 223 Quantity Surveyors (45 firms), 254 Architects (130 firms), and 1829 Engineers (31). From the list of engineers only the structural engineers were considered and 31 firms were identified. Because two state firms have branches in all the 10 regions, the total number of firms was increased to 244 out of which out of which 157 were randomly sampled for all the research. In the second survey, 145 were reached with the questionnaire. For the practitioners' workshop, purposive deliberate sampling was used to select 40 experts. [See Appendix 2 for details]. Because more than 80% of the practising professionals are centred in Accra and to a smaller extent, Kumasi, the survey population for practitioners was restricted to these cities with additions from Takoradi, Cape Coast, Koforidua and Sunyani, that is five out of the 10 regions.

ii. Clients Research: Purposive deliberate sampling was used in the first pilot survey to select 8 interviewees from 4 central government agencies (ministries); 2 Metropolitan

assemblies; 1 district assembly and one department for the interview. In the second survey, 5 central government agencies (Ministries) were sampled out of 10, 70 assemblies were randomly sampled out 138; 5 Nationalised institutions out of 10, 11 company clients were selected out 52 financial institution who are also construction clients; 20 out of 61 registered real estate developers and 15 private individual clients. Out of a total sample size of 131 + 10% = 144 was selected.
In the final survey, only the government agencies were selected for the survey: 70 + 5 + 5 = 80. In addition, practitioners were called to participate in clients questionnaires. Table 4.2 summarises the response rates. For the same reasons as those of the practitioners, the survey for clients was restricted to these five reasons. Table 4.3 shows the approaches used in the entire data collection. Tables 4.4 and 4.5 show the details of clients' and practitioners' research and data collection methods respectively. Figure 4.4 shows the flowchart of the data collection methods used.

iii. Potential sources of Biases.

The approaches used in the sampling exposes the process to undercoverage bias. This is because five out of the 10 regions were not covered. In addition, the response rate in both cases showed that a reasonable number of the questions were not returned. However, most of the respondents provided valid responses. Most weaknesses in the sampling approach is minimised by the repeated nature of the survey, along the same line of questioning in both cases. This ensured that subsequent surveys played the additional role of validating the earlier results. In addition, an expert's workshop organisation to discuss the results of the second survey of the practitioners also provided a further strength to the two results obtained. In the case of the clients, responses obtained from other client regarding the common questions: "expectations from service providers" provided a basis of comparison with government client's position.

Table 4.2 Response rate for the three surveys For Clients and Practitioners

Survey	Questionnaires sent	Response	Rate%
Practitioners' Survey 1	157	65	41.40
Practitioners' Survey 2a	140	28	20.00
Practitioners' Survey 2b	40	20	50.00
Practitioners' Survey 3	144	66	45.83
Clients' interview	-	8	100.0
Clients' survey 1	144	63 all client types	43.75
Clients' survey 2	80	26 government agencies	32.50
Clients' Survey 2	60	49	81.67

Table 4.3 Approaches used in the data collection

Research phases	**Client's Investigation**		**Practitioners' Investigation**	
	Strategy	**instrument**	**Strategy**	**instrument**
One	Qualitative (interview)	Semi-structured questions(Appendix 2)	Intra-method mixing (QUAN, qual)	open- and closed-ended questionnaires (Appendix 5)
Two	Intra-method mixing (QUAN, qual)	open- and closed-ended questionnaires (Appendix 3)	Intra-method mixing (QUAN, qual)	open- and closed-ended questionnaires (Appendix 6)
Three	Quantitative	closed-ended questionnaires (Appendix 4)	Quantitative	closed-ended questionnaires (Appendix 7)

Table 4.4 Client's Research Methods and data collections

Phases	Sampling Approach	Data Collection approach	Data analysis	Analysis and use of findings	Priority
1	Purposive deliberate	Interview, [Open-ended questions]	Qualitative	Noticing, coding, themes	Qualitative
2	*Random, Purposive deliberate* [for public client, Real estate developers], *snowballing* [for investors and owner occupiers]	Intra-method mixing, [closed- and opened-ended questions for both private and public clients]	Both qualitative and quantitative data analysis	i. Private and public results compared. ii. public clients findings documented	i. Public client results integrated with clients measures (needs/motivations) from practitioners' survey 1 ii. Cluster measures for survey 2
3	Random, Purposive deliberate	quantitative	quantitative	Results as findings	quantitative

Table 4.5 Practitioners' Research Methods and data collections

<table>
<tr><th>Phases</th><th>Sampling Approach</th><th>Data Collection approach</th><th>Data analysis</th><th>Analysis and use of findings</th><th>Priority</th></tr>
<tr><td>1</td><td>Stratified random, Purposive deliberate, opportunity and snowballing</td><td>Intra-method mixing [closed- and opened-ended questions]</td><td>Both qualitative and quantitative data analysis</td><td>Integrate both the results into a questionnaire for next phase</td><td>quantitative</td></tr>
<tr><td>2 a.</td><td>Stratified random, Purposive deliberate, opportunity and snowballing</td><td>Intra-method mixing [closed- and opened-ended questions]</td><td>Both qualitative and quantitative data analysis</td><td rowspan="2">i. Integrate all the three results and cluster them into a questionnaire, for next phase.
ii. separate clients' perspective measures for clients' questionnaire for survey1</td><td rowspan="2">Both quantitative and qualitative</td></tr>
<tr><td>2 b</td><td>Stratified random, Purposive deliberate, opportunity and snowballing</td><td>Focus, [experts' workshop]</td><td>qualitative</td></tr>
<tr><td>3</td><td>Purposive deliberate, opportunity and snowballing</td><td>quantitative</td><td>quantitative</td><td>Results as findings</td><td>quantitative</td></tr>
</table>

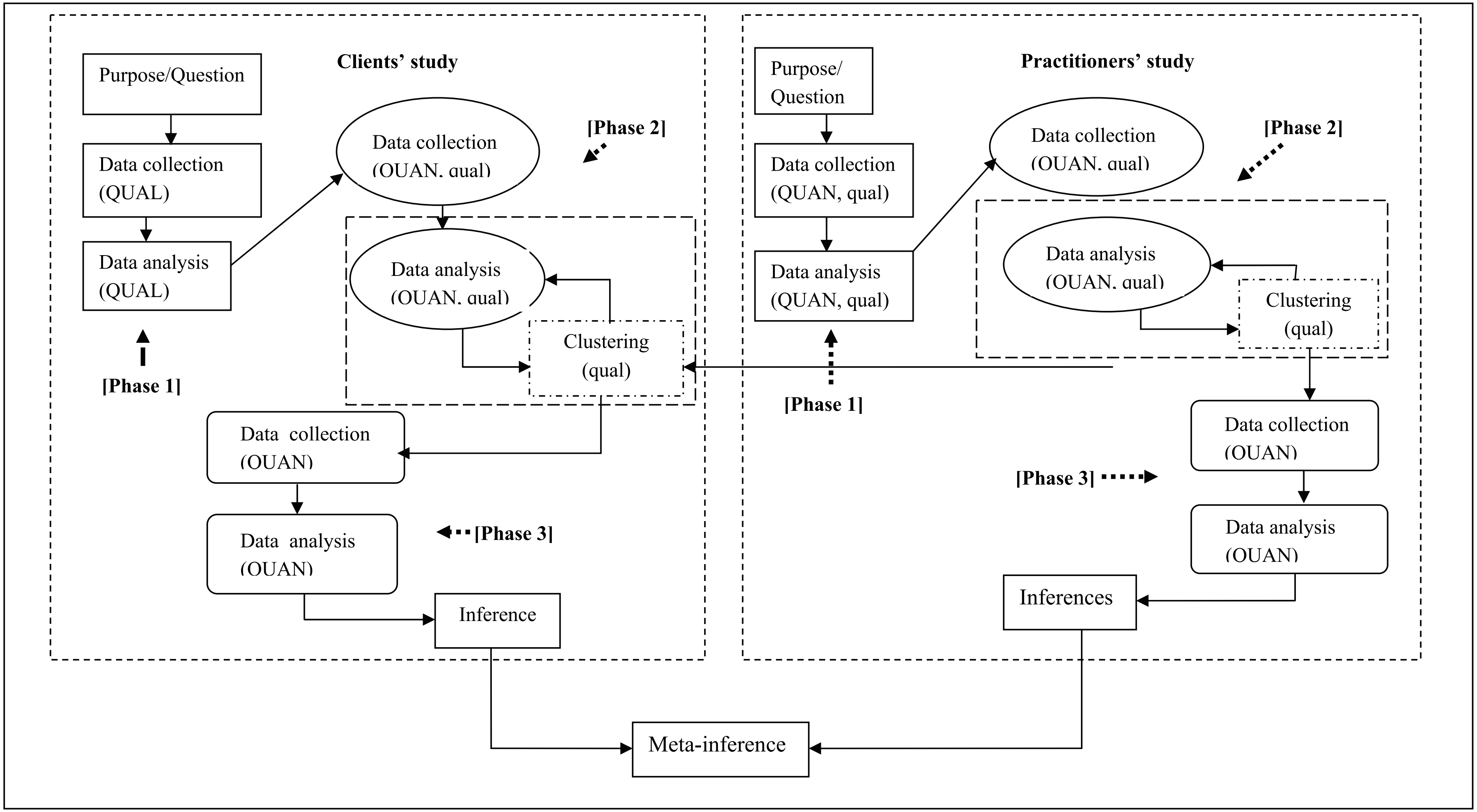

Fig.4.4 Flowchart of Mixed Model and Mixed methods used for the research

4.6 Research on Practitioners' Pilot surveys –Data Collections and results

This pilot survey took twelve months to complete, while the main survey took six months. The first phase was used in collecting relevant measures of project performance in Ghana. A questionnaire approach was used (mixture of open- and closed-ended items) to achieve this aim (refer to Appendix 2). The closed-ended items were measures obtained from literature. In these practitioners were asked to select the ones which are relevant in Ghana. The open-ended questions allowed practitioners to include any measure known to be relevant in Ghana but were not included in the questionnaires. The latter type represented the qualitative aspect while the former represented the quantitative aspect, the dominant method. The analyses brought together a set of measures which are of varying degree of relevance based on responses received.

The results of the first pilot studies were used to create an improved version of the questionnaires for the survey in second pilot studies. Using mainly closed, but also some open questions, the main goal of the survey was to assess which measures were considered to be important indicators for project performance. Using likert scales of 1 to 4, important factors were selected as those that score three or higher.

Tables 4.6 and 4.7 describe the results of t-test for statistical significance of indicators and factors respectively. The first column of Table 4.6 contains the main measures (criteria). The second column comprised the related sub-measures which were found to be important. The third column contains sub-measures which were found to be not only important but also statistically significant. In Table 4.7, the first, column contains factor groups, while the second and third column contains the related sub-measures which are important and those which were found to be statistically important respectively. The sub-measures in italics are new measures proposed by respondents.

Table 4.6 Summarised result of inferential statistical analyses of Practitioners Survey 2 (Measures)

Measures		
Main measures (Dimensions)	**Sub-measures (Criteria) which are only important**	**Sub-measures (Criteria) which are both important and statistically significant**
Criteria (13:0:4)		Cost, Time, Technical Quality, Client Satisfaction
Cost (12:1:2)	Variation between contact sum and final account	Fluctuation costs, Variation costs
Time (13:2:3)	Actual time for honouring certificates as against agreed, Times for arrivals of materials	Variation between estimated time and actual completion time, Actual commencement time, Time for evaluation and certification,
Technical Quality (9:1:1)	Records of variation orders	Major variation between original design and actual completion works,
Managerial (12:3:4)	Risk management, Personnel management, Decision making procedures	Budget management, Communication with team and workers, Resource schedule and control, QS services, Architectural services
Innovation and learning (14:1:0)	Uniqueness of project	
Environmental Impact Assessment (3:1:0)	Construction waste handling	
Project Execution Efficiency (15:8:5)	Site organization, Frequency of variation orders, Consistency of variation orders, Regularity of site meeting, Relationship between expected and actual outputs, Effective health and safety measures, Project going on schedule, Project going on budget	Contractors diligence to work, Contractors response to architect's/ engineer's instructions, Time for honouring payment certificates, Proper budgeting preceding project, Complete designs before proceeding.
Customer Perspective (10:4:3)	Functionality to end user, Solving customer problems, Adequacy of internal functioning, Adequacy of security facilities,	Initial cost to end user, Aesthetic appeal, Adequacy of service installation,
Finance/Commerce (3:2:0)	Cash flow generation, Profit generation	
Contribution to Business (11:3:0)	Building a positive image of the client's company, Causing firm's growth, Having a large impact on the company's future,	
Benefit to National Infrastructure (6:0:0)		
Future Perspective (4:1:1)	Preparing organization for future	Long-term benefits,

Table 4.7 Summarized result of inferential statistical analyses of Practitioners Survey 2 (Factors)

Measures		
Factor Groups	**Factors which are only important**	**Factors which are both important and statistically significant**
Factors Related to the Project (10:7:3)	Project value, Uniqueness of project activities, Project duration, Urgency, Project location, Project definition, *Project density*	Project type, *Contractor's experience,* Buildability
Factors Related to the Project Manager/Consultant (12:5:7)	Ability to trade-off among competing requirement, Competence, Commitment, *Perception of his role and responsibilities*	Ability to coordinate, Ability to delegate authority, Ability to take decision when necessary, Competence, Commitment, Ability to lead, Communicate effectively,
Factors Related to the Project Team (6:0:6)		Technical background, Communication, Relationship among them, Commitment, Competence, Ability to work as a team
Factors Related to the Client's Organization (8:2:6)	Project organization structure, Functional manager's support	Top management, Relationship with project team members, Ability to take decisions, Technical ability, Understanding project cycle and procedures, Relationship with the contractor
Factors Related to the external environment (10:4:4)	Social environment, Technological environment, Sub-contractors, Availability of labour	Political, Economic, Client, Suppliers of building materials,
Intermediate factors (16:4:9)	Effective use of technology, Work breakdown structure, risk management, Start-up difficulties	Client consultation and acceptance, Effective planning and scheduling, Effective coordinating and communication, Effective control & monitoring, Quality management, Project preliminary estimates, Availability of resources, Client's attitude towards payments, Financial management,

** The ratios in the first columns of Tables 4.6 and 4.7 describes: the number of sub- measures used in the questionnaire: the number of sub- measures found to be only important: the number of sub- measures found to be both important and statistically significant.*
The tables record only the last two sets of sub- measures, the first can be referred from Appendix 9.

4.6.1 Discussions of the Key Criteria and Indicators

1. Table 4.6.
a. Key Measures.

Out of the 13 main measures used in this questionnaire, it turned out that the traditional *cost, time, quality,* and *client satisfaction* turned out to be the most important and significant ones. The non-traditional ones received rather low ranking showing that they are of little importance. This confirms the position of Atkinson's (1999) observation that, all these years, practitioners have acquainted themselves only with these traditional measures.

b. Individual sub-measures.

From the results, the rankings of the levels of importance of the set of sub-measures in each main measure, as well as those which were deemed to be statistically significant confirm that practitioners' responds to questions reflected how acquainted they are with these measures and sub-measures. Regarding the first five main measures which represent the practitioners perspective, two of them, *managerial* and *project execution efficiency,* had the highest number of their sub-measures being ranked as important and statistically significant: (12:9:5) and (15:13:5) respectively. Practitioners are very familiar with *cost, time* and *technical quality*, yet it turned out that they believe that most of the sub-measures that really define them are not important in the Ghanaian situation. This is seen in the rankings of these indicators received: (12:3:2), (13:5:3) and (9:2:1) respectively. *Innovation and learning* and *Environmental impact assessment* are new criteria to consider by practitioners in Ghana and their indicators, as expected, received lower ranking (14:1:0) and (3:1:0) respectively. The other 5 criteria in Table 4.6 are those of client's perspective criteria which were tested on practitioners.
The result is a reflection of Ghanaian practitioners' perception on which sub-measures are presently important within known measures, and which main measures are important in assessing performance. However, the study hold the position that for comprehensive assessment and the one that will support improvements and satisfy all the expectations of a project, it is not enough to limit the number of relevant measures to only the familiar ones which received high ranking. The relatively high mean values as well as the t-values of the other sub-measures ranked as of little important and non-statistical significant suggest their relative relevance and that they need not be discarded altogether (refer to Appendix 9).

2. The factors (Table 4.7).

The results of practitioners' ranking of the factors on the other hand showed that most are important and affect the performance of projects in Ghana. In addition, a reasonable number were also found to be statistically significant. Using the framework of Belassi and Tukel (1996) as a framework, the results only confirms its strength, generality and relevance to other environments, in this case the Ghanaian construction environment.

4.6.2 Results from a Follow-up Experts' Workshop –Focus Group Discussion

Following the findings of the survey, it became necessary to organise a workshop of team of experts to have experts' opinion survey and the results obtained. This was to assess the validity of these results and to take informed decisions based on qualitative analysis on which of the criteria is of practical relevance to the Ghanaian situation.

In this research, one qualifies to be an expert if one meets the following criteria:

i. Has the requisite professional certificate provided by the responsible professional bodies,

ii. Has practiced for not less than 5 years since obtaining professional certificate,

iii. Has attended the last three continuing professional development

At end of the workshop, it was realized that most of the measures and sub-measures were of relevance in assessing construction project in Ghana, both the ones which reflected purely the view of practitioners and those which are inclined towards the client. It was also suggested that some of the measures need refinement and structuring to make it more succinct. The following were also agreed.

'Innovation and learning' dropped

An issue was raised about the relevance of including of *innovation and learning* as a measure of assessing project performance. The conclusion of the ensuing discussion was that it should not be included. The reason being that *innovation* is not yet a major issue in the Ghanaian construction industry. No project is executed by the government with the aim of bringing about innovation. With regard to *learning,* it was agreed that it should not be seen as a measure per se; rather the entire process of execution and all the experiences should be recorded as a learning material for improvement purposes in the future. This position agrees with Ankrah (2007) findings that the level of innovation and learning in construction is generally not high. Again, Riley and Claire-Brown (2001) has shown in their research findings that innovative values in production and process manufacturing companies are more significant than in construction. Ibert

(2004) reasoned that collective learning is lost once a project is completed and the project organisation is disbanded. Be that as it may, it is one of the aims of this research that the assessment tool in contemplation is expected to facilitate the purpose of *learning* from project experiences as a basis for improvements.

Social Impact Assessment be included

It was mentioned that social impact assessment should be included as a measure because of its relevance in recent times in Ghana. The explanation was that it is a major issue of government that projects bring about changes in the social life of the people. Therefore the impact of the project on society should be considered as a measure of performance.

Factors that affect Performance

There was a unanimous agreement on the factors groups for their relevance in the Ghanaian construction industry. This corroborates the responses from the survey.

Integrating the Results

The results from the workshop were integrated with those of the second survey (phase 2) to prepare the final (main) survey for practitioners' research. This was achieved by qualitatively clustering some closely related measures and sub-measures, renaming them criteria and indicators respectively and thereby reducing the overall number of these measures. Those measures which were client related were separated and added to the clients' research at the final phase after they have been investigated in practitioners' perspective. These were: *customer perspective, financial/commerce, contribution to business, benefit to national infrastructure, future perspective.*

4.6.3 Adopted Names for the Measures and Sub-measures: Criteria and Indicators

In preparation for the final survey, it became necessary to re-define the key terms to be used in the survey for the model development and to clarify the distinctions between dimensions, criteria, indicators since these terms have often been used interchangeably in literature. The problem caused by the difference in the definition of criteria and indicator has been well acknowledged (Lammerts van Buren and Blom, 1997; Sherry et al, 2005). This stems from the fact that both words has been sometimes interchange. It is worth showing the distinction between the two at this stage.

A criterion is a standard by which a thing is judged. It adds meaning and operationally to a principle (a fundamental truth) without itself being a direct measure of performance (Zborowski et al, 1999). They are the essential elements that must be present as the goals of performance. Examples are Cost, Time, and Technical Quality of a project. According to the CCFM (Canadian Council of Forest Ministers, 1995): “A criterion is a category of conditions or processes by which sustainable forest management may be assessed…characterised by a set of related indicators, which are monitored periodically to assess change. An indicator is a quantitative or qualitative variable which can be measured and described and which, when observed periodically, demonstrates trends”. Chan et al (2004) defines criteria of project success as *“the set of principles or standards by which favourable outcomes can be completed within a set specification”.*

On the other hand, Indicators can be viewed as variables that can be used to measure the status or condition of a system or process (Mendoza and Prabhu, 2002). In this context, indicators are used as measures for assessing performance in a certain criteria. They are the control variables (also referred to as pressure, process or driving force) that may in turn influence the system. Indicators are used to infer the status of a particular criterion. They convey a “single meaningful message” called “information” (Zborowski et al, 1999). According to Beatham et al (2004), KPIs are measures that indicate performance of associated processes. An example cited is about the ***temperature*** gauge on an engine which, when it shows an unusually high temperature, could be indicative of other problems or potential problems which need corrective action. In this research, the following Hierarchy exists between Performance, Criteria and Indicators (Figure 4.5).

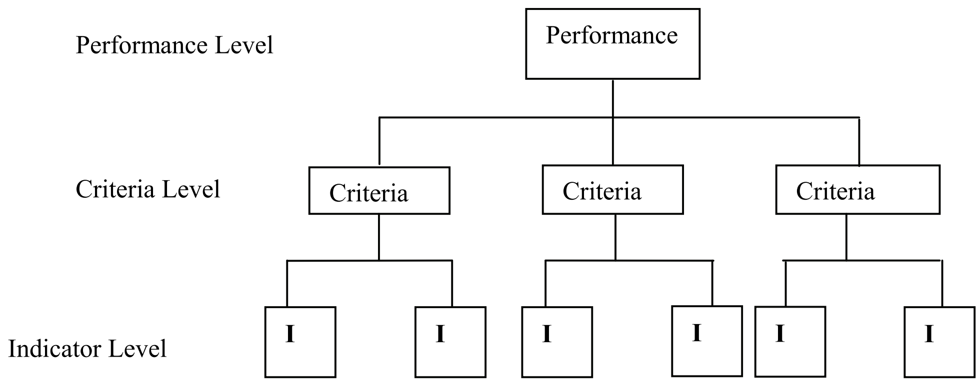

Fig. 4.5 Relationship between criteria, Indicators and Performance as used in this research

For the criterion of cost, for example, such controllable variables as; fluctuation cost, variation cost, dispute cost, etc are indicators. They give information of the "Cost" criterion. Indicators are, thus, the direct or indirect signs and signal that can be used to monitor and assess criteria (Sherry et al, 2005). Indicators in this research are the sub-criterion. Subsequently, measures referred to as "dimensions" become "criteria".

4.6.4 Qualitative Clustering and Filtering

Background

For both surveys (clients, and Practitioners') it was decided that the main questionnaires for model development for the research should be designed based on measures and sub-measures which have gone through qualitative filtering and groupings or clustering. On the basis of the above, the main survey was designed with measures that could reflect relevance and importance, as well as being measurable. This required that some of these measures are first 'filtered' from the lot since there may be more sub-measures in some cases than could be populated in a typical main-measure. After this, the remaining ones are 'clustered' (deciding which sub-measures should appear in which perspective/criteria/factor group), as observed by Cobbold and Lawrie (2002). Within the proposed assessment framework, it is expected that measures and sub-measures follow a certain hierarchical order as far as they could provide a basis for objective measurement.

Procedure

Before finalising the choice of sub-measures, the provisional set (from the results) were assessed against the following range of qualities (DTRL (2001, p. 29): *redundancy* (necessary and important ones*), operationality (*clearly defined enough for assessment), *size,* and *mutual independence of preference* –It is required in MCA that criteria and what they measure must be independent of each other. This condition must be met if the sum of weighted averages is to be used to combine preference scores across criteria. It means that whenever two criteria are closely related that they are not preference independent of each other, they should be combined into a single criterion, which captures the common dimension of their value. The same is true of the indicators. (For practitioners' measures for the Main survey, refer to Appendix 14, for the clustering process). This meant that they needed to be re-named and arranged to fit the structure of a known framework. In the case of practitioners' measures, these criteria were mapped onto, and justified by, the framework for best practice project management as provided by the "Project

Management Body of Knowledge (PMBOK) Guide (PMI, 2004, p. 11). Because it is the intention of this research to recommend project performance assessment as an engine of construction industry development in the long run and to support the industries quest for sustainability, these measures were also made to fit within the primary pillars of sustainability as provided by "Achieving Excellent in Procurement Guide 11" (OGC, 2009, pp. 8-9). By ensuring that they fit in these guides, these measures assumes the structure that lends itself to both best practice in project management as well as playing a role in the global agenda of construction industry development and sustainability. The relevant indicators usable within these criteria will depend on the particular location of the project and the contingency factors at play.

Ultimately, six distinct criteria for assessing construction project in Ghana emerged: *Cost(C), Time (T), Quality (Q), Management and Execution Efficiency (MEE), Social Impact (SI) and Environmental Impact (EI)* (Table 4.8).

Table 4.8 Guides for Modelling Performance Criteria in Practitioners Perspective

No.	**Selected Criteria at Project level**	**Project Management Knowledge Areas. (PMI)**	**Sustainability Pillars**
1	*QUALITY*	Project Quality Management	ECONOMIC
2	*MANAGEMENT AND EXECUTION EFFICIENCY*	Project Integration Management	
3		Project Communication Management	
4		Project Risk Management	
5		Project Procurement Management	
6		Project Human Resource Management	
7		Project scope Management	
8	*COST*	Project Cost Management	
9	*TIME*	Project Time Management	
10	*ENVIRONMENTAL IMPACT*		ENVIRONMENTAL
11	*SOCIAL IMPACT*		SOCIAL

This research posits that, for now, it is sufficient to assess construction project in these criteria mostly for the following reasons:
i. They are supported by the project management body of knowledge areas;
ii. They are supported by the pillars of construction sustainability;
iii. They form well delineated groupings under each of which one of the relevant a sub-measure can related to;
ii. these categorisation of the criteria (of the main measures) provide opportunity for other indicators (sub-measures) that become relevant in future to be added as well as to eliminated the ones which would be relevant at a point in time;
iii. they promise to address all the areas that are necessary to support improvements in project execution, promote construction sustainability, and the ultimate development of the Ghanaian construction industry, in this regard, representing a balanced scorecard of measures for the industry.
In the case of the factors groups that influence performance, the adopted framework (Belasi and Tukel, 1996) was maintained as the broad categorisation based on their endorsement by the respondents and at the experts' workshop. However, the related factors under these also went through clustering as shown in Appendix 14. The resultant measures (criteria and factor groups) and sub-measures (indicators and factors) are all detailed in Table 5.1.

4.7 Research on Clients' Pilot surveys –data collections and results

Mainly, clients' research adopted Steckler et al.'s (1992) model 1, (i.e. using qualitative method to develop quantitative measures). This was deployed as a sequential exploratory design as provided by Creswell et al.'s (2003), because it was realized that the interview was a fundamental means of knowing what is really in the minds of the clients. Eight public client agencies were interviewed (refer to Appendix 5 for the interview questions). The purpose of this research was to identify:
i. Clients' interpretation of project performance.
ii. Why they have that point of view.
iii. How they came by that point of view.
iv. What their roles have been in the implementation of their project.
v. How they conveyed their view of dissatisfaction of the situation.

The purpose of the qualitative data analysis was to extract from the data some form of explanation, understanding or interpretation of clients regarding their projects. This process involved two main things:
i. Writing about findings from data in forms of themes
ii. Coding of these themes (refer to Appendix 10).

Seidel (1998) describes the qualitative data analysis process in terms of *Noticing, Collecting, and Thinking* about phenomena, categories and themes. Bryman (2008 p.550-554) elaborate on coding and thematic analysis of interviews. These formed the basis of designing the matrix for coding and thematic analysis (Appendix11). The response from the interview were analyzed qualitatively through the process of coding the responses, finding categories and subsequently, relating the various categories to find *themes* for the details. The themes that had common relationships were synthesized out of which seven statements emerged.

4.7.1. Themes from clients' Responses

Statement 1: Clients want to play active roles in project implementation
Statement 2: For every project, clients have set standards to be met and the extent to which these set standards are met determines their satisfaction level.
Statement 3: Clients believe that the performance of service providers is a function of project performance and hence expect much from them, especially, consultants.
Statement 4: Clients are generally dissatisfied when their expectations from service providers are not met.
Statement 5: Clients believe that consultants do not always work towards achieving their ultimate satisfaction.
Statement 6: Clients always have a well defined objective or need for which they undertake a project.
Statement 7: Clients want the performance of consultants to be assessed continuously, throughout the project phases.

The above statements (findings) provided a framework within which a second pilot survey was conducted. Ultimately, three questions underpinned the data collection process in this second phase:
i. What are the objectives, needs or motivation of clients when they undertake to construct a building project?
ii. What are clients' expectations from service providers?
iii. How can these needs and expectations be determined so as to serve as an assessment measures and sub-measures in the perspective of the client?

4.7.2 The second Pilot Survey for Clients

The first two questions above formed the basis of the second pilot surveys. The third was addressed in the main survey. In the process clients were asked to provide a general assessment of service providers' performance in these measures and sub-measures. The questionnaire was grouped into two: i. clients' needs/motivation for undertaking a project and
ii. Clients' expectations from service providers (practitioners and contractors). In the latter category clients were also asked to rank their responsibilities and the extent to which they are meeting those responsibilities towards the accomplishments of the project objectives. This survey was conducted on four types of clients who provide the bulk of building projects in Ghana: *government agency, the social security and national insurance trust (SSNIT), real estate developers* and *owner occupiers.* Mbachu's (2003) questions on client satisfaction was adopted and adapted in a likert scale type (refer to Appendix 6).

i. Summary of Results from Second Pilot Survey

A summary of the results is shown in Tables 4.9, and 4.10. The first column of Table 4.9 contains the client type, the second and third columns contain the sub-measures found to be important and those found to be statistically significant. Later, the four clients were grouped into private (Investors, Owner occupiers and Real estate developers) public (government agencies) clients.
With reference to Appendices 12, it is conclusively deduced that for all types of clients:
i. All the ranked expectations of clients from service providers were both important and found to be statistically significant.
ii. In most of the cases, there were statistically significant performance gaps between clients' expectations from service providers and the general assessment of their performance (exceptions: in the case of the project managers', private clients saw no significant performance gap in *Team work and efficient coordination;* and from consulting engineers *Workable design*).
In Table 4.10, the first column contains the service providers usually engaged by clients. The next three columns describe the public clients' assessment of the extent to which service providers are meeting their expectations. This is followed by three columns which describes the assessment of private clients on service providers in the same light. The results show that that in general:
i . both public and private clients have a common expectations from service providers, and
ii. both the public and private clients agreed that service providers are generally meeting those specific expectations, on the average.
iii. In general, private clients are more satisfied with service providers than public clients.

Table 4.9 Summary Results of Client's Survey l analyses

Client type	Needs/Motivations which are only important	Needs/Motivations which are both important and statistically significant
Real Estate Developers (4:0:3)		For Profit, To maintain/improve market share, To achieve sales targets
Investors (7:4:3)	For business expansion, market share improvement, competitive, For diversification purposes; To minimize investment risks believing that property is a comparatively low risk and stable investment vehicle; To achieve capital growth/ long-term retention of funds against inflation; Speculative to meet anticipated demand	For diversification purposes; To match fund liability with property asset base; To achieve desired returns on investment/ profitability levels.
Owner occupiers (5:5:0)	To minimize rental costs in long-term leasehold, resulting from leasehold decision, To improve on capital assets of the firm, To enhance corporate image, To acquire or extend infrastructure facilities with a view to enhancing business process	
Public Client (5:0:1)		To satisfy social needs

Table 4.10 Summary of percentage satisfaction of clients' expectations
From service providers

Service Provider	Public Clients			Private Clients		
	No. Expectations.	**Range (%)**	**Av. (%)**	**No. Expectations.**	**Range (%)**	**Av. (%)**
Quantity Surveyor	5	13.68	73.28	5	6.4	77.14
Architects	6	9.80	74.33	6	11.79	78.51
Project Managers	5	19.77	68.19	5	17.87	83.81
Consulting Engineers	5	2.74	73.54	5	1.51	84.97
Contractors	7	9.6	68.17	7	11.27	78.22

The results above show that clients in Ghana have the same expectations from service providers as their counterparts in South Africa. This is in the light of the fact that, as already stated, this aspect of client's research adopted the same indicators as used by Mbachu (2003) who conducted his research in South Africa.

Other related Results

In the case of client's responsibilities and the extent to which they are meeting them (Appendices 12), all but one measures showed statistical significant position (*Assessing levels of similar development springing up, or having been slated for near future development with a given node, before investing*).

Comparing the expectations of public and private clients

The results showed that there were generally no differences between the expectations of the two client types from the same service providers whose services they usually engage. The exceptions were: one from the Architects (*Aesthetic appeal*), one from the contractors (*financial capacity and adequate guarantee against own and sub-contractors default*), and one from clients' responsibilities (*Assessing levels of similar development springing up, or having been slated for near future development with a given node, before investing*). This is supported by the t-test results.

Clustering and Filtering

As already mentioned in the case of the practitioners' analysis, these measures were also grouped and clustered, each of which comprised measures of similar characteristics. In the particular situation of clients' needs and motivation criteria, three sources of information were carefully combined in the processes of clustering and filtering:
i. Clients' measures tested in practitioners' survey 2.
ii. Clients' measures tested in client survey 1
iii. Additional measures suggested by respondents in Client survey 1
(Refer to Appendix 15)
In the case of the client, the clustering resulted in two main criteria: *Needs/Motivation (N/M) and Expectations from service providers (ESP).* These are further defined by indicators and sub-indicators. Focusing on the government clients, N/M is defined by *contribution to good*

governance (CGG), contribution to national infrastructure (CNI) and *addressing future infrastructural needs (AFIN)*. ESP is defined by clients' specific expectations from all the service providers. Without prejudice to other possibilities, this research limited the service providers to *Project Managers/Consultant, Architects, Quantity Surveyors, Consulting Engineers and Contractors.* Other may be roped in or existing ones removed according to the demands of the project. Similar to the case of practitioners, it is the position of this research that, for now, these two criteria captures the essence of what has been hitherto referred to as "clients' satisfaction"; and could be used when assessing construction project performance in the Ghanaian construction industry. The following reasons underpin this decision:

i. They cover the three main aspects of monitoring infrastructural development: (a) *physical and financing (b) process and (c) impact monitoring (PMI, 2001; Ramirez, 2002; Otieno, 2000).*

ii. They are broad enough to allow for new N/Ms or ESPs to be captured;

iii. They provide a means by which clients latent and stated needs could be addressed in their own measures.

iv. They support management efficiency as requested by project management body of knowledge;

The results of the measures after the qualitative cluster analyses of clients' measures are shown in table 5.5.

4.8 Proposed Model for Building Assessment Measures and Sub-measures for Projects

The foregoing provides a basis for proposing a model to be used for building contingency-based measures for use in assessing the performance of a typical construction project. Tables 4.11 and 4.112 illustrate the proposed model which is applicable under any construction projects for clients and practitioners respectively. Each follows the process of brief, design, execution and handing over stages. Each model follows the flowchart of figure 4.6. The same approach is also used to build these factors and their sub-factors. This is one of the key deliverables of this research.

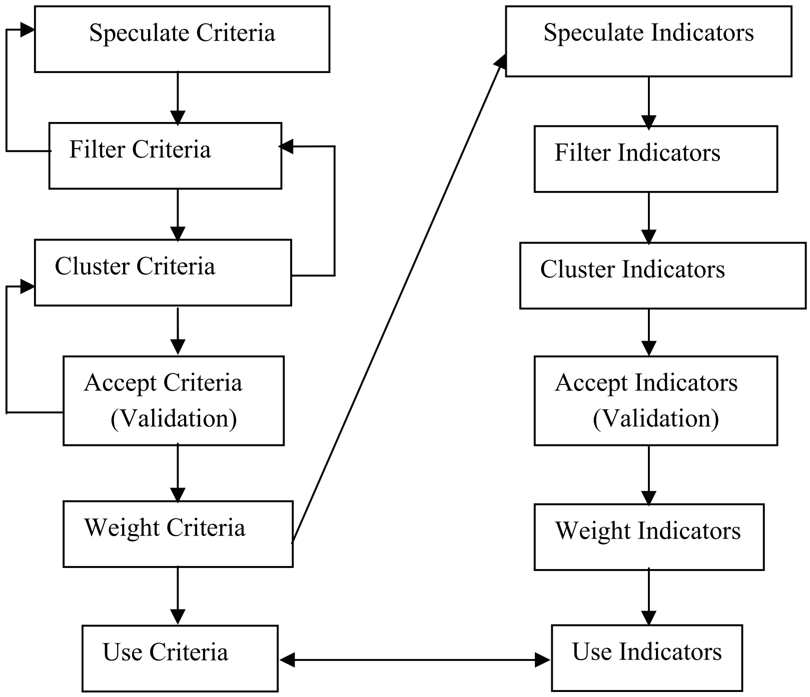

Fig.4.6 Flow Chart for Building Assessment Measures and Sub-Measures

The flowchart in Figure 4.5 summarises the major milestones in the building up of the assessment measures for use on any project.

i. It begins with the speculating of the appropriate criteria which are expected to be used in the assessment procedure. This could be drawn from a data bank of measures or from sources of best practice for adaptation.

ii. The next stage is to begin the qualitative analysis of filtering from the measures so as to decide from among the list those which prove to be of real relevance to the project situation.

iii. The resultant criteria are then analysed for clustering. This groups them into a well defined groups or categories which will be capable of measuring the expected specific objectives of the project in a balanced form. This requires merging some measures into one named or under a new name that reflect the contents.

iv. The resultant groups are then re-analysed for their acceptance.

v. The accepted measures are then weighted to determine the relative importance of each of them in the set towards the accomplishments of the specific objective they are expected to measure.

This is followed by a repetition of the procedure for selecting the relevant indicators for each selected criterion.

vi. After going through this process, the measures are then ready to be used on the project.

NB: In this research, the main measures (criteria and the factor groups) for the Ghanaian situation are established already in the research, steps i-iv should be skipped for the criteria.

All the above steps are to be used to determine the relevant criteria, indicators and factors that will used to measure and monitor the project performance.

The above process is further elaborated in tables 4.11 and 4.12 for clients' and practitioners' perspectives respectively.

Table 4.11 A Contingency-based Model for Building Clients' Measures and Sub-Measures

Activity	Actor(s)	Stage	Method	Guidelines/Tools
Building criteria, Indicators and Factors				
Speculate client's criteria for performance	Performance assessor (PA)or project manager (PM), design team, client or client's representative	Briefing period to contract documentation	Interviews, and questionnaires	Client's brief, design parameters, specifications, BOQs and contract documents etc.
i. Filter the criteria	PA, PM, design team, client or client's representative	Design period to contract documentation	i. Questionnaire for filtering.	i. Guidelines from literature. ii. Rank analysis
ii. Cluster the criteria qualitatively	PA	Design period to contract documentation	ii. Agglomerative method	ii. Hierarchical clustering, value tree
Indentify the relevant indicators for each of the criteria	PA, PM, design team	Design period to contract documentation.	Interviews, discussions, and questionnaires	Client's brief, Design parameters, specifications, BOQs and contract documents etc.
Filter the indicators	PA, PM, design team	Design period to contract documentation.	Interviews, discussions, and questionnaires	Client's brief, Design parameters, specifications, BOQs and contract documents etc.
Cluster the indicators	PA, PM, design team	Design period to contract documentation.	PA	Client's brief, Design parameters, specifications, BOQs and contract documents etc.
Accept and adopt the measures for assessment	PA, PM, design team, client or client's representative	Pre-implementation stage	Discussions	Client's brief and interview report, Design parameters, specifications, BOQs and contract documents etc.
Using criteria, indicators and factors in assessment				
Weight the criteria, indicators and factors	PA, PM, design team, client or representative of client	Pre-implementation period	Questionnaires	Rating in percentages or pairwise comparison for analytical hierarchy process (AHP).
Use the weight criteria, indicators and factors in the assessment tool	PA	Throughout Project Life Cycle	Provided by assessment tool	Assessment tool

Table 4.12 a Contingency-Based Model for Building Practitioners' Measures and Sub-Measures

Activity	Actor(s)	Stage	Method	Guidelines/Tools
Building criteria and Indicators				
Decide on practitioners' Criteria for performance	PA, PM, design team	Design period to contract documentation	Interviews, and questionnaires	Design parameters, specifications, BOQs and contract documents etc.
i. Filter the criteria	PA, PM, design team	Design period to contract documentation	i. Questionnaire for filtering.	i. Guidelines from literature. ii. Rank analysis
ii. Cluster the criteria qualitatively	PA	Design period to contract documentation	ii. Agglomerative method	ii. Hierarchical clustering, value tree
Indentify the relevant indicators for each of the criteria	PA, PM, design team	Design period to contract documentation.	Interviews, discussions, and questionnaires	Design parameters, specifications, BOQs and contract documents etc.
Filter the indicators	PA, PM, design team	Design period to contract documentation.	Interviews, discussions, and questionnaires	Design parameters, specifications, BOQs and contract documents etc.
Cluster the indicators	PA, PM, design team	Design period to contract documentation.	PA	Design parameters, specifications, BOQs and contract documents etc.
Accept and adopt the measures for assessment	PA, PM, design team	Pre-implementation stage	Discussions	Design parameters, specifications, BOQs and contract documents etc.
Using criteria and indicators in assessment				
Weight the criteria, indicators and factors	PA, PM, design team, client or representative of client	Pre-implementation period	Questionnaires	Rating in percentages or pairwise comparison for analytical hierarchy process (AHP).
Use the weight criteria, indicators and factors in the assessment tool	PA	Throughout Project Life Cycle	Provided by assessment tool	Assessment tool

4.9 Conclusion

The aim of the main data collection was to show how the identified measures could be organised into models which could be developed into a framework for assessing and managing construction project performance in Ghana. The second objective has been to show that construction project performance assessment is a multifaceted approach. The approach enabled the determination of the perspectives of clients and practitioners on how and in which criteria and indicators they want construction projects to be assessed and also monitored. The results represent the experiential view of these stakeholders. Thus, a direct result of the methodological approach is the proposed a model usable for building contingency-based measures (criteria and indicators) for assessing construction project performance. The researchers believe that the model lends itself for adaptation for use on any construction project. It also allows the possibility of determining multiple perspectives as expected in the case of construction project execution with its many stakeholders. Finally, The six criteria that reflected practitioners' perspective [cost, time, quality, management and execution efficiency (MEE), social impact (SI), and environmental impact (EI)] and the two criteria of the clients' [needs/motivation criteria (N/M) expectations from service providers (ESP)] are considered very representative of a combined or shared perspective of clients and practitioners in Ghana for now.

CHAPTER 5: Modelling Practitioners' and Clients' Perspectives Performance: the Main Survey

5.1 Introduction

As indicated in the previous chapter, the aim of the main data collection was to show how the identified measures could be organised into models which could be developed into a framework for assessing and managing construction project performance in Ghana. The results of main surveys for practitioners and clients are discussed in this chapter. The first part of the analyses yield models that represent the perspective of practitioners on project performance, regarding its assessment and monitoring and controlling of the project throughout its life cycle. The next is devoted to modelling clients' perspective. The models revealed themselves in shapes and characteristics that motivated the name "performance polygons" which are illustrated in Figures 5.1 and 5.2. Thus, the chapter concluded by stating that measures used to monitor, control and measure construction project performance should be regarded as having a number of "degree of freedoms", to undergo changes contingent on the demands of the project at any phase, just like a typical polygon. The chapter merely provided the analysed results from the survey. The contextual analysis of the results in relation to the Ghanaian situation is explained in chapter six. The chapter begins, however, by explaining the designation of the measures adopted for the main surveys.

5.2 Practitioners' Perspectives on Project Performance

The method of analyses is structured into three sections based on the questionnaire design, namely,

i. **Criteria and Indicators for assessing project performance**. Analyses of this section resulted in a model showing the relationship between the Project Performance Assessment and their criteria used in assessing it, as well as the relationship that exists between each criteria and its set of indicators.

ii. **The Factors Affecting Project Performance.** The analyses of this section resulted in the establishment of models representing the relationship that exist between each of the factor groups (influencing factors) and their respective factors (active factors) as they affect the performance of the project.

iii. **Effect of the Factors (in their groups) on each of the Criterion of Project Performance.** Analysing this section resulted in models showing the relationships that exist between each of the criteria and the set of factors Groups.

5.2.1 Results of the Analyses

The detailed results of the analysed responses are as shown in Appendix 10. It shows the average weightings of each of the sub-measures in the perspective of each group of practitioners Architects, Quantity Surveyors, and their corresponding standard deviations. This is followed by the overall average weighting and standard deviation for the practitioners taken together. From these results, the "Perspective Models" for each group of practitioners, as well as those of all the practitioners, are extracted.

5.2.2 Extracting the Perspective Models and the Relationships

1. The Principle.

i. The average rating of each group of practitioners on a set of indicators in relation to the criteria under consideration represents the model showing how important or influential each indicator is in the set. Since these represent the perspective of one group of practitioners, say, Architects, it becomes the "Perspective Model" of set of indicators of the Architect in that respect. For example, if the main measure is "Cost", then the average responses provided by Architects for the indicators of cost, namely, *Environmental/Social costs, Managerial costs, Legal costs, Incidental costs, Fluctuation cost, Total Cost Overrun,* becomes Architects' "Perspective Model" for Cost Indicators regarding their influence on Cost.

ii. For each group of practitioners, a relationship could be established between the criteria and indicators based on the "Perspective Model" in a form of an equation:

$y_1 = a_1x_1 + b_1x_2 + c_1x_3 + \dots\dots\dots + nx_n$,

where,

y_1 = the main measure (dependent variable).

$x_{1,}\, x_{2,}\, x_{3\dots}$ and x_n are the sub-items (independent variables), and

a, b, c… and n represent the averages (weightings) obtained from the analyses.

iii. The mean of all the averages of each of indicators from the responses of each group of practitioners represent their "overall averages" or "weightings". Together, they represent the "Practitioners' Perspective Model" of the indicators, in this case, *cost indicators*, regarding their individual influences on Cost.

iv. A relationship could be established between criteria and the set of its indicators based on the "Practitioners' Perspective Model" based an equation:

$Y = AX_1 + BX_2 + CX_3 + \dots\dots\dots + NX_n$,

Where Y is the main measure being (dependent variable),

$X_{1,}\, X_{2,}\, X_{3\dots}$ and X_n are the sub-items (independent variables), and

A, B, C… and N represent the weightings obtained from the analyses.

The above relationships are possible because the weights (averages) of all the sub-measures in a set add up to 100% or 1. The same relationship exists between the influencing factors and the active factors.

v. In the case of the equations for the Practitioners Perspective Models, dependent variables becomes the "Objective Function" which the assessment seeks to minimise or maximise, as the case may be, in order to achieve a project objective.

2. Describing the Tables [for detailed analysis, see Appendix 10].

i. Table 5.1 contains the abbreviated form of the measures as used in the models and relationships.

ii. Table 5.2 shows the Factor groups and their effects on the criteria. In table 5.2 each row shows how the set of the factor groups (on the left) relate to each assessment criteria (at the centre); and how the criteria in turn relate to their set of indicators (at the right).

Table 5.1 Abbreviations for the Assessment Measures

No.	Criteria	Abbre-viation	No.	Criteria	Abbre-viation
	Project Performance Criteria	**PP**		**Project Team**	**PT**
1	Cost	**C**	**36**	Technical Background (Education)	**TB**
2	Time	**T**	**37**	Relationship among team members	**RTM**
3	Quality	**Q**	**38**	Commitment of team members	**CTM**
4	EI	**EI**	**39**	Ability to work as a team	**ATW**
5	S.I	**SI**	**40**	Competence of team	**CT**
6	MEE	**MEE**		**Project Manager/Consultant**	**PM/C**
	Cost	**C**	**41**	Ability to coordinate	**AC**
7	Environmental/ Social Costs	**ESC**	**42**	Ability to delegate authority	**AD**
8	Managerial Costs	**MC**	**43**	Ability to lead	**AL**
9	Legal Costs	**LC**	**44**	Arbitration skills	**AS**
10	Incidental Costs	**IC**	**45**	Ability to communicate	**ATC**
11	Fluctuation Costs	**FC**	**46**	Knowledge/Skills abt. Project.	**KS**
12	Total Cost Overrun	**TCO**		**Project**	**Pj**
	Time	**T**	**47**	Project size	**PS**
13	Valuation/ Certification Times	**TVC**	**48**	Project value	**PV**
14	Times for Payment of C. Works	**TP**	**49**	Urgency for completion	**UC**
15	Incidental Times	**IT**	**50**	Project Uniqueness	**PU**
16	T. For Comp. of Major Works	**TW**	**51**	Project complexity	**PC**
17	**Quality**	**Q**	**52**	Life cycle	**PLC**
	Reworks (number/extent)	**R**		**Client Organisation**	**CLO**
18	Material test records	**MTR**	**53**	Top Mgt. support	**TMS**
19	Services test records	**STR**	**54**	Client's Org. Structure	**COS**
20	Eng./ Arch's Approval/ Disapproval.	**E/AR**	**55**	Relationship with Project Team	**RPT**
21	Variation, number/extent	**V**	**56**	Ability to take decisions	**ATD**
22	**Management and Execution Efficiency**	**MEE**	**57**	Relationship with contractor	**RC**
23	Decision Making Process	**DMP**	**58**	Sensitivity to Environmental Issues	**SE**
24	Communication and Reports	**CR**		**Project's External Environment**	**PEE_P**
25	Efficiency of project Team	**EPT**	**59**	Political	**PE**
26	Supervision of contractor	**SCON**	**60**	Economic	**EE**
27	Inspection and Approval of works	**IAW**	**61**	Social environment	**SE**
28	Site Meeting Regularity	**SM**	**62**	Nature /Weather	**NW**
	Environmental Impact	**EI**	**63**	Availability of Labour, Material, Plants	**LMP**
29	Investment. On Environmental Issues	**IE**			
30	No. of employees with env. tasks	**NEE**			
31	No. of reported Incidents	**NRI**			
32	compliance with regulations (extent)	**DC**			
	Social Impact	**SI**			
33	No. of Population affected	**NPA**			
34	No. and type of community institutional structures affected	**NCSA**			
35	Type of Comm./Soc. resources affected	**TRA**			

5.3 Models and Summary of Relationships

Analysed results from the practitioners as shown in Appendix 10 represent the weightings for each of the measures and sub-measures. Together they represent the models of practitioners' perspective of project performance. Because the weightings of each set of sub-measures that define the main measure add up to 100%, the following relationships are established between them.

i. Summary 1: Criteria –indicators Relationships.

PP = 26.2C + 18.5T + 20.1Q + 10.2EI + 9.8SI + 14.9MEE……. 5.1

C = 12.8 ESC +20.3MC + 9LC + 10.5IC + 22.2FC + 25.2TCO …......................................5.2

T = 20.6TVC+ 30.1TP + 13.9IT + 35.4TW………………………….........................5.3

Q = 15.2R+ 21.5MTR + 17.5STR + 28.2E/AR + 17.7V..5.4

MEE = 16.2DMP + 15.6CR + 21.4EPT + 19.2SCON + 14IAW + 13.7SM.........................5.5

EI= 27.6IE + 21.1NEE + 19.9NRI + 31.3DC...5.6

SI = 33.5NPA+ 35.4NSCA + 30.8TRA...5.7

ii. Summary 2: The Criteria-Factor Groups Relationships

C = 16.6PM/C + 18.9PT + 28.7Pj + 18.4CLO + 17.4 PEE_P ………………………………..5.8

T= 17.7PM/C + 19.7PT + 25.6Pj + 20CLO + 16.9 PEE_P …………………………..........5.9

Q = 25.6PM/C + 28.6PT + 15.1Pj + 15.9CLO + 14.6 PEE_P ..……………………………5.10

MEE_2= 25.2PM/C + 25.5PT + 15.7Pj + 18.2CLO + 15.5 PEE_P ....…………………..5.11

SI= 16.3PM/C + 15.8PT + 23.5Pj + 20.1CLO + 24.2PEE_P 5.12

EI= 15.9PM/C + 16.4PT + 25.4Pj + 17.6CLO + 24.8 PEE_P ……..…………………….5.13

iii. Summary 3: The Factor Groups-Factors Relationships

PT = 27.4TB + 13.8RTM + 17.9CTM +18.3AWT + 22.6CT……………………….........5.14

PM/C = 20.6 AC + 14.1AD + 16.9AL + 10.1AS + 15.8ATC + 22.6KS………………….....5.15

Pj = 20.1PS+ 21.9PV + 18.0UC + 12.6PU + 16.8PC + 10.9PLC……………………….........5.16

CLO = 17.5TMS + 16.8COS + 19RPT + 21.9ATD + 13.5RC + 11.1SES.………….........5.17

PEE = 19.9PE + 26.6EE + 14.8SE + 14.9NW + 23.8LMP 5.18

iv. Summary 4. The effect of the factor groups on overall project performance

PP =19.6PM/C + 20.8PT + 22.3Pj + 18.4CLO + 18.9PEE...5.19

5.3.1 Explanation of the Models

The three summaries above represent practitioners' models on the various facets of project performance assessment in Ghana.

1. Summary 1 shows the "assessment score sheet". These describe the relationships between:

i Project performance and the criteria by which they could be assessed (equation 5.1). The relationship shows that in assessing *project performance* (PP) in the perspective of practitioners, *cost* (C) must be given the highest priority with 26.2%, followed by *quality* (Q): 20.1%, then *time* (T): 18.5%, *management and execution efficiency* (MEE): 14.9%, *environment impact* (EI): 10.2% and *social impact* (SI): 9.8%. This relationship provides information as to which criterion is playing what role in any level of project performance at any stage of the assessment.

ii. Equations 5.2-7 show each criterion and its indicators. The relationships show the weighting of each indicator among the set of indicators within the set in the criterion. For example, equation 5.2 shows the criterion *cost* (C) with indicators *environmental and social costs* (ESC) with a weighting of 12.8%; 20.3% for *managerial cost* (MC); 9% for *legal costs* (LC); 10.5% for *incidental costs*; 22.2% of *fluctuation cost* (FC); and 25.2% *total cost overrun* (TCO). The same holds for the other criteria i.e. quality, time, MEE, SI and EI.

2. Summary 2 shows the "monitoring score sheet". These describe the relationships that connect the influencing factors (factor groups) that affect the performance of projects to the individual criteria (equations 5.8-13). For example, equation 5.8 shows that the criterion *cost* of the project is influenced by the five factors in this manner: factors related to the *project manager/consultant* (PM/C), 16.6%; the *project team* (PT), 18.9%; the *project* (Pj), 28.7%; the client's organisation (CLO), 18.4%; and the *project's external environment* (PEE_P), 17.4%. The same holds for the other criteria. The relationship shows the extent to which these factor groups affect the particular criterion. The essence of this relationship is to assist in monitoring the impact these factors are having on each of the criteria.

3. Summary 3 shows the "control score sheet". These describe the relationships of the influencing factors and their active factors showing the dominance of each the active factors in a set (equations 5.14-18). For example, the influencing factor, project team (PT), is represented by *technical background* (TB) of the team, 27.4%; *relationship among tem members* (RTM), 13.8%; *commitment of team members* (CTM), 17.9%; *ability to work as a team* (AWT), 18.3%; and *competence of team* (CT), 22.6%. The same holds for the other influencing factors.

4. Summary 4 shows the relationship between the factor groups (influencing factors) and overall project performance (equation 5.19).

Table 5.2 Overall strength of Influence of Factor Groups over Assessment Criteria

Criteria	PM/C		PT		Pj		CLO		PEE	
	Wtg.	Ranking	Wtg.	Ranking	Wtg.	Ranking	Wtg.	Ranking	Wtg.	Ranking
26.2C	16.6	5	18.9	2	28.7	1	18.4	3	17.4	4
18.5T	17.7	4	19.7	3	25.6	1	20.0	2	16.9	5
20.1Q	25.6	**2**	28.6	**1**	15.1	4	15.9	3	14.6	5
14.9MEE	25.2	**2**	25.5	**1**	15.7	4	18.2	3	15.5	5
10.2EI	16.3	4	15.8	5	23.5	2	20.1	3	24.2	1
9.8SI	15.9	5	16.4	4	25.4	1	17.6	3	24.8	2
Ave. wtg/Overall Ranking	**19.6**	**3**	**20.8**	**2**	**22.3**	**1**	**18.4**	**5**	**18.9**	**4**

Table 5.2 works out the average effect of a typical factor group on overall project performance. This is based on how each factor affects all the criteria in different degrees. In addition, each row on the table shows the relative effect (by ranking the weightings) of each factor on a particular criterion. For example, the first row shows how each of the five factor groups affects ‘cost’. In this row, it shows that factors related to the project (Pj) has the most influence over ‘cost’ while the factor with the least effect on ‘cost’ are factors related to the project manager/consultant. Overall, it the average weightings shows factors relating to the project still has the highest influence on the overall project performance; the least are the factors related to the client’s organisation.

The summaries are depicted in the Polygons below.
1. Figure 5.1 illustrates the model of project performance in Practitioners’ perspective
2. Figures 5.2 illustrate the model of the factors groups as the affect project performance in Practitioners’ perspective.

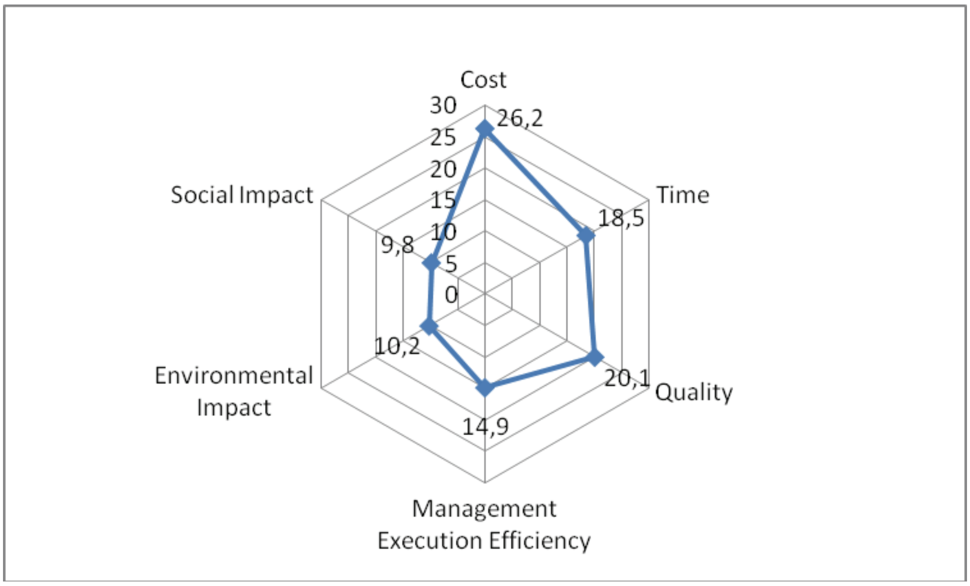

Fig. 5.1 A Model of Practitioners' Perspective.

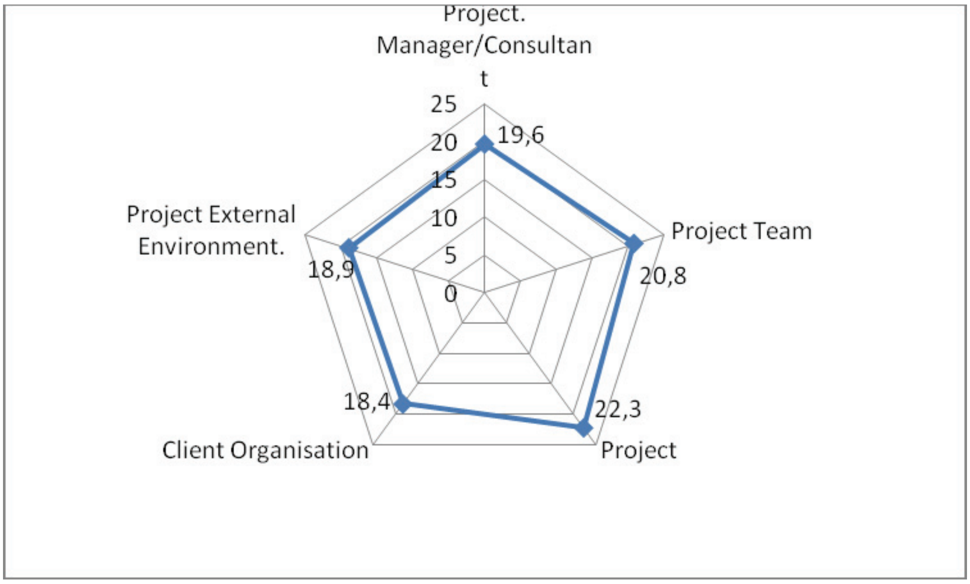

Fig. 5.2 Practitioners' Model of the Main Factor Groups.

5.4 Clients' (Government's) Perspective of Project Performance

This section is devoted to analysing the responses from the second questionnaire clients (which was also given to practitioners to answer for comparison purposes. It provides a means by which the perspective of the clients on project performance is determined.

5.4.1 Client's Perspective of Project Performance

The aim of the final survey of the client was twofold:
i. To determine what goes to determine the client's perspective of project performance and how it could be modelled,
ii. To determine the extent to which practitioners' views on project performance compare with those of the client's, given the client's measures as the yardstick. The strategy of the questionnaire was to ask clients to rate, in order of influence or importance (as the case may be) the following measures:

a. The criteria that defines their needs and motivation for undertake projects;

b. The criteria representing client's (government's) expectation from service providers (Architects, Quantity Surveyors, contractors etc.);

c. Given that the Client's Needs/Motivation criteria are influenced by service providers' performance or lack of it, as well as other factors, clients were asked to rate these according to their individual influences;

d. The client's satisfaction levels across the project life cycle (Rowlinson, 1999 p.27; McDermot, 1999 p.42)

e. How does the client rate the key criteria for assessing project performance in order of importance?

Items (a) and (b) capture client's perspective of project performance, providing criteria in which it should be measured. Items (c) and (d) provide a means by which the project performance could be monitored for control purposes. The detailed results are shown in tables in Appendix 13. The analyses from these tables yielded models that related the various criteria with their indicators, and factors and their indicators. Finally, models that relate clients' needs/motivation criteria to the influencing factors are shown.
The models are expressed in three forms:
1. Those relating to the clients' responses based on given clients' questions.
2. Those relating to Practitioners' responses on the same questions.
3. Those representing a shared perspective of clients' a practitioners'.

As in the case of the practitioners' models, it was necessary to abbreviate the descriptions of the measures in these models. Table 5.3 contains the main abbreviations for the descriptions for all the measures used in the perspective of the client.

Table 5.3 Abbreviations for Measures of Client's Perspective

No.	Criteria	Abbreviation	No.	Criteria	Abbre-viation
1	**Client's Needs and Motivation**	**N/M**	**15**	**Expectations from Quantity Surveyors**	**EQS**
2	Contributing to Good Governance	**CGG**	**16**	Providing good Financial Advice	**GFA**
3	Contributing to National Infrastructure	**CNI**	**17**	Efficient Execution of Procurement process	**EPP**
4	Addressing Future Infrastructural Needs	**AFIN**	**18**	Accurate, fair and timely preparation of valuation certificate	**PVC**
	Contributing to Good Governance	**CGG**	**19**	Efficient performance of duty as per terms and conditions of Employment	**EPD_{QS}**
1	Building a positive Image for the government	**PI**	**20**	**Expectation from the Architect**	**EARCH**
2	Creating (jobs) employment	**CJE**	**21**	Providing Acceptable Design on time	**PAD_{A}**
3	Regulating the economy	**RE**	**22**	Providing team Leadership	**PTL**
4	Improvement in country's GDP	**IGDP**	**23**	Providing timely and comprehensive site instruction	**PSI_{A}**
5	To satisfy social Needs	**SSN**	**24**	Efficient Site Supervision and Inspection	**$ESSI_{A}$**
	Contributing to National Infrastructure	**CNI**	**25**	Efficient performance of duty as per terms and conditions of Employment	**EPD_{A}**
6	Adding to national physical Infrastructural stock	**PIS**	**26**	**Expectations from Project Manager/Consultant**	**EPM/C**
7	Developing a new technical capacity	**DTC**	**27**	Coordination and Teamwork	**CTW**
8	Contributing to other projects	**COP**	**28**	Technical and Managerial Competence	**TMC**
9	Contributing critical fields of National Interest	**FNI**	**29**	Delivery within project estimated goals	**DPG**
10	Investing excess liquidity in infrastructure	**IEL**	**30**	Ensuring compliance of all social and environmental regulations	**SER**
	Addressing Future Infrastructural Needs	**FIN**	**31**	Efficient performance of duty as per terms and conditions of Employment	**$EPD_{PM/C}$**
11	Providing housing and infrastructure for increasing population	**HIS**	**32**	**Expectations from Consulting Engineers**	**ECE**
12	Providing housing and infrastructure for future expectations	**HFE**	**33**	Providing timely, Complete, Comprehensive design	**PAD_{CE}**
13	Creating incentive for accelerated growth	**IAG**	**34**	Efficient site supervision and inspection	**$ESSI_{CE}$**
14	Providing facilities for expanding government activities	**FEG**	**35**	Providing timely and comprehensive instruction	**PSI_{CE}**
			36	Efficient performance of duty as per terms and conditions of Employment	**EPD_{CE}**

Table 5.3 Cont'd

No.	Criteria	Abbre-viation	No.	Criteria	Abbre-viation
37	**Expectation from the Contractor**	**ECon**	**52**	**Satisfaction across project life cycle**	**SPLC**
38	Delivery within agreed time	**DPT**	**53**	Inception stage	**IS**
39	Diligence to work	**DTW**	**54**	Execution Stage	**ES**
40	Coordination of the specialists and subcontractors' work	**CSW**	**55**	Commissioning Stage	**CS**
41	Financial Capacity	**FC**	**56**	Use stage	**US**
42	Efficient Performance of duties as per terms and conditions of appointments	**EPD_{CON}**	**57**	**Client's Satisfaction Criteria**	**CSC**
43	**Influencing Factors**	**IF**	**58**	Cost	**C**
44	Quantity Surveyors	**QS**	**59**	Time	**T**
45	Architects	**Arch**	**60**	Quality	**Q**
46	Project Managers	**PM**	**61**	Environmental Impact	**EI**
47	Consulting Engineers	**CE**	**62**	Social Impact	**SI**
48	Contractors	**Con**	**63**	Management and Execution Efficiency	**MEE**
49	Project Team	**PT**	**64**	Expectation from Service Providers	**ESP**
50	Client's Organisation	**CLO**	**65**	Client's Needs	**N/M**
51	Project's External Environment	**PEE_{CL}**	**66**	Overall Project Performance	**OPP**

5.4.2 Summary of Relationships based on Clients' Perspective

The analysed results of clients' and practitioners' questionnaire as shown (see Appendix 13 for details) represent the weightings for each of the measures and sub-measures. They represent the models of the measures in clients' perspective on one hand, and practitioners' modelling of these clients' measures and sub-measures on the other. Based on these models and for the fact that each set of sub-measures in a main measure scales up to 100%, it is possible to express the results in relationships as summarized in below.

i. Summary 1: The Client's Needs/ Motivation
Criteria and their indicators

$N/M = 32.1CGG_1 + 37.9CNI + 30AFIN$ ……………………………………………………5.20
$CGG = 17.4PI + 22.5CJE + 20.4RE + 19.4IGDP + 20.3SSN$ ………………………………5.21
$CNI = 35.8PIS + 17.7NTC + 18.5COP + 25.1FNI + 12.9IEL$ ………..…………………..5.22
$AFIN = 30.8HIP + 21HFE + 25IAG + 23.2FEG$ ………..……………………………… .5.23

ii. Summary 2: The Clients Needs/Motivation and the factors that influence them.

$CGG = 13QS + 13.8Arch + 13.6PM + 11.8CE + 16.6Con + 10.6PT + 12.5CLO + 8\,PEE$ ……………..…………………………………….. 5.24
$CNI = 12.1QS + 13.9Arch + 11.7PM + 11.9CE + 15.2Con + 14.8PT_{CL} + 12.6\,CLO + 7.8\,PEE$ ………..……………………………………………………5.25
$AFIN = 11.2QS + 16.4Arch + 11.9PM + 11.7CE + 12.3Con + 11.7PT + 14.4\,CLO + 12.3\,PEE$ ……………………..…………………………………..5.26

iii. Summary 3: The Client' Expectation from
Service Providers and the indicators

$EQS = 30.9GFA + 26.6EEPP + 21.7PVC + 20.8EPD_{QS}$ ……….………………………….5.27
$EARCH = 28.5PAD + 16.3PTL + 18.3PSI + 19.6ESS + 17.3EPD_A$ ………..……………. 5.28
$EPM/C = 19.6CTW + 24.2TMC + 27.1DPP + 13SER + 16EPD_{PM/C}$ ……….................... 5.29
$ECE = 28.9PAD_{CE} + 29ESSI_{CE} + 21.2PSI_{CE} + 20.4EPD_{CE}$..……….............................. ..5.30
$Econ = 29.6DPT + 20DTW + 11.7CSW + 20.6FC + 18.1EPD_{Con}$ ………………………. 5.32

iv. Overall Project Performance and the 'shared' criteria

$$PP = 17.6C + 11.4T + 18.3Q + 7.6EI + 10.3SI + 11.7MEE + 11.6ESP + 11.5N/M \quad \ldots\ldots 5.33$$

v. Overall Project Performance and the Factors that influence clients Needs/Motivation.

$$PP = 13.8QS + 15.3Arch + 13.1CE + 16cCon + 11.7PT + 9.7CLO + 6.4PEE \quad \ldots\ldots 5.34$$

vi. Clients satisfaction across project life cycle.

$$APLC = 21IS + 24.8ES + 23.7CS + 29.6US \quad \ldots\ldots 5.35$$

5.4.3 Explanation of the Models Representing Clients' and Practitioners' Perspectives

The six set of summaries above represent clients' models on the various facets of project performance assessment in Ghana.

1. Summary 1, equation 5.20 describes the relationships between each of the client's need and motivation criteria and their indicators. The relationship shows that in assessing client's (the government's) need and motivation satisfaction*, contribution to national infrastructure* (CNI) is given the highest priority with 37.9%, followed by *contributing to good governance* (CGG): 32.1%, then *addressing future infrastructural needs* (AFIN): 30% (equation 5.20).

In equations 5.21-23, the relationships show the weighting of each indicator among the set of indicators forming the set in each criterion within clients' needs/motivation dimension. For example, equation 5.21 shows the criterion *contribution to good governance* (CGG) as represented by *building a positive image for the government* (PI) with a weighting of 17.4%; 22.5% for *creating (jobs) employment* (CJE); 20.4% for *regulating the economy* (RE); 19.4% for *improvements in country's GDP (IGDP)*; and 20.3% for *satisfying social needs* (SSN) The same holds for the other criteria.

2. Summary 2 shows the relationships that connect the Influencing factors that affect the client's needs and motivation satisfaction to the individual criteria (equations 5.24-26). For example, equation5.24 shows that the criterion *contribution to good governance (CGG)* is influenced by the five factors in this manner: the *quantity surveyor* (QC), 13%; the *Architect* (Arch), 13.8%; the *project* manager(PM), 13.6%; the consulting engineer (CE), 11.8%; and the *contractor* (Con), 16.6%; the *project team* (PT), 10.6%; the client's organisation (CLO), 12.5%; and the project's external environment (PEE), 8%. The same holds for the other criteria. The relationships show the extent to which these influencing factors affect the particular criterion. The essence of this relationship is to assist in the monitoring of the extent to which the satisfaction of these needs/motivations is being impacted on by these factors.

3. Summary 3 shows the relationships of the influencing factors and their active factors (called expectations). and the weightings of these active factors (equations 5.27-32). For example, the influencing factor, expectations from the quantity surveyor (EQS) is represented by *providing good financial advice* (GFA), 30.9%; *efficient execution of procurement process* (EEPP), 26.6%; *providing accurate fair and timely valuation* certificate(PVC), 21.7%; and *efficient performance of duty as per terms and conditions of employment* (EPD_{QS}), 20.8% (equation 5.27). The same holds for the other factor groups.

4. Summary iv, v and vi describes three relationships (equation 5.33-35).

Equation 5.33: this shows the relationship between overall performance and the combined assessment criteria and, equation 5.34 shows the relationship between overall project performance and the influencing factors.

Equation 5.35 shows clients' prioritisation of their satisfaction across the project life cycle. It shows that even though client's satisfaction is at its highest at the use stage (US), 29.6% , they are equally concerned about their satisfaction of the development stage, i.e. *inception stage* (IS), 21%, execution stage (ES), 24.8%; and commissioning stage (CS), 23.7%.

5. Diagrammatic Illustrations. Figure 5.3-5.8 illustrates the various models in forms of "Performance Polygons". Figure 5.8 Illustrates the Polygon of the "shared" perspective (clients' and Practitioners')

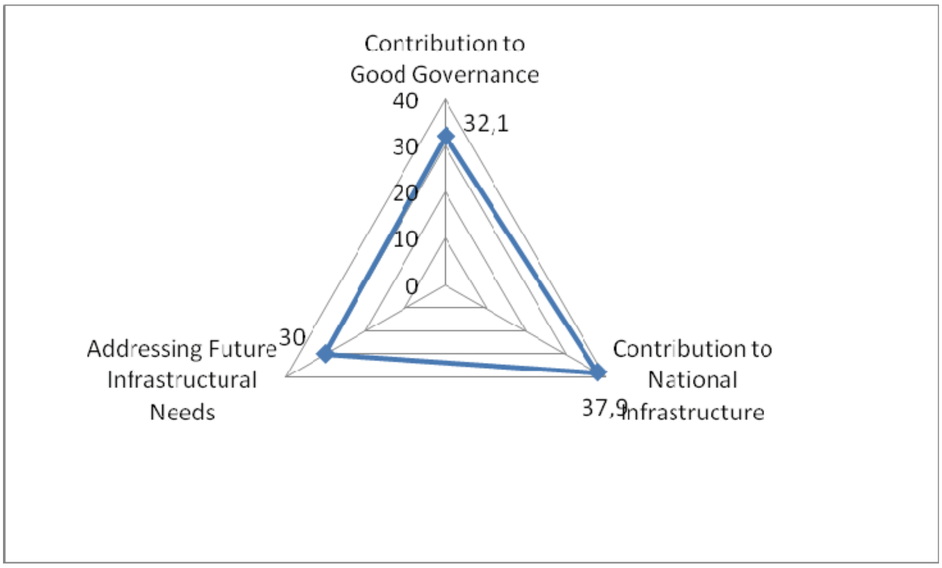

Fig. 5.3 Clients' Model of their Needs/Motivation Criteria.

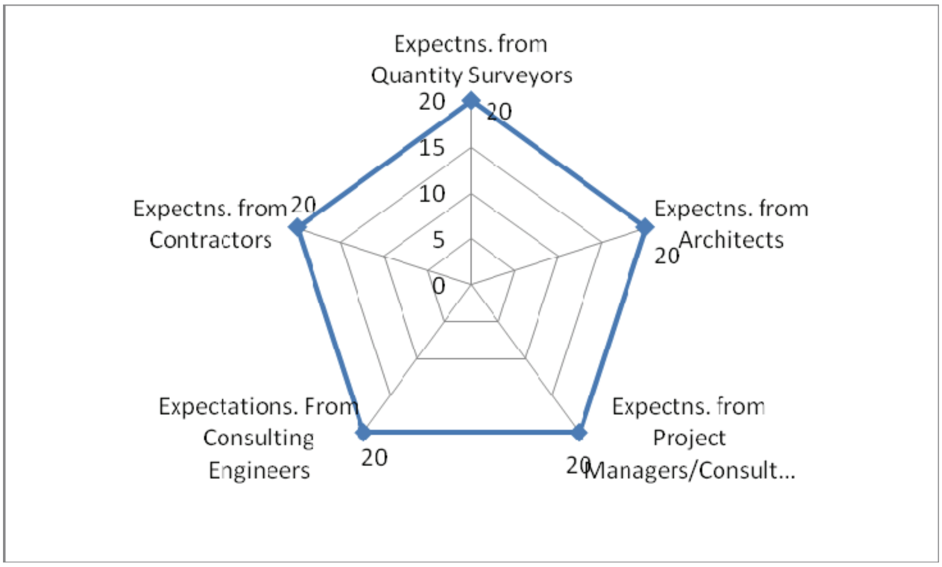

Fig. 5.4 Clients' Model of the five criteria that represent their expectations from service providers. [NB: Equal weightings for all show that clients expect nothing less than 100% from each service provider.

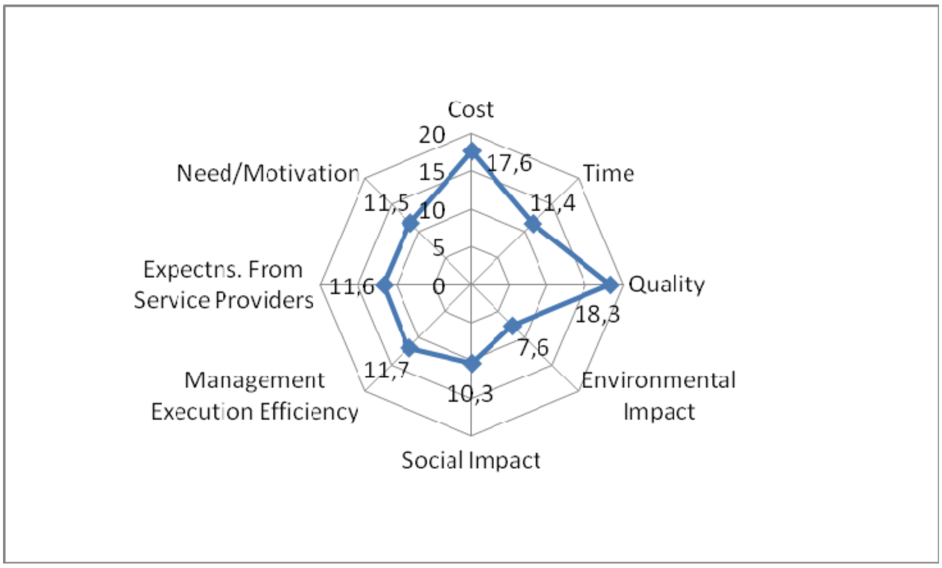

Fig. 5.5 A Model of the eight combined criteria in Clients' Separate view.

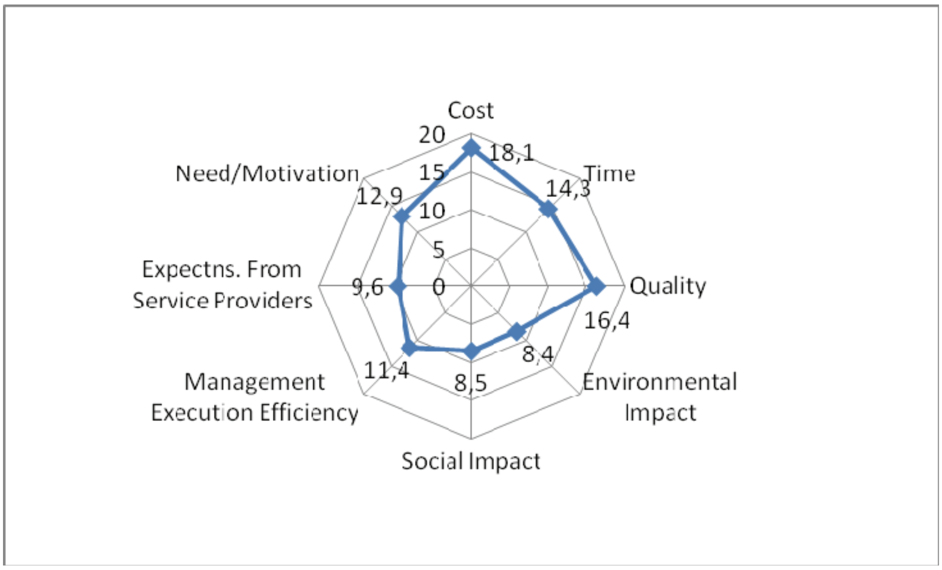

Fig. 5.6 A Model of the eight combined criteria in Practitioners' Separate View

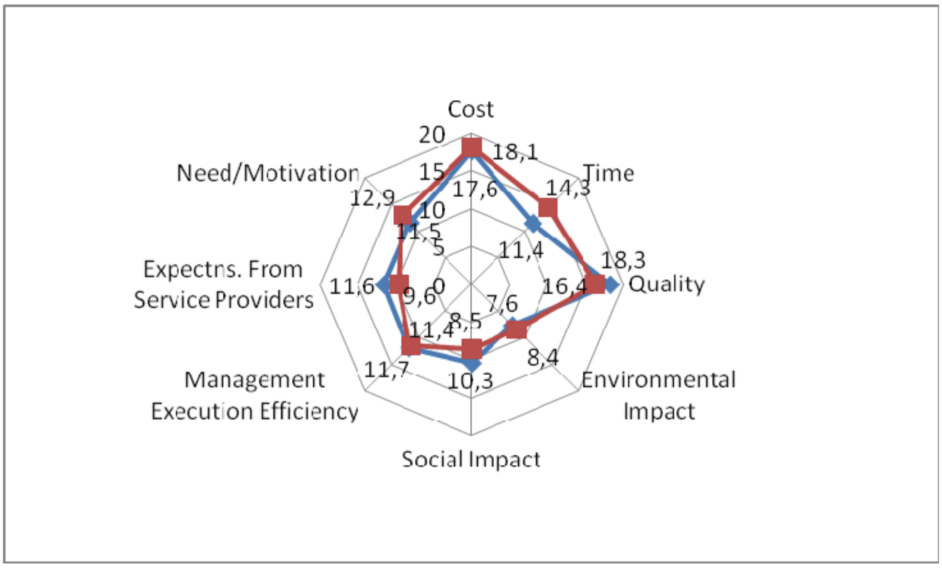

Fig. 5.7 Comparison of Clients' and Practitioners' ratings of the eight main criteria
[NB: Brown colour represents practitioners' rating; blue colour represents client's rating.]

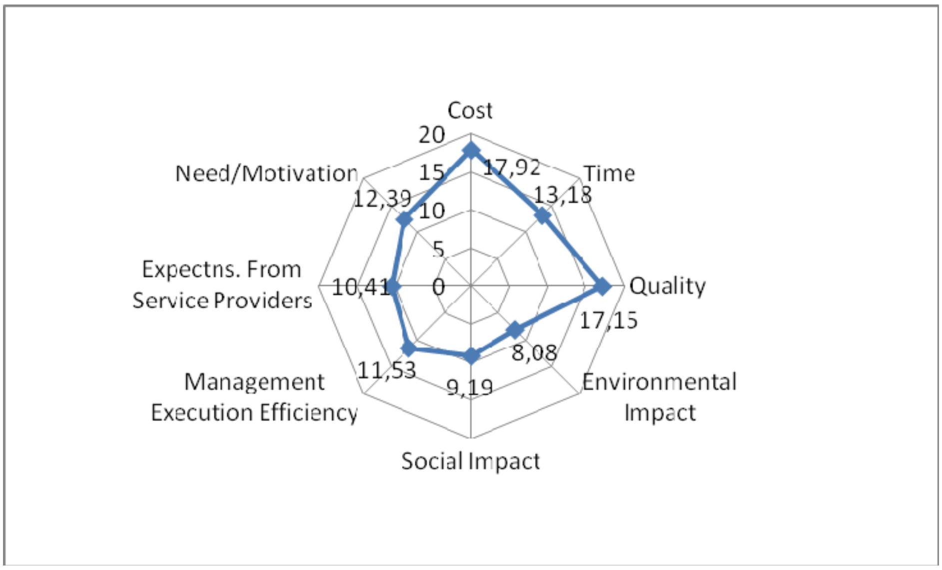

Fig. 5.8 A Model of the 'Shared Perspective' of construction project performance.

5.5 Conclusion: Highlighting the "Performance Polygons"

The analyses of the two surveys have resulted in the perspectives in which practitioners on one hand, and clients on the other, wish to assess the performance of construction projects in Ghana. The survey also resulted in the identification of the factors that influences performance in both cases. Significantly, the results showed that both practitioners and clients believe that each of the factors wield different impact on the indicators, and hence the criteria. In the same way, they believe that in assessing project performance with the identified criteria and indicators, they attach difference import to each of them according to the demands of the project, the expectations of the clients and other contingency factors. This resulted in attaching weightings to these measures.

The weightings attached represent the averages of what importance practitioners attach to these criteria based on the experiences. The findings have shown that project performance (and particularly in construction) should be assessed in multi-criteria and multi-indicators with varying weightings to reflect the project needs. Consequently, this research agrees with Atkinson (1999) that the assessment of a construction project performance should be considered in excess of the iron triangle. Working within the contingency theory as applied to the project situation, this research notes that in the special case of construction projects the term 'multidimensional' as used to describe 'multicriteria' is not limited to the 'numbers' of the "measures" used. Its meaning should extend to cover the number of changes these set of criteria and indicators can undergo due the peculiarity of the needs of a typical construction project. In other words, the set of multi-measures used to assess construction project performance have the degree of freedom to undergo a number of changes contingent on the project needs including, but not limited to:

i. Changes in weightings attached to the criteria and indicators according to their relative importance in the present project;

ii. Changes in the number of indicators that are necessary to define a criterion, in other words, a change in an aspect of the definition of a criterion (by extension or reduction in the sub-measures);

iii. Changes across the project life cycle.

Therefore, this research likens the multidimensional, multicriteria nature of these assessment measures to

"**an irregular polygon with 'kn' degrees of freedom"** *where in this model, the degrees of freedom is determined by managerial decisions and include the freedom of the model to be "adapted" and "adopted" to any project situation (**position**); the freedom for the weightings to change to reflect the particular project situation, and the various phases across the project life cycle (**rotational orientation**); the freedom to increase or decrease the number of the indicators depending on the project circumstances, number and weights of parameters and needs (**overall-size**); and the possible resultant forms the assessment will take based on the various adaptations (**shape**)*[NB: bolded words describes the degrees of freedom for a typical irregular polygon].

The model, thus, agrees with the contingency theory which is summarised as "one size does not fit all (Shenhar et al, 1997)". The research, thus, posits that models for assessing construction project performance should be contingency-based. Again, like all polygons, each corner has several angles –each criterion has several indicators.

Finally, a cursory observation of the shapes of figures 5.5, 5.6, 5.7 and 5.8 shows that the differences in perspectives between clients and practitioners regarding the combined criteria (the eight) has to do only with the extent or emphasis not the focus or direction, generally. The similarity of the shapes and the direction gives a loosed suggestion that the disputes that usually exist between clients and practitioners regarding the status of a project could be seen as an exaggeration of the reality based on mere perception. Bissah et al. (2003) gave five reasons/sources of conflict in project environment: *project goals not well defined, administrative procedures, schedules, communication problems and resource allocation.* Each of these creates a conflict situation as a result of undefined expectations and inadequate information on procedure or the lack of it. It shows that it is possible to minimise this suspicion and the resulting disagreements or disputes if things are clarified between and among key stakeholders of a project, and expressed in a 'shared perspective'. One of the means of eliminating this is by using a front-ended project management approach in which "*expectations* will be agreed as *expectation*, *criteria* will be agreed as *criteria*, and *weightings* to be agreed as *weightings*" from the outset and throughout the project. Lack of adequate update based on issues agreed on will always generate "perceptions" based on suspicions in the minds of clients, where, in most cases, there is actually, only a slight difference between the reality and what is supposed to be made clear.

CHAPTER 6.0: Explanations of the Main Survey Results in the Ghanaian C. I. Context

6.1 Introduction

This chapter provides a detailed explanation of the main survey results and relates the findings to the Ghanaian construction industry. The explanations take the view that the results reflect the context of the Ghanaian situation in terms of the socio-economic, socio-cultural, institutional and political factors at play. Therefore, the explanations herein collaborate very much with concepts and theories that formed the foundation of the theoretical framework of this research as discussed in chapter 3. A close observation showed that, in certain cases, the results as explained are applicable beyond the borders of Ghana. The chapter begins by discussing practitioners' perspective of project performance as provided by the responses in the main survey. This is followed by discussing the results of client's analysis. Practitioners' responses on client's perspective of project performance were discussed alongside those of the clients'. This approach allowed the comparison of practitioners' responses on clients' perspectives of project performance and provided a means of obtaining a shared perspective. In the process, interrelationships among certain criteria and factors were observed. In addition, the results showed which are the most important and the less important criteria among the lot when considered in the shared perspective of clients and practitioners.

6.2 Explaining Responses from Practitioners' Questionnaire

Table 5.2 shows the relationship between each of the six criterion and the factor groups which affect them. It also shows how these criteria can be measured through their indicators. In addition, it captures the relationship between each criterion and its indicators. Together with their weightings (averages) they represent the measures, and their relative importance, which are relevant in the assessment of project performance as well as its monitoring and control in the perspective of practitioners. These are discussed in detail as follows.

6.3 The Assessment Criteria

As expected, the "iron triangle" of Cost (26.2%), Quality (20%) and Time (18.5%) criteria emerged as the three most important criteria, in that order of descending, to practitioners in Ghana. Evidently, they are the most known, often sited, and most used criteria by practitioners to assess project success (Atkinson, 1999; De Wit, 1988; Storm and Janssen, 2004). The results of the six criteria are discussed in this section.

6.3.1 Cost

Cost as a criterion is defined by its indicators: "*Total cost overrun (25.2%), Fluctuation cost (22.5%), Managerial cost (20.3%), Environmental and Social cost (12.8%), Incidental cost (10.5%) and Legal cost (9%).* The *total cost overrun* is a constant and worrying phenomenon in the Ghanaian construction industry. This is because the rate of growth of government revenue as against amount needed for investment. Worse, the instability in the macro-economy, characterised by erratic inflationary trends (Table 6.1) has meant that the cost of projects is of much concern for a country struggling to provide the needed infrastructure. Indeed, it is often good news if typical project is completed within budget – this is very rare. Practitioners are often pressured by the government to help reduce costs of construction. This provides a possible explanation for the highest influence of cost in the overall performance criteria. The second is closely linked to the first *–fluctuation cost*. In a country of erratic inflationary trend, *fluctuation cost* is a very important aspect of the overall cost of the project at any phase. This also provides a good indication of how the project cost is affected by the "project external environment". The *managerial cost*, i.e. the cost of engaging the services of the project manager or consultant and the project team, is essentially a fixed one (a percentage of the contract sum) and may vary with adjustments in this sum due to changes in the certain parameters of the project and its environments e.g. time, scope, price fluctuations and so on. *Environmental* and *social* costs depend partly on the extent to which the project impacts on both the environment and society and how much the client spends on mitigating the effects. This usually forms a small part of the cost of government building projects (except when there is a massive civil engineering works and road constructions) not only because of their sizes and complexities but also because there are not many enforceable laws in these regard. The position of *incidental costs* (costs relating to accidents, inclement weather, industrial actions etc) and *Legal* costs show that they represent the least of the overall cost of projects, most of the time. *Incidental* costs relating to accidents and injuries are covered by insurance of which premium is paid by the contractor to indemnify the client, except where those incidents are cause by the negligence of the client (clause 15, Articles of Agreement and Condition of Contract for building works, 1988), the other aspect deals with the losses due to time spent in attending to these. In addition, fewer "complex and mega" projects have often meant fewer "safety risks" to workers. Industrial actions by construction workers are rare basically because most of the workers, being unskilled and casual workers, are not part of organised labour. As of 1999, as much as 80% of construction workers were not part of unionised labour; this number being an increment from 59% in 1992 (Hodges and Baah, 2006). With regard to *legal costs,* it is usually not a regular part of the overall project cost. The construction industry in Ghana is beset with less litigation, especially, regarding government projects. With regard to conflict situations, parties are often referred to Arbitration. Even, this is not a regular feature of most of the low-level and middle- level projects which form the majority of projects in the industry. This is particularly true in dealing with the government, where service providers (particularly contractors) would want to be in the good books of the government (client) in order to gain repeat jobs in the midst of ever increasing competition. In the light of this, they have constantly been at the receiving end of an unfair treatment operationally, especially, regarding delays in payment of certified works, a situation aggravated by the existing complex and lengthy bureaucratic system (Anvuur and Kumaraswamy, 2006; Crown Agents, 1998; Eyiah and Cook, 2003). Yet they have always chosen to only wait and hope to be paid in the long run –despite provisions in the Ghana Government Condition of Contract empowering them to take action (clause 21 and 32).

Table 6.1 Selected Economic Indicators (2001-2007)

National Accounts Prices	**Growth rate in %**							
	2001	**2002**	**2003**	**2004**	**2005**	**2006***	**2006****	**2007***
Real GDP Growth	4.2	4.5	5.2	5.8	5.8	6.0	6.2	6.5
Agriculture	4.0	4.4	6.1	7.5	6.5	6.2	5.7	6.1
Industry	2.9	4.7	5.1	5.1	5.6	6.2	7.3	7.7
Service	5.1	4.7	4.7	4.7	5.4	5.5	6.5	6.7
Indirect Tax	5.4	4.3	4.4	4.3	4.4	4.5	4.5	4.4
Change in GDP Deflation	34.6	22.8	28.6	14.4	15.0	11.2	11.2	12.3
Inflation (annual growth %)	32.9	14.8	26.7	12.6	14.4	8.8	11.8	8.8
Inflation (end of each period)	21.3	15.2	23.6	11.8	14.9	8.3	11.2	8.3
Government Revenue (Total)	18.1	17.9	20.8	23.8	24.9	23.5	22.1	27.3
Government Revenue (Tax)	17.2	17.3	20.2	21.7	22.1	21.4	20.3	23.6

***:** Budget Figures; **: Projections.

Source: Ghana Budget 2007, Appendix 2 as obtained from Ghana Statistical Service/Ministry of Finance and Economic Planning.

6.3.2 Quality

The indicators of Quality were rated in this order: *Engineers/Architects approval and disapproval records* (28.2%), *material test records* (21.5%), *number and extent of variations* (17.7%), *service test records* (17.5%), *number and extent of reworks* (15.2%). Practitioners believe that the most important indicator of the quality of a building under construction is what the Consulting Architect or the Consulting Engineer says it is about the parts as constructed. Architects'/Engineers' approvals on key aspects of the project before continuing is an important prerequisite throughout the project execution in Ghana. This is also supported by requirements in government's conditions of contract for building works (clauses 1(i); 2(1-5); 6; 8, and 13). The availability of such a record (and the contents) or lack of it is an important indicator of the true state of the whole building. The next on the line is records showing that all materials that went into constructing the building has been tested and approved by the supervisory team, particularly the Architect, Engineer and, sometimes, the Project manager (clause 6). This is also seen as an important testimony of the quality of the building. The third is about the number and extent of variation. According to Practitioners, too much variation orders have the potential of affecting not only the integrity but also the quality of the building. When these are extensive, they end up affecting the vision, homogeneity and the very unity of the parts as originally designed. The forth is records showing that all the services in the building have been tested and approved as functional after installation. The last is about the *number and extent of rework*. In a situation where there is poor on-time supervision, and where the contractors keep doing the wrong things, supervisors always find themselves asking the contractor to open-up, demolish, and re-do the affected parts of the building as required by contract conditions. This negative production activity has worse effect on the building than variations. It is rated last probably, because of its less frequency. All these indicators of quality are directly within the control of the Project Team and Project Manager and are controllable throughout the project phases. Practitioners' concern with the quality of the project is linked with an institutional requirement to do so, and more importantly, with their willingness to please and excite the client, especially with the finished work, to ensure repeat work.

6.3.3 Time

The third most important criterion is *time*. The most influential indicator of *time* for the project according to practitioners is *the time for completion of major works* (35.4%). "Major works" are those parts of the project which takes a lot of the time to complete and which must be completed before other parts of the project can continue, e.g. the substructure of a building. They are critical works and will be dependent on the project being executed. Taking more than a third of the total weighting, this indicator appears to be a serious one in the view of practitioners. A key motivation is that such major works are milestones at which payment certificates can be raised and therefore practitioners attach special importance to them. The control of this indicator is in the domain of the Project Manager/ Consultant and the Project Team as far as they are able to ensure a good MEE. Within performance measurement, this will have to be defined. The next is *time for payment of certified work (30.1%).* This also takes a third of the total weighting. In Ghanaian construction industry this is a key influencer of the duration of the project due the rampant delay in payment to contractors as explained above. In the extreme case, this results in contractors suspending works until they receive payments. This result in time overruns. Sometimes they have no choice but to abandon the project altogether as a result. Despite provisions in the conditions of contract allowing contractors to determine the contract under these circumstances, it is not easy to find any record to that effect for socio-cultural reasons as explained above. Delayed payments have been identified as a major cause of project time overruns (Fimpong et al., 2003; Anvuur and Kumaraswamy, 2006; Crown Agents, 1998; Eyiah and Cook, 2003). The third most influential indicator is *time for valuation and certification (20.6%).* This depends on both the contractor and the Consultants (usually, the Architect and the Quantity Surveyor). It has often been influenced by disagreements about performance and compliance issues as well as issues of relationship between the contractor and the project supervisory team. Westring (1997) notes that post-award negotiations and delays in evaluation and an extensive system of controls accounts for the overall delays in construction in Ghana. The one with the least influence over cost is *Incidental times (13.9%).* This comprises the time taken to address such issues as accidents, inclement weather, industrial action, and litigations and so on. For the same reasons as those of *incidental costs*, they were rated as the least. The ranked position of incidental times as compared with it related item "incidental cost" shows an internal consistency of these responses.

6.3.4 Management and Execution Efficiency (MEE)

This was selected as the forth most important criterion for assessing project performance. It has a weighting of 14.9%, and is represented by its indicators: *efficiency of the project team (21.4%), supervision of contractor (19.2%), decision making process (16.2%), communication and reports (15.2%), inspection and approval of works (14%) and site meeting regularity (13%)*. Generally, the MEE is seen as the most immediate metric with which the performance of the Project Manager/Consultant and the Project Team is measured. Though, at the forth position of importance, the MEE has a visible bearing on all the other criteria. Practitioners ranked efficiency of the project team as the most important indicator of this criterion. This is based first on the qualification, capacity and experience of the team members. Secondly, it has to do with their diligence to work. The *supervision of contractor* was rated as the second most important indicator of MEE. This is because it is an issue in the Ghanaian construction industry (often also a source of worry for clients) that the project management team have not shown enough dedication and consistency in this regard. This is usually due to their commitments to other projects running in parallel. The remaining four criteria revolve around contractual requirement as regards the day-to-day running of the project. In other words, the response indicates that MEE could be seen in three levels: (i) the calibre of the management's team (ii) the supervision of the contractor, and (iii) the management of the project, in that order of important. The success or otherwise of these functions will have a direct impact on the quality of the project.

6.3.5 Environmental and Social Impact

The Environmental and Social Impacts falls at the fifth and sixth position of relative importance (10.2%, 9.8%) respectively. Environmental impact criterion is represented by four indicators: *compliance with regulations (31.3%), investment on environmental issues (27.6%), number of employees on environmental tasks (21.1%) and number of reported incidents (19.9%).* This criterion is heavily dependent on the client's organisation as a key factor. For each project, these measures demand a complete client's commitment from the outset and it is a measure that should indicate the environmental consciousness of projects.

The Social Impact criterion is defined by: *number and type of community institutional structure affected (35.4%):* Economic (employment/income characteristics) , Political (size and structure of districts/ municipal, metropolitan assemblies), Education (schools, change in student population, attendance), Health (changes in health conditions), religious and other interest groups; *number of the population affected* (33.5%): population change, relocation, influx or outflow of temporary works, seasonal residents etc. *types and amount of social resources affected (30.8%):* infrastructure, land use, patterns, and cultural, historical and archaeological resources. This criterion is a measure that is expected to ensure the social consciousness of clients during project execution.

The positions of these on the assessment scale shows that these aspects of the industry are just receiving the needed attention.

6.4 The Influencing Factors within the context of Organisational Environment

This section describes the possible interaction between the influencing factors and how they impact on the project performance. This discussion is related to the theories relating the organisation's strategy and its environment on performance as discussed in chapter 3 as a key part of the theoretical framework for this research. The results hold implications for contingency theories of business policy, organisation theory, and project management practice. The aim is to apply these relationships to the construction project as a temporary organisation as a basis for explaining how the results from the research could be used to regulate project performance through the influencing factors.

6.4.1 The Project's Environmental factors as addressed in the Research.

The project's environmental factors found in the research are classified under:
1. **The project's internal environment, consisting of:**
i. **factors related to the project:** *project size, project value, and urgency of completing the project, Project complexity, project uniqueness and project life cycle*. These define the environmental complexity of the project.
ii **factors related to project management team and the client**:
a. ***factors related to the client's organisation*** *(top management support, client's organisational structure, relationship with project team, ability to take decisions, relationship with contractor, sensitivity to environmental and social issues);*
b. ***factors related to the project manager/consultants*** *(ability to coordinate, ability to delegate authority, ability to lead, arbitration skills, ability to communicate, knowledge and skills about the project);*
c. ***factors related to the project team*** *(technical background, relationship among team, commitment of team members, ability to work as a team, competence of team).*
These define the strategic posture of the project.

2. **The project's external environmental factors**: *the economic environment, availability of resources (labour, plant and material), political, natural (weather etc) and the social environments.*
These define the environmental dynamism and munificence of the project.

6.4.2 Implication for Research and the Analysis

Working within the multidimensional concept of project performance, this background is of relevance to this research in that it allows the achievements of performance targets with the use of strategies, taking cognisance of the prevailing environmental factors. The problems of construction project execution everywhere, and Ghana in particular has to do with cost overrun, time overrun, inefficient management and execution, and failure in environmental and social indicators among others. The aim of construction project management from the owners (government of Ghana in this case) and managers (consultants, project team etc) point of view is, thus, not about ROI and positive gains in other financial or market-based measures but to ensure that performance targets are achieved. On the basis of the foregoing, this research believe that a good strategic posture, taking cognisance of the prevailing project environment would go a long way to correct these deficiencies, despite the numerous challenges the industry in Ghana faces. In the light of these, the results of the influencing factors are analysed within the confines of their effect on performance as measured through the six performance criteria under discussion.

The discussions of the results follow the procedure of explaining the context in which the factors affect the criteria as per their weighting. It divides the factors into two: project environmental factors (further divided into internal and external environments), and (ii) the strategic posture factors.

6.5 The Influencing Factors and the Effect on the Assessment Criteria

The relevant Influencing factors or factor Groups whose sub-measures (active factors) were rated by respondents in the practitioners' questionnaire were: *Project Managers/Consultants, Project Team, Project, Client's Organisation and the Project External Environment.* These factor groups turned out to be the set of influencers of construction project performance in Ghana. Their influence or effects on performance are measured in the identified criteria. As shown in Table 5.2 above. These factor groups or "influencers" have varying effect on each of the assessment criterion. The actual mechanism, however, takes place between the factors and the indicators. This section addresses some significant outcomes.

It is observable that the influences of these factors on specific indicators vary across the project phases. Storm and Janssen (2004) observe that "some predictors (Factor Groups) have more predictive power in the early phases of a project, while others become more important at a later stage". This position is also supported by an empirical research reported by Pinto and Slevin (1988) and Belout and Gauvreau (2004). This means that it is proper that those factors must be identified at the stages of high influence so that they could be controlled for effective outcomes in specific criteria of the project. Controllability stems from the fact that the particular factors within factor groups can be readily manipulated to ensure a positive influence on the relevant indicator at the relevant stage. The foregoing speculates that: efficiency in project performance management is achievable if the factors are monitored and controlled at the stage where their 'predictive powers' are high over a relevant criteria whose sensitivity to change is also high at that stage. This depends on the use of flexible strategies appropriately and when it matters. This forms the bases on which, it is proposed, project performance can be monitored and controlled through the use of measures.

Table 6.2 groups the factors into two: project environment and project strategic posture and relate it to their average effect on the criteria. The percentages in Table 6.2 represent the combined weighting of the relevant factors as obtained from the responses. This also gives an indication of the average effort required to control these factors so as to ensure good performance results in the respective criteria. The following section explains how the factors affect the six assessment criteria.

Table 6.2 Controllability of Factor Groups in relation to the Assessment Criteria

Criteria	**Project's Environment (NHF)**		**Overall%**	**Strategic Posture (HF)**			**Overall%**
	Internal Environment typifying *complexity*	**External environment typifying *munificence* and *dynamism***		**CLO**	**PM/C**	**PT**	
26.2C	28.7Pj	17.4PEE	**46.1**	18.4CLO	16.6PM/C	18.9PT	**53.9**
18.5T	25.6Pj	16.9PEE	**42.5**	20CLO	17.7PM/C	19.7PT	**57.4**
20.1Q	*15.1Pj*	*14.6PEE*	***29.7***	*15.9CLO*	*25.6PM/C*	*28.6PT*	***70.1***
14.9MEE	*15.7Pj*	*15.5PEE*	***31.2***	*18.2CLO*	*25.2PM/C*	*25.5PT*	***68.9***
10.2EI	23.5Pj	24.2PEE	**47.7**	20.1CLO	16.3PM/C	15.8PT	**52.2**
9.8SI	25.4Pj	24.8PEE	**50.2**	17.6CLO	15.9PM/C	16.4PT	**49.8**
Average			**41.27**				**58.73**

6.5.1 Influencing Cost

From the project management point of view, the influence on *cost* by any factor is high at the inception stage. The planning and control of cost at this stage is a crucial determinant of how the project will fare in terms of *cost*. From the survey, the results show that total effect of the project's environment (the project and the project's external environment) on *cost,* as represented by their weighting, 46.1%. From table 7.2, the *Project* as defined by factor *project size, project value, and urgency of completing the project, Project complexity, project uniqueness and project life cycle*, has the highest overall weighting over *Cost* (28.7%). These define the *environmental complexity* of the project and the factors at play, once established, assumes a relatively constant state throughout the implementation period to conclusion unless other factors (especially, the external environmental factors) changes to require a *reactive* strategy . Incidentally, it is also at this stage that the factors related to the *project* can be controlled to achieve the required level of *cost.* The results suggest that priority should therefore be given to controlling the environmental complexity of the project at the point where it is possible to so: at the design stage. The next most influential factor over cost is the PEE. (During the execution stage, it is clear that little can be done to change the project factors unless there is the need for variation caused by external environmental factors. The PEE (17.4%), defined by: *the economic environment, availability of resources (labour, plant and material), political, natural (weather etc) and the social environments,* represents the *environmental munificence and dynamism* affecting project performance. The effect of these factors on *cost* could be very pronounced depending on their severity of the factor or factors at play at the time of designing the project. This will usually impact on design considerations. Key among the controllable active factors are *political, economic and the social environments*. *Resource availability* is also another design stage consideration. With its characteristics of changing and causing changes over time regarding its *munificence* and *dynamism,* consideration of the factors at the design stage should not only be limited to the prevailing condition of the factors but also include an estimation of likely behaviours of the factors likely to be at play during the course of the project. This explains the reason why the "fluctuation clause" is an important feature of government contract provisions in Ghana (clause 28 of the conditions of contract). Thus, it could be said that 46.1% (table 6.2) effort is required to ensure good cost performance of the project and this is mostly required at the beginning.

According to table 62, the results 53.9 % of the effort to regulate *cost* at the inception stage of the project depends on the strategic posture of the project typified by the human core factors: Project Team (PT), 18.9%; Client's organisation (CLO), 18.4%; and Project Manager/Consultant (PM/C), 16.6%. What this implies is that at the inception stage both *proactive* and *reactive consistency* strategies are required to interact efficiently with the project's environmental factors, characterised by complexity, dynamism and munificence, to ensure an acceptable cost standards for the project. In other words, the *aggressiveness, analysis, defensiveness, futurity,* *proactiveness, riskiness, and quality service* of these three human factors, in the face of the prevailing project environment are crucial for determining the cost levels of the project.

During execution period, the *dynamism* and *munificence* (typified by PEE) will be the likely source of impacts requiring *strategic flexibility* in the strategic posture (undertaken by CLO, PM/C and PT) to be bring about corresponding changes in the project on the environmental *complexity* of the project (typified by the factors related to the project).

6.5.2 Influencing Time

Regarding the project's environmental factors, the results show that 42.5 % (Pj: 25.6%; PEE: 16.9%) effort in the project's environment is required throughout the project life cycle to ensure good performance in *time*. The influence of the factors on *time* is medium to high at the inception stage. At this stage of the project all efforts are geared towards the estimation of the project *time* based on these factors. Being the dominating factor in this criterion too, the factors related to the *project* holds the key to the estimated duration it will take to complete the works, all other things being equal. The PEE usually works to impact on time mostly at the implementation stages. At the inception stages, however, PEE can either impact to speed up or delay the design and project start ups, as it has been the case usually in government projects. In situations where time of completion becomes the ruling factor, *cost* is usually traded for *time* and everything is done to secure the project within time. During such periods, the PEE factors really interact with the project factors to determine the project *time*. However, during the execution, time is more susceptible to PEE (*environmental munificence* and *dynamism*) than the project factors (*environmental complexity*).

Usually, some of external environmental constraints that will eventually militate against the smooth execution of the project are a result of "bad seeds" sowed at the design and commencement phases. Political decisions may act to delay or suspend the project; weather conditions may cause disruptions and stoppages etc. In practice, when PEE takes its toll on the project at the execution stages, it will take combined weightings of the three human care factors are 57.4%: CLO: 20%, PM/C: 17.7%, PT: 19.7% (the strategic posture) to influence performance in time through *reactive flexibility* strategies. In Ghana, the CLO (the government) was identified as the most influencer of the project duration in all the stages. Depending on the action or inaction of the CLO, the project may be fast-tracked or delayed at each stage. The situation also holds for the PM/C and the PT as well, especially, when their commitment to the project is partial.

6.5.3 Influencing Quality

The combined effect of the project's environmental factors weighs 29.7% (Pj: 15.1%; PEE: 14.6%). This shows that on the average, the effect of these two factor groups on the *quality* of the project is minimal.

Quality at the initial stages of the project is about standards and specifications as provided by the design of the project and this is having both a cost and contractual implication. Regarding the *PEE* it is about decisions on resource (material, plant, labour) types, trade-offs between cost-quality based on prevailing economic considerations, and political influences over the designs parameters etc. At the execution stages the influence of these becomes even smaller, since the achievement of project quality is solely in the domain of the three human core factors, PM/C (25.6%), PT (28.6%), and CLO (15.9%). These have a combined weighting of 70.1% over quality. They all have high influence over *quality* throughout the project life cycle. At the inception stage however, the influence is more linked to the PM/C and PT. The real impacts of these factors are observed at the execution stage where *quality* needs to be mostly ensured. The actions or inactions of these three human core factors at execution are crucial to the overall quality of the project. This is particularly true of the supervisory team (PT) and the leader (PM/C). The effect of the client's organisation on quality during execution stage is the issue several variation orders regarding the initial specifications and standards etc. based on the prevailing external environmental factors. This is not typical of the government of Ghana, though.

6.5.4 Influencing MEE

MEE, which has as its indicators: *decision making process, communication and reports, and efficiency of the project team, supervision of contractors, inspections and approval of works, site meeting regularity,* is one criterion that demands high attention throughout the project life cycle. It's exposure to influence through its indicators is high at all the stages. At the inception stages, the indicators that are likely to be impacted on are *decision making process, communication and reports, and efficiency of the project team.* The combined impact of the project's environment on MEE is about a third on the average across the project life cycle, 31.2% (Pj: 15.7% and PEE: 15.5%). At the decision stage, the factors related to the Project and PEE, i.e., *value, complexity, type and size* of the project in contemplation, as well as those of the PEE, the prevailing *political, economic and social environment* could really impact on the decision making aspect of MEE. During the execution stages, the *urgency of completing the project* and *the project uniqueness,* (from the project factor groups), together with the potential changes in the external environmental conditions could impact on the MEE, i.e., if they are significant.

Throughout the project the combined weighting of the *strategic posture* typified by the CLO, PM/C and PT is 68.9%. This means the success of the MEE is highly dependent on the actions and inactions of these three, especially, the PM/C (25.2%) and the PT (25.5%). At the initial stages the impact of these two on, *communication and reports, and efficiency of the project team* are usually high. The CLO will impact on the *decision making process* and marginally on *communication and report*. During the execution stages, MEE depends mostly for its performance on these three human factors, barring any changes in the project environmental factors. Here, the performance of all the indicators of MEE requires the utmost attention of the strategic posture, especially, *supervision of the contractor, inspection and approval of works, and site meeting regularity.*

6.5.5 Influencing Environmental Impacts

In the case of Environmental Impacts the combined weightings of the *Project* and *PEE* as influencers are relatively higher: 47.7%, with a near split weighting points for each influencing factors (23.5%, 24.2%) respectively. The results show that there is a notable influence of both the factors related to the *Project* and the *PEE* on EI. From the *Project* end this has to do with the extent to which its parameters: *type, size, value, and complexity* and the rest, will impact on the physical environment as they are being considered at the design stage and also at the commencement stages. This relates to the natural resource requirement, efficient use of these resources, the effect the completed edifice will have on the environment, whether the demands of the project will call for some demolishing.

Addressing issues relating to EI of a project is thus a key design stage activity. Together with the influence of the PEE as represented by *the economic, availability of resources (labour, plant and material), political, natural (weather etc) and the social environments*, much can be achieved at the design stage by way of designing to reduce the environmental impact of the project at the execution stage.

For the EI, the three human factor groups have combined weighting of 52.2%. This suggests that a little more effort is required from these to ensure favourable environmental impact of the project. The implication is that a lot more work will need to be done at the design stage to ensure the satisfactory results are obtained on EI criteria. During execution, a lot will depend on the client's organisation (20.1%) in controlling EI, supported by The PM/C (16.3%) and the PT (15.8%) This suggests that the client's commitment to support compliance with standards and rules when his attention is drawn to them by the Project Manager/Consultant and Team is crucial. Cooperation and interaction among the three human factors is all that remains to be done throughout the execution stages to ensure satisfactory EI result. Specifically, these efforts will be measured through the indicators of EI: *Compliance with regulation, Investment on environmental Issues, Number of employees with environmental tasks, number of reported incidents.*

6.5.6 Influencing Social Impact

The SI of a project can be felt at all the stages. The construction process itself is associated with known impact on society, positive and/or negative. This is indicated by: *number of population affected, number and type of communities and institutionalised structures affected, type of community and social resources affected*. Sometimes it involves movements of workers away from families (or movement of workers with families) over the project period. It may result in the increased use of existing institutional structures or their virtual redundancy. Hence, it is necessary that these are considered for enhancement or mitigation depending whether the impact is positive or negative. The *Project* and *PEE* as influencing factors pulled a combined weighting of 50.2%, which is almost equally split between the two factors. This shows that the influence is very pronounced. At the inception stage, the very development of the *Project,* with all its parameters dictates the direction and possible extent of the impact on society. Again, the social impact of the project could be affected positively or negatively by the external environmental factors (PEE), particularly*, political* and *economic* factors, as well the availability or otherwise of resources (labour, materials and plants). Again, in a country where most of the land is still vested in stools, government's intention for undertaking projects could be greatly supported or seriously frustrated by the social and cultural environment shaped by traditions and traditional rulers of the project's intended location. The need to control the *Project parameters and PEE* at the design stage to ensure a positive social impact of the project cannot be overemphasised. The impact of the three human factors at the inception stage would be to efficiently address these issues. During the execution stages, their influences become more paramount in controlling SI. Hence, throughout its development, the *project* development and the PEE are the most influencers of SI. The strategic posture factor groups (PT, PM/C, CLO) combined weighted 49.9%. Most of this effort is required at the beginning than at the execution phases and counting on the project and PEE. Once, the project starts, it would only require good supervision to ensure the events conform to plans to avoid social outcry. At the execution stage, supervision would help to mitigate the expected negative effects contemplated at the design stage and to maximise the positive impacts. This is particularly true considering the indicators of SI: *Number and type of community affected by the project (positive or negative), Number of population affected (positive or negative) and Community/Society resources affected.* On the other hand, if poor work is done at the design stage, one should expect a project beset with recurrent "fire fighting".

6.5.7 Notable Influence of CLO, PM/C and PT on Quality and MEE

The high combined weightings of the three human factor groups (70.1% and 68.9%), as they influence Quality and MEE respectively, is of particular significance to performance management. Ensuring good performance in Quality and MEE is high at the execution stages. This means that is where the project's strategic posture must also be positioned to influence them for good performance. The results showed that practitioners recognise this special relationship between *quality*, and *MEE* as assessment criteria and *CLO, PM/C and PT* as the key influencing factors. Significantly, a similar pattern for the models (by way of ranking) of these factor groups as they affect both *quality* and *MEE* is noticeable (Table 6.2). But for the differences in the weightings, the influences of the factor groups from the highest to the lowest a similar order: ***Project Team, Project Manager/ Consultant, Client's Organisation****, the Project, and lastly, The Project External Environment,* in that order.

For *quality*, 54.2 % of the weighting is shared among two factor groups whose relevance are evident: PM/C and PT. Largely, thus, this finding partially supports the findings of Tukel and Rom (2001) that *quality* is a primary success measure for project managers and that the priority given to quality does not change during various stages of the project regardless of project type and industry classification. For the MEE, these two factor groups together weighted 50.7%. The position of the client (18.2%) in these cases is also relevant in the sense of the recent calls for active involvement of government clients in project execution (Egan, 1988; Latham, 1994), to ensure that events are conforming to plans. However, the onus still lies on the PT and the PM/C to deliver to the client's satisfaction. Accounting for more than 50% of the performance of a construction project in the dimension of *quality* and *MEE*, these factor groups show that to ensure project *quality* and *MEE*, the two most important factor groups to pay attention to, in the opinion of Ghanaian practitioners, are the Project Team and the Project Manager/Consultant.

It is expected that they show the capability to influence these factors (instead of the reverse) through the use of both *flexible* and *consistent* strategies as appropriately to ensure the success of the projects. Indeed, this is in-line with Turner's (2002) proposal that project success factors should satisfy the following three requirements:

- They should represent elements of the project and its management.
- The project manager and the project Team must be able to influence them.
- The factors, when present, should increase the chance of success.

The second statement goes to support the school of thought that these strategic postures should interact with the project environment to influence performance. This special relationship between the Project Team and the Project Manager as influencing factors on one hand, and the Quality and MEE criteria on the other has practical implications. This has to do with the visibly direct relationship between the indicators that define the two criteria on one side and the underlying active factors that relate to the two influencing factors on the other. A close observation of Figure 6.1 illustrates the strong connections between the Quality-MEE-Project Team-PM/C "quartet" through their sub-measures. As can be seen, all the factors that relate to both the Project Team and the Project Manager/Consultant have direct impact on all the indicators of both the Quality and MEE criteria. It would seem that practitioners believe that these two criteria hold the centre of the whole concept of monitoring and controlling of project performance together, and that by ensuring good performance in Quality and MEE, Project Managers and Team would be ensuring that the project stays on course regarding its duration (time) and budget (cost), and MEE in particular would laterally influence Environmental and Social Impact results. Hence the important role of the project Manager/Consultant and the Project Team (as influencing factors) are well acknowledged by the results of this research. This position supports Turner's (1999, p.4) as quoted in Jugdev and Müller (2005) that "project management is about managing people to deliver results, not managing work". Hence Jugdev and Müller (2005) conclude that project management, then, is applied to projects to optimise efficiency and effectiveness, not the former alone, as most literatures appear to be suggesting. This keeps project management from being entrenched as an operational concept. This is a key concept in managing projects as behavioural systems.

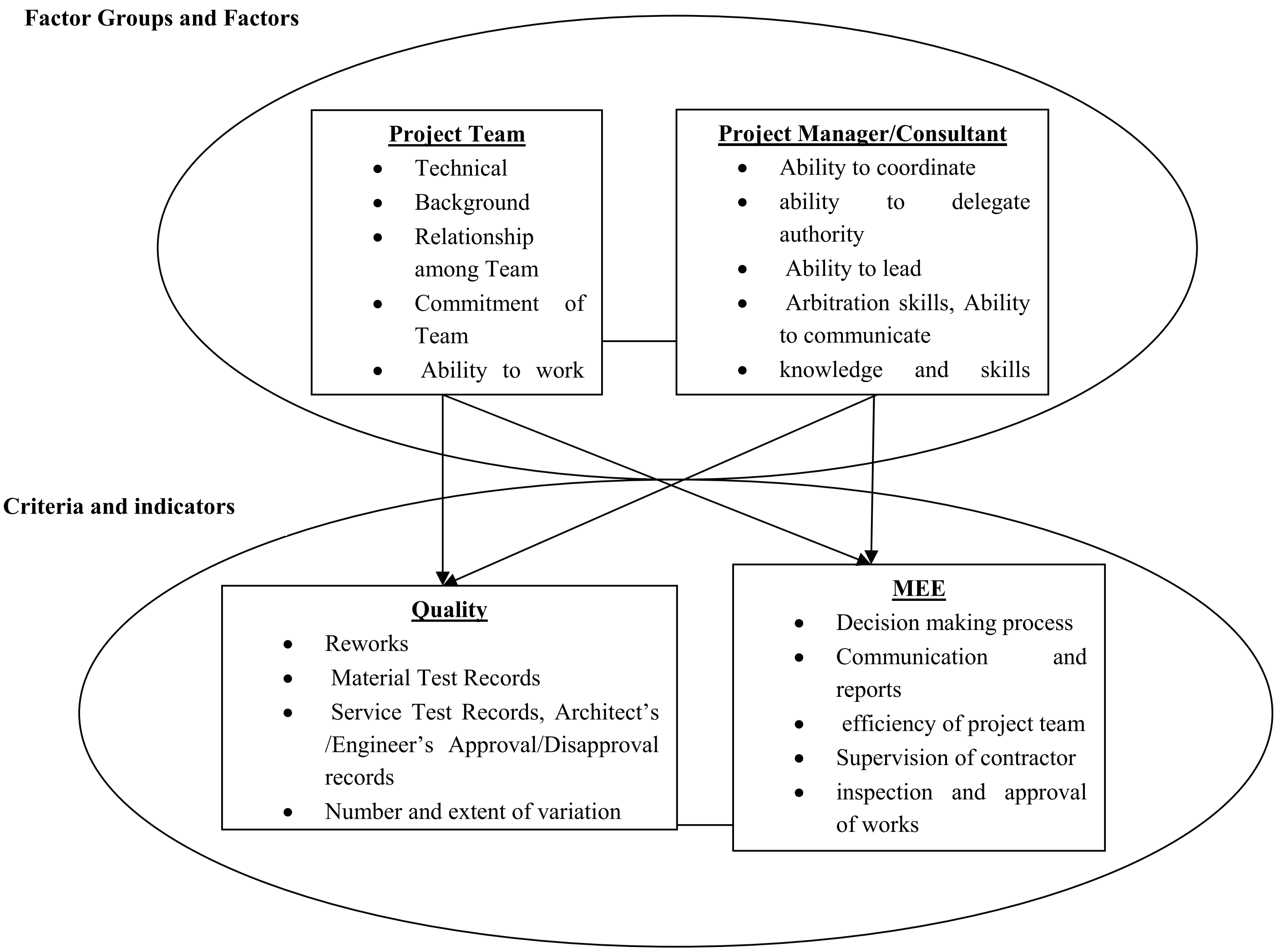

Fig. 6.1 Strong Relationship between Quality, MEE, Project Team, and Project Manager/Consultant

6.6 Clients' and Practitioners' Rankings Compared

6.6.1 Introduction

This section explains the responses to clients' questions addressed to both clients and practitioners. The purpose was basically to determine the clients' perspective of project performance and by allowing practitioners to answer the same questions the following objectives were achieved:

i. To obtain the clients perspective of project performance.
ii. To obtain practitioners estimation of clients perspective of project performance.
iii. To obtain a "shared perspective" (practitioners and clients) of project performance.

The approach used in the explanation is to address the context of the response in comparison. Each section begins with the comparative description of the general trends in the results of responses from clients and practitioners. This is followed by a discussion on the results.

6.6.2 Explanation of the tables

The following explanations are based on tables 6.3, 6.4, and 6.5.

i. Table 6.3 is a summary of comparing the results of clients and practitioners analyses of the same questions. It consists of 15 main measures grouped into four: Needs/Motivation, Expectations from service providers, the Influence of eight influencing Factors on clients' needs and motivation criteria, client's satisfaction across project life cycle measures, and overall project performance criteria (second column). The third column contains the number of sub-measures responded to. These are the subjects of comparison. The fourth column contains the number of sub-measures whose responses from clients matched with those of practitioner. There is a match whenever, clients' rank of a sub-measure matched with those of the practitioners' within a set. The fifth column contains the abbreviated name of the matched sub-measure, while the last column shows the ranked position which matched.

ii. Tables 6.4 and 6.5 consist of the estimated ranked positions and weightings of the key influencing factors of overall project performance and the three client's needs/motivation criteria. It describes the extent to which the factors affect each criterion. The first row shows the estimated weights and ranks of the influencing factors over the overall project performance. The next three rows measures the same effects on client's needs and motivation criteria. The fifth row shows the average of the weightings and ranks for the three client's needs and motivation criteria. The last row shows the combined average for the weighting and ranking for the overall project performance and client's needs/ motivation criteria

For the details of the analysis refer to Appendix 13 Tables 1-4.

The results from table 6.3 show that out of 84 sub-measures, practitioners' rankings agreed with clients' in 34 cases (40.5%). This also further shows that even though, they may not always agree, the different can easily be bridged. This confirms the extent to which the two can share a common perspective.

Table 6.3 Matching Practitioners' Rankings with Clients' Given Client's Questionnaires

No	Measures	No. of Sub-measure	No. of Matched Sub-measures	Matched Sub-Measure(s)	Matched Ranked Position
1.i	**Needs/Motivation criteria**	**3**	**1**	CNI	1
ii.	**Contribution to Gd. Governance**	**5**	**0**	-	
				PIS	1
iii.	**Contribution to Natl. Infrastructure**	**5**	**2**	FNI	2
iv.	**Addressing Future Inf. Needs**	**4**	**2**	HIS	1
				IAG	2
	Sub-total	**17**	**5**		
2	**Expectations from Practitioners**				
				GFA	1
i.	**Quantity Surveyor**	**4**	**4**	EPP	2
				PVC	3
				EPD_{QS}	4
				EARCH	1
ii.	**Architect**	**5**	**3**	PAD_{A}	5
				EPD_{A}	4
				DPG	1
iii.	**Project Manager/Consultant**	**5**	**3**	SER	5
				$EPD_{PM/C}$	4
iv.	**Consulting Engineers**	**4**	**2**	PSI_{CE}	3
				EPD_{CE}	4
v.	**Contractors**	**5**	**2**	DPT	1
				CSW	5
	Sub-total	**23**	**14**		
3.	**Influences on Client's needs/Motn.**				
i.	**Overall Project Performance**	**8**	**2**	PM	3
				CE	5
ii	**Contribution to Gd. Governance**	**8**	**2**	PM	3
				CLO	5
				Arch	3
iii.	**Contribution to Natl. Infrastructure**	**8**	**4**	PM	7
				Con	1
				PEE	8
iv.	**Addg. Future Infrastructural Needs**	**8**	**1**	Arch	1
	Sub-total	**32**	**9**		
4	**Client Satisfaction Criteria**				
				IS	4
i.	**Satisfaction across PLC**	**4**	**4**	ES	2
				CS	3
				UC	1
ii.	**OPP**	**8**	**2**	EI	8
				SI	7
	Sub-total	**12**	**6**		
	Total	**84**	**34**	**40.5%**	

Table 6.4 Clients Rankings of the extent of influence of the Factors on Clients' Needs/ Motivations Criteria

Clients' Needs/Motivation	**Influencing Factors**															
	QS		**Arch**		**PM**		**CE**		**Co n**		**PT**		**CLO**		**PEE**	
	Wtg.	**Rankg.**	**Wtg.**	**Rankg.**	**Wtg.**	**Rankg.**	**Wtg.**	**Rankg.**	**Wtg.**	**Rankg.**	**Wtg.**	**Rankg.**	**Wtg.**	**Rankg.**	**Wtg.**	**Rankg.**
Overall Project Performance	*13.8*	*4*	*15.3*	*2*	*14.0*	*3*	*13.1*	*5*	*16.0*	*1*	*11.7*	*6*	*9.7*	*7*	*6.4*	*8*
Contributing to Good Governance	13.0	4	13.8	2	13.6	3	11.8	6	16.6	1	10.7	7	12.5	5	8.0	8
Contributing to National Infrastructure	12.1	5	13.9	3	11.7	7	11.9	6	15.2	1	12.6	4	14.8	2	7.8	8
Addressing Future Infrastructural Needs	11.2	6	16.4	1	11.9	7	11.7	4.5	12.3	3	11.7	4.5	14.4	2	10.4	8
Average weighting for Needs/Motivation	**12.1**	**4**	**14.7**	**2**	**12.4**	**5**	**11.8**	**6**	**14.7**	**1**	**11.7**	**7**	**13.9**	**3**	**8.7**	**8**
Combined Average weighting and rank	**12.5**	**5**	**14.9**	**2**	**12.8**	**3.5**	**12.1**	**6**	**15.0**	**1**	**11.7**	**7**	**12.8**	**3.5**	**8.2**	**8**

Table 6.5 Practitioners' Ranking of the extent of Influence of the Factors on Clients' Needs/Motivation Criteria

Clients' Needs/Motivation	**Influencing Factors**															
	QS		**Arch**		**PM**		**CE**		**Co n**		**PT**		**CLO**		**PEE**	
	Wtg.	**Rankg.**	**Wtg.**	**Rankg.**	**Wtg.**	**Rankg.**	**Wtg.**	**Rankg.**	**Wtg.**	**Rankg.**	**Wtg.**	**Rankg.**	**Wtg.**	**Rankg.**	**Wtg.**	**Rankg.**
Overall Project Performance	*14.6*	*2*	*16.1*	*1*	*12.7*	*3*	*12.2*	*5*	*11.4*	*6*	*10.2*	*8*	*12.6*	*4*	*10.4*	*7*
Contributing to Good Governance	15.7	1	13.1	4	13.2	3	10.3	7	14.8	2	9.5	8	12.1	5	11.1	6
Contributing to National Infrastructure	15.3	2	13.2	3	9.6	7	11.6	5	18.6	1	10.4	6	12.3	4	8.9	8
Addressing Future Infrastructural Needs	11.5	5	16.5	1	10.3	6	9.2	8	15.1	2	10.2	7	14.8	3	13.1	4
Average weighting and ranking	**14.3**	**3**	**14.7**	**2**	**11.5**	**5**	**10.8**	**7**	**14.9**	**1**	**10.0**	**8**	**12.9**	**4**	**10.9**	**6**
Combined Average weighting and rank	**14.2**	**3**	**14.7**	**2**	**11.4**	**5**	**10.8**	**7**	**14.9**	**1**	**10.0**	**8**	**12.9**	**4**	**10.9**	**6**

6.7 Comparison on Clients' Assessment Criteria: Clients and Practitioners Results [Clients' figures in the discussions are obtained from equations 5.20 to 5.35 in Chapter 5; for Practitioners' figures, check Appendices 13]

6.7.1 Clients' Needs/Motivation Criteria

With regard to the client (the government of Ghana), the most important among the three key needs/motivation for which she undertakes a project is to (i) *contribute to the national infrastructure* (37.9%)", defined by *adding to national infrastructural stock (25.8), contributing to critical fields of national interest (25.1%), contributing to other projects (18.5%), developing a new technological capability (17.7%), and investing excess liquidity in infrastructure* in order of importance. This is followed by (ii) *contributing to good governance* (32.1%), defined by *creating job employment (22.5%), regulating the economy (20.4%), to satisfy social needs (20.3%), improvements in GDP (19.4%), and building a positive image for the government (17.4%)* in order of importance. The last in the ranking is (iii) *addressing future infrastructural needs* (30%) as defined by *Providing housing and infrastructure for increasing population (30.8%), Creating incentive for accelerated national growth(25%), providing facilities for expanding government activities(23.2%), and providing housing and infrastructure for future expectations* in that order.
For the same questions, practitioners' choice of the most important need/motivation really coincided with those of the client i.e. *contributing to national infrastructure* (40.5%). There was however, a disagreement between the second and third ranking with practitioners choosing *addressing future infrastructural needs* (32.3%) ahead of *contributing to good governance* (27.4%)".

6.7.2 Discussion

From table 6.4 we notice that overall practitioners agreed on 5 out of the 17 rankings of the indicators: almost 1 in 4 for clients' need/motivation criteria, none for *contribution to good governance*, and 2 each for *contribution to national infrastructure* and *addressing future infrastructural needs*. In 3 out of the four cases, practitioners agreed with clients ranking regarding which is the most important indicator in each group, the odd one being of course, the indicators of *contribution to good governance*.
However, apart from the rankings of the indicators in *addressing future infrastructural needs* where the differences between the two pair of rankings are marginal (where we had 3, 4 and 4, 3 positions), the rest showed no closeness at all. This shows that as far as the needs/ motivation of clients are concerned, there is a visible gap between what practitioners perceive as the most important of clients' needs. These measures represent clients' latent (unstated) and yet, important indicators of their satisfaction criteria. The gap, thus, should be seen as a potential client's satisfaction gap. These needs/motivations are "latent" in clients brief and the gap shows practitioners' inability to predict them, let alone satisfy them. This find partly

explains why clients believe that “consultants do not always work towards achieving their ultimate satisfaction” as recorded in statement 5 of clients’ themes resulting from the interview (in chapter 4). The theory is, if one does not know what is really expected of one, it is not possible for one to satisfy the need in question. The problem is the procurement processes in the Ghanaian construction industry (Public projects) does not allow these all important but implicit needs/motivation of the clients to be known. The general route has been for the central government to package these projects and then asks practitioners to begin the process of selecting contractors. Finally, the winning contractor is shown the site and work begins. The focus of the job, as far as these service providers are concerned is to ensure that the project is finished on time and on-budget. However, though not usually considered, the study has shown that clients could have several motivations for undertaking a project and which satisfaction is necessary for repeat jobs for service providers. It is therefore the proposal of this study that the selection process of service providers should be structured in such a way as to highlight these latent needs and motivations of public client.

6.8. Clients’ Expectations from Service Providers

This section discusses the results of clients’ expectations from service providers in comparison with how practitioners responded to the same questions.

6.8.1 Quantity Surveyors

Clients rank their expectations from Quantity Surveyors in this order of importance: *“Providing good and reliable financial advice(30.9%, ranked 1)”, “Efficient execution of procurement process (especially tendering)(26.6%, ranked 2)”, “Accurate, fair and timely preparation of the valuation certificate (21.7%, ranked 3)”, efficient performance of duties as per terms and conditions of appointment (20.8%, ranked 4)”*. For the expectations from the Quantity Surveyor, practitioners’ rankings and those of the client are in a complete accord. In sum, this shows that to a large extent, Practitioners’ perception of what clients expect from them and the importance clients attach to each item has been correct.

6.8.2 Architects

Among the five expectations from the Architects, both clients and practitioners agree on three ranks: *providing acceptable design on time* as the most important measure with relatively high weightings (28.5% and 30%) respectively; the next is *efficient performance of duties as per terms and conditions of appointments* (16% and 15.3%, ranked 4) respectively, and also, *providing team leadership* with a common weighting of 16.3% and ranked 5. For the remaining two measures relating to Architects, Client chose *effective site meeting* (19.6%, ranked 2) ahead of *providing timely and comprehensive site instruction* (18.3%, ranked 3); while practitioners positioned them the other way round (19.1%,18.1%) respectively. The closeness of the weightings of these two indicators together with their position shows that there is a close association between clients and practitioners rankings on them, essentially.

6.8.3 Project Managers/Consultants

Under this service provider, practitioners ranked three measures in just the same way as clients did. Clients' and practitioners' rankings for these are: *delivering within the project estimated goals* (27.1%, 31.5%, and ranked 1) respectively, *efficient performance of duties as per terms and conditions of appointment* (16%, 15.3%, ranked 4) respectively, and then *ensuring compliance of all social and environmental regulations* (13%, 11.9%, ranked 5) respectively. Further, client chose *technical and managerial competence* (24.2%, ranked 2) which was ranked 3 by practitioners with weighting of 19.8%, and *coordination and Team work* (19.6%, ranked 3) which was ranked 2 by practitioners with weighting of 22.7%. This comparison also shows a close similarity between the rankings from the two sources.

6.8.4 Consulting Engineers

Practitioners' rankings agreed with those of clients in two of the four items describing clients' expectations from the consulting engineer. These are: *provision of timely and comprehensive design* (21.3%, 22.4%, ranked 3), and *efficient performance of duties as per terms and conditions of appointment* (20.4% and 20%, ranked 4) for clients and practitioners respectively. Clients ranked *providing effective supervision and inspection* as the most important expectation (29%), which was ranked the second most important by practitioners (22.6%). The second most important item for clients is *providing timely, complete, comprehensive design* (28.9%), which was ranked as the most important item by practitioners (35.1%).

6.8.5 Contractors

For clients' expectations from contractors both clients and practitioners choose *delivery within agreed project time* (29.6%, 30.1%, ranked 1) and *coordination of the specialists and sub-contractor's works* (11.7% and 15%, ranked 5) respectively as the two most important ones. Clients' other rankings include *financial capacity* (20.6%, ranked 2), *diligence to work* (20%, ranked 3), and *efficient performance of duties as per terms and conditions of appointment* (18.1%, ranked 4). Practitioners on the other hand ranked *efficient performance of duties as per terms and conditions of contract* (19.2%) as the second most important expectation. This followed by *financial capacity* (18.1%, ranked 3), and *diligence to work* (17.6%, ranked 4).

6.8.6 Discussion

The trend reveals that in 14 out of 23 cases , that is, 60.8%, practitioners ranking of an expectation and its relative importance agreed perfectly with those of the client. Again, in 4 out of the 5 cases (80%) both practitioners and clients agreed on which was the most important expectation among the group. For the remaining rankings in each group where differences exist in rankings between practitioners and clients, it turned out that in 3 out of the 5 cases (60%), these differences were marginal, i.e. it was cases of interchanging positions e.g. between 1, 2 and 2, 1 or 2, 3 and 3, 2 for the same pair of items. Hence it could be generalised that practitioners agreed with clients' rankings as far as which expectations are the three most important ones in each group in 4 out of 5 cases (80%). Similarly, practitioners and clients agree perfectly on the least important items in each group in all cases and in 3 out of 5 cases, they even agreed on the two least important items. This shows that substantially, practitioners are close to appreciating what is expected of them by clients as well as the ones which are the most important ones.

This validates the results of the second survey in which both public and private clients agreed that practitioners generally are meeting their expectations as required. For public clients, this measured between 68% and 75% satisfaction level (Table 4.10). Further, it supports the theory that once the expectations are known and agreed upon, it becomes possible that they can be met.

Another important feature from the clients' response is that they generally, rank "site supervision and inspection" very highly and expect same from those whose duty it is to do so: Architects and Consulting Engineers (ranked 2 and 1 respectively). This is a key function indicating performance of architects and other consultants; and supports an initial result from the clients' interview (chapter 4) where all respondents posit that they perceive it as a positive sign of project performance if there is regular site supervision and inspection by Architect and other consultants.

6.9 Influence of Service Providers and Other Factors on Project Performance

This section describes responses on the relative influence of the influencing factors as they affect project outcome and clients' needs/motivation criteria and how practitioners' responses compare with those of clients'.

6.9.1 Overall Project Performance

From the clients' point of view contractors ranked overall as the most influencing factor (16.0%) as it affect overall project. The next most influential factor is Architects (15.3%) followed by Project Managers (14.0%), Quantity Surveyors (13.8%), the Consulting Engineers (13.1%), the Project Team (11.7%), Client's Organisation (9.7%), and Project's External Environment (6.4%) in that order.

Practitioners on the other hand believe that the most influential factors of project outcome are Architect (16.1%), followed by Quantity surveyors (14.6%), PMs (12.7%), the Client Organisation (12.6%), Consulting Engineers (12.2%), Contractors (11.4%), PEE (10.4%), and lastly, the project Team. This means that practitioners agreed with client on the positions of the PMs and Consulting Engineers.

The big difference between the two positions of the "contractor" from the two perspectives is significant. The factors can broadly be categorised into (i) influences by practitioners and clients' organisation (ii) influences by the contractors (iii) PEE. While the client ranked contractors' influences above the practitioners', the practitioners ranked the contractors' influences lower on project performance, with the PEE always placed last.

6.9.2 Contributing to Good Governance

1. Clients once again maintained their ranking for the first four influencing factors: Contractors as the most influential factor (16.6%) on their need of using a project to contribute to good governor, followed by Architects (13.8%), then Project Managers (13.6%), Quantity Surveyor (13.0%) and the least influential, the PEE (8.0%). There are however changes in others i.e. Client Organisations (12.5%), Consulting Engineers (11.5), and Project Team (10.7%) which were ranked 5th, 7th and 8th respectively.

Practitioners ranked Quantity surveyors (15.7%) as the most influencing factors when it comes to the "contributing to good governance" criterion. Contractors (14.8%) occupied the second position. Project Managers and the Project Teams retained their third and eighth positions (13.2%, 9.5%) respectively. The rest are Architects (13.1%, 4th), Client Organisations (12.1%, 5th), PEE (11.1%, 6th), and Consulting Engineers (10.3%, 7th). There was agreement between only two pairs of rankings on these criteria: Project managers (3rd) and Client's organisation (5th).

6.9.3 Contributing to National Infrastructure

Clients ranked contractors (15.2%) as the most influential of all in affecting the criterion of "contributing to national infrastructure". Client Organisations ranked second (14.8%) with Architects (13.9%) taking the third position. The rest are Project Team (12.6%, 4th), Quantity Surveyor (12.1%, 5th), Consulting Engineers (11.9%, 6th), PMs (11.7%, 7th) and PEE (7.8%, 8th).

Practitioners ranked Contractors (18.6%) as the most influential factor with regards to affecting the project need of "contributing national infrastructure", agreeing in this case with the client. The second most influential factor selected by practitioners is "Quantity Surveyors (15.3%)". This is followed by Architects (13.2%), Client Organisations (12.3%), Consulting Engineers (11.6%), Project Managers (9.6) and PEE (8.9%) in that order.

Overall, there was agreement between the rankings of the two views in four cases: those of the Architect, the PM, the Contractors and PEE positions.

6.9.4 Addressing Future Infrastructural Needs

Clients ranked Architects (16.45%) as the number influencers of their need/motivation to use construction projects to "address future infrastructural needs". This is followed by "client Organisations (14.4%)" with the "contractor (12.3%)" falling in the third place. The "Project Manager (11.9%) ranked forth, while the "consulting Engineers" and the "Project Team" which tied up in the fifth position (11.7%). The seventh position was occupied by the Quantity Surveyor (11.2%) and the least influencer once again is the PEE (8.2%).

In the practitioners' view, however, the most influencers of this criterion are the "Architects (16.5%)", followed by the "contractors (15.1%)", "client organization (14.8%)", PEE (13.1%), "Quantity Surveyors (11.5%)", PMs (10.3), the Project Team (10.2%), and "consulting engineers (9.2%)". Overall practitioners' rankings agreed with those of clients in only one case: those of the Architect.

6.9.5 Discussion

In 3 out of the 4 cases clients ranked contractors as the most influential factor of project performance. Practitioners on the other hand ranked contractors once as the most influential, twice as the second most influential for *clients' needs and motivation criteria*. This shows that clients and practitioners generally agree that contractors' actions and inactions is to be given the priority, among the rest, if clients' needs and motivation criteria are to be satisfied. From table 6.6, however, in the combined overall analysis (average of the weightings including those of the overall performance) in client's opinion, the order of importance regarding influencing the outcome of a project is: *Contractors, Architects, Clients' organisations, Quantity Surveyors, Project Managers, Consulting Engineers, Project Team and Project External Environment*. In the average weighting of clients' response on the three needs/ motivation criteria, the order was: *Contractors, Architects, Client Organisations, Quantity Surveyors, Project Managers, Consulting Engineers, Project Team and Project External Environments*. That of the overall project performance alone is in the order: *Contractors, Architect, Project Manager, Quantity Surveyors, Consulting Engineers, Project*

Team, Client Organisations and Projects' Execution Efficiency. There is only a marginal difference between the results obtained on the overall performance alone and the other two. The main difference is the positions of the "client organizations". The rest are interchanged positions of "Quantity Surveyors" and "Project Managers". However, there is no difference between clients' ranking of the extent to which these influencing factors affect the accomplishment or otherwise of their needs/motivation, and how the combined rankings show. This indicates to a large extent that clients' assessment of the influence, and hence performance of these factors on the overall performance of their project is fairly consistent. Secondly, it indicates that it is directly linked to how they helped to satisfy these needs/motivations which are usually unstated.

However, practitioners placed Architects as the most influential on *overall project performance*. With regard to clients' needs/motivation, Architects, Quantity Surveyor and Contractors were respectively selected as most influential in each of the criteria in turn. In the overall average and combined averages, however, contractors were ranked as the most important once again. On the other hand, practitioners ranked contractors at the 6th position on *overall project performance*. Again, in this specific case of *overall project performance,* there is a remarkable difference in positions (for the contractor on one side and the rest of the practitioners on the other) in clients view (1, and 2-6) and in practitioners' view (6, and 1, 2, 3, 5, 8) respectively. Indeed, practitioners believe that even the clients' organisation wield more influence over the overall outcome of the project than contractors. Practitioners believe that funding and decision making from the clients coupled with adequate supervision from them is the most determining factor. And that a hardworking contractor could be incapacitated given these conditions. Another explanation is to the effect that it is an institutional requirement backed by the conditions of contract to determine the contract of a non-performing contractor and replace him with a new one. They therefore see the contractors influence as an intermediate one.

This difference in emphasis has both institutional and political inclinations and could have diverse implications on clients and practitioners perceptions on project execution challenges, leading to disagreements and disputes. For example, in Ghana where cases of project delay, suspension and abandonment of public projects are common; there is the danger of a potential disagreement between practitioners and clients as to the objective analysis of the factors and courses. Once, these analysis and conclusions are flawed, there is little or no chance of learning from past mistakes, resulting in lack of improvements and developments in the industry, generally. This could partially explain why the contractor has always been the victim of "contract determination" (Clauses 20 & 21) in Ghana; and, probably, why the clause of "liquidated and ascertained damages" (Clauses 18) is of little practical relevance to the Ghanaian construction industry (Conditions of Contract for building works, 1988). This could lead to a situation where clients will choose to trade-off practitioners' fees for contractors' certificates when they constrained. On the other side of the coin it also implies that in as much as contractors would take the brunt of poor project performances in the clients' view, and client dissatisfaction, it also shows that much credit would go to them in terms of good performance. Practitioners, thus, have a lot to do to impress the clients of their influence, both in the area of clients' satisfaction and overall project performance. This is highlighted by the fact that in average ranking of clients' needs and motivation, and the combined rankings, contractors ranked as the most influential factors in the view of both practitioners and clients (tables 7.5 and 7.6)

6.10 Clients Satisfaction across Project Life Cycle

This section discusses how clients rated their satisfaction levels as the project progresses across its life cycle. This results are also compared with those of practitioners on the same questions

6.10.1 The Use stage

This is another area where both clients and practitioners agreed in all rankings. Together they said that clients' satisfaction is highest at the "use stage (29.6%, 28.5%)" when the project has become a product. Within the confines of the project Life Cycle, this is measured within the six months "defect liability period" beginning from the date of handing over (Conditions of Contracts for Building Works, 1988). Within this period the client's satisfaction is given real meaning depending on whether there appeared "zero defects" on one extreme (confirming high quality work) or "multiple defects" on all parts of the building on the other extreme (indicating poor quality work).

6.10.2 The Execution stage

This is followed by satisfaction at the "execution stage (24.8%, 25.1%)". At this stage, clients' satisfaction level is highly linked with what "expectations" they have from their service providers together with their assessment of "management and execution efficiency" of the project. The level of satisfaction at this stage will increase the motivation of the clients regarding decisions to continue, suspend, alter or abandon the project altogether, all things being equal.

6.10.3 The Commissioning Stage

The next one in order of importance is "Commissioning stage (23.7%, 25%)". Clients' satisfaction at this stage is closely linked with the governments' intention to "indicate" good governance. This especially so when the project is one which is being undertaken in response to the public's expressed long awaited need. This was the case when the construction of the two new stadia in Tamale and Takoradi, and the renovation of the Accra and Kumasi stadia were commissioned towards the Africa Nation's Cup in 2008.

6.10.4 The Inception Stage

The stage of least satisfaction to clients is "inception stage (21.9%, 20.9%)". Clients' satisfaction level at this stage has to do with how quickly and efficiently the design team performed and it is climaxed by the delivery of completed design reflecting clients' exact vision on time and with cost ceilings. It is closely linked

6.10.5 Discussion

Clients' rankings show that clients attach relatively equal importance to development of the project throughout all the stages. This is shown by the rather close distribution of the weightings. This means that clients are no longer waiting for the key to be handed over to them but would want to be sure that every part of the project development gives them a cause to be satisfied. This means clients are interested in both development satisfaction and use satisfaction as noted by Yisa et al. (1996) and Rowlinson, 1999 p27 and 42). Hence Latham (1994) recommends that government as clients should be seen to be playing active role in the developmental processes of the project; setting demanding standards and ensure best practice. a position that

6.11 Clients' Results on the "Shared Perspective" of Project Performance

This section begins by discussing clients' responses on the eight criteria representing the shared perspective of project performance. The results are compared with those of practitioners.

6.11.1 Quality

Clients ranked *quality* (18.3%) as the most important of all the other criteria used to assess project performance. This means that among other criteria, a failure in the quality of the work would impact negatively on the overall satisfaction of the client. This is particularly true of the government client in Ghana where the undertaken of a project or lack of it has a serious political connotation: more projects, well executed, and to the satisfaction of the public regarding *quality* (these days the public tend report contractors who they perceive are doing shoddy work on the electronic and print media) is a plus to raising the public image of the government, and vice versa.

6.11.2 Cost

This is followed by the *cost* (17.6%) of the project. The government as a client knows very well that when the cost of the project is perceived as been 'too much' in comparison to the project by the public it raises concern and affects good governance needs, especially concerning public perception on reputation and corruption. Thus, all things being equal, the cost of the project is also of grave concerned to the client. The problem, however, is that as of now there is no practical mechanism to standardise project costs for effective benchmarking. The public procurement act of 2003 (Act 663) sought to regularise and standardise procurement procedures in Ghana as way of eliminating fraud in contract award. By enforcing the award to the lowest evaluated bidder, the government hopes it will ensure reductions in contract prices. However, this in itself does not guarantee this reduction, since what is lowest is subjective in general and specific to the other competitors. What is important for objective comparison and benchmarking is a means by which, barring any price differences resulting geographic location and inflationary effect over time, the same design should cost almost the same everywhere.

6.11.3 Management and Execution Efficiency

The next in order of importance to the client is *management and execution efficiency* (11.6%) of the project. This goes to affirm clients' earlier position (as revealed in the interviews and expectation from practitioners) that their level of satisfaction with their project is closely linked with the performance of those who are managing the project, as defined by: "*decision making process, communication and reports, efficiency of project team, supervision of contractor, inspection and approval of works and site meeting regularity*". Indeed, this also shows the level of confidence the government as client reposes in those appointed to manage its projects.

6.11.4 Expectations from Service Providers

The next in line is closely related*: expectation from service providers* (11.6%). It adds another dimension to the execution efficiency, focusing on the general performance of their specific duties as discussed above.

6.11.5 Clients' Needs/Motivation

The fifth most important item is the satisfaction of *clients' needs/motivation* (11.5%). This is defined by the three criteria: *"contribution to good governance, contribution to national infrastructure, and addressing future infrastructural needs"*. This has been discussed above.

6.11.6 Time

Next is *time* (11.4%). From the practitioners point of view, it will be surprising that time has been pushed this far from the traditional "iron triangle" of "cost, time and quality" Atkinson (1999). However, considering the conditions that govern contracts which allows the determination of a contractor for non-performance, and the emphasis placed on management and execution efficiency, clients could be implying that the issue of execution time is a function of how well the project is managed and executed. The other reality of the situation in the Ghanaian construction industry (public sector) is that in majority of the cases, the success or failure of the *time* criteria of a project depends, less on the management team, and less on the contractor, and more on the client. This results from delays in payment procedures and payments due to bureaucracy and intermittent shortage of funds. Clearly, the government as a client is yet to show enough commitment to delivery within project time. In addition, the idea of equitable distribution of the "national cake", through the national budget, across the regions has meant that part, not the whole, of the funds for a typical project is provided for the several projects across the country in a typical construction year so that additional (not necessarily the remaining) part is proposed in the following year. Hence, it is usually the case that a project that could be done within 1 year could take 2 or more "construction years" to complete. The result is therefore a true reflection of the relationship between the government as a client and construction time.

6.11.7 Social Impacts and Environmental Impacts

Clients placed *social impacts* (10.3%) as the seventh and *environmental impacts* (7.6%) eighth in order of importance regarding their satisfaction. Generally, a good project well managed in terms of MEE, Quality and Cost will have an overall positive impact on both the society and the environment. It could be considered in the same category as *time*, in some respect.

6.11.8 Practitioners ranking

Practitioners rankings of the above eight criteria are in the following order of importance: Cost (18.1%), Quality (16.4%), Time (14.3%), Clients' Needs (12.9%), Management and

Execution Efficiency (11.4%), Expectation from Service Providers (9.6%), Social Impact (8.5%), and Environmental Impact (8.4%). When the two clients' criteria of service providers and Clients' Needs are taken out, the order becomes: Cost, Quality, time, Management and Execution Efficiency, Social Impact, and Environmental Impact. By ranking the weighting for the assessment criteria from table 5.2 (practitioners response on practitioners questionnaires), one sees a close similarity between the relevant ones in the two sets (of course, with EI and SI positions interchanged). The fact that different set of practitioners provided similar ranking from questions posed differently in different questionnaires shows a great deal of consistency on the part of practitioners in Ghana regarding their views on these measures. This validates practitioners' models from the other questionnaire regarding the assessment criteria.

6.11.9 Discussion

For the rankings of the eight project performance criteria it turned out that there was barely an agreement 2 out of 8 (25%) positions. The fact that practitioners rankings criteria validates a previous rankings on similar criteria strengthens the positions that regarding the main assessment criteria, practitioners' are consistent on their perspective and this does not always agree with those of clients for whom they serve. This answers one of the two main research questions of the research: "How does practitioners' perspective of project performance compare with those of the clients?"

In general, clients seem to sum up their perspectives thus: *"the two most important criteria for assessing project performance are 'Quality and Cost' (practitioners agree to this), and the two least important ones are 'EI and SI' (practitioners agree to this too). In between these two extremes are MEE, Expectations from service providers, Clients needs (unstated) and Time. To these they attach almost equal importance making it difficult for any form of trade-off (practitioners do not necessarily agree)".* Again, the high rankings (1 and 2) of "Quality" and "Cost" as accorded by both practitioners and clients should be seen as equally significant as the lowest two rankings they accorded EI and SI. In these four criteria, clients and practitioners are close in their views.

In this research, the shared perspective was obtained by combining the two responses (of all the eight criteria) in the analysis on equal basis. In real assessment, it may be necessary to weight the "power" or "influence" of the client on one side against practitioners on the other over the assessment criteria. Usually, being the owners and sponsors, clients have the greater influence and therefore "share" in the combined (shared) perspective. Assuming it is established by analysis that clients have 60% influences over all the criteria as against 40% for practitioners, these will affect their share in the 'shared' perspective. The procedure would be to multiply each stakeholder's weighted criteria by their power and then add them to represent the combined or shared perspective. Table 6.6 summarises the comparison of the results from the two sets of surveys. In this research, the result pushes up client needs/motivation criteria [NB: in the last column of table 6.6, 60 percent was multiplied to client's weightings and 40 per cent for practitioners before combining them into a "shared perspective"].

Table 6.6 Summary of Models representing Clients', Practitioners' and Shared Perspectives

Ranking	Responses from Clients' Comparison Questionnaires					Shared perspective with client having 60% 'share'
	Client' N/M		Perspectives of overall Project Performance			
	Clients'	Practi-tioners'	Clients'	Practi-tioners'	Shared	
1	CNI	CNI	Q	C	C	C
2	CGG	AFIN	C	Q	Q	Q
3	AFIN	CGG	MEE	T	T	T
4			ESP	N/M	N/M	N/M
5			N/M	MEE	MEE	MEE
6			T	ESP	ESP	ESP
7			SI	SI	SI	SI
8			EI	EI	EI	EI

6.12 Rank Correlation Analysis

In addition to the above discussions, Spearman's Rank correlations analysis was done to test the statistical degree of association between the two pair of rankings of the indicators for each set. The SPSS was used to test the significance level at 5%, and the results are shown in table 6.7. The results suggest that out of the 15 cases, 13 show a positive correlation between practitioners and clients rankings (80%); two of these showed a perfect positive correlation. Again, 7 out of the 13, (46.7% of the 15) of the cases were statistically significant at 95% confidence intervals.

The results show a strong positive correlation between the ranking of practitioners and clients on what clients expect from them. The result is a statistical support of the observed trend as discussed above. Three out of the five cases show a statistical significance result. In addition, there was a statistical significance in four other measures. Overall, seven measures showed statistical significance as shown in table 6.7 below.

Table 6.7 Association between the Rankings of Clients' and Practitioners' on Client's Measures

Measure	**n**	**r =1 – {(6∑d²) /n(n²-1)}**	**Remarks**	**Test of Results (P<0.05)**	**Remarks**
Need/ Motivation	3	0.500	Strong +	0.667	N.S
Contributing Good Governance	5	0.103	Weak +	0.870	N.S
Contributing to National Infrastructure	5	0.700	Very Strong +	0.188	N.S
Addressing Infrastructural Needs	4	0.800	Very Strong +	0.200	N.S
Expectations from Quantity Surveyors	4	1.000	Perfect +	0.0	SS
Expectations from Architects	5	0.900	Very Strong +	0.037	SS
Expectations from Project Managers/ Consultants	5	0.900	Very Strong +	0.037	SS
Expectations from Consulting Engineers	4	0.800	Very Strong +	0.200	N.S
Expectations from Contractors	5	0.700	Very Strong +	0.188	N.S
Influences on Overall Project Performance	8	0.476	Weak +	0.233	N.S
Influences on Contributing Good Governance	8	O.762	Very Weak	0.028	SS
Influences on Contributing to National Infrastructure	8	0.786	Very Strong +	0.021	SS
Influences on Addressing Infrastructural Needs	8	0.587	Very Strong +	0.126	N.S
Satisfaction across Project Life Cycle	4	1.000	Perfect +	0.0	SS
Project Performance Criteria	8	0.762	Very Strong +	0.028	SS

{Key: n: number of indicators or sub-measures compared; Strong + =Strong positive correlation; Weak + = weak positive correlation;
Perfect + =Perfect positive correlation; NS = statistically not significant at 5%; SS= statistically significant at 5%}

6.12.1 Significant measures for Clients and Practitioners

1. Expectation from Service Providers

- Expectations from the quantity Surveyors
- Expectations from Architects
- Expectations from the Project Managers/Consultants

2. Influence of Factors over clients' needs

- Influence of service providers, clients organisation and the Project's External Environment on clients' needs of undertaking projects for "contributing to good governance"
- Influence of service providers, clients organisation and the Project's External Environment on clients' needs of undertaking projects for "contributing to national infrastructure"

3. Clients' satisfaction measurements.

- Clients' satisfaction across Project Life Cycle
- Project Performance criteria.

6.13 Conclusion

In general, the results of the surveys as discussed are found to reflect the true situation in Ghanaian construction industry, particularly the building sector. It shows that both practitioners and clients responded to questions based on the experiences within the industry over the years.

Specifically, contextual analysis of the results has alluded to the fact that there are socio-cultural features of the industry which have evolved over the years –mostly due the interactions between the key stakeholders, the political, economic and social environments – and these indeed influences the way practitioners and clients perceive issues regarding the construction process and its management in Ghana. Notably, the Ghanaian political environment has been characterised by a history of instability and uncertainty due to rampant military take-overs for the first 32 of its 52 years. Prominent among the effects these have on construction includes incumbents' outright abandonment of projects initiated by previous regime. This affected the learning process and institutional developments of the industry. These practice, however, seems to be taken a turn for the better since 1992 when smooth transitions of power through democracy started.

However, the fact that Governments, in the name of "sharing the national cake" will allocate a smaller portion of the total project budget (among several competing projects across the

length and breadth of the country) per each fiscal year has meant that construction process is still clouded in uncertainty of completion within time. It is thus no wonder, that client rated *time* as the sixth most important criteria among the eight assessment criteria. Practitioners placed it in the 3rd position. This is understandable regarding the relationship between time of delivery and payments for work done. Regarding, the economic effects, the records show that the country's economic growth could be described as very erratic and inconsistent (Table 6.1). With inflation rising unusually high within the same year, the cost of the project sometime doubles at the time of completion. This puts a strain on the resource availability for the project and service providers take the brunt of it. What is worse, service providers usually have to pre-finance their inputs and be reimbursed through payment certificates. With delays and unreliable trends of payments to service providers the project is often suspended when these service providers reach their limits of tolerance. This has overall effect also on *quality*. Again, due to resource constraints in Ghana, clients' main concern for the project is to ensure that the right thing is done to provide value for money and this is expressed in the expectations on *quality*. Among the eight criteria shred by clients and practitioners, clients ranked *quality* as the most important one. Practitioners posit it at number two. Thus for both clients and practitioners, *cost* and *quality* are regarded as the two main criteria by which the performance of construction project performance indicate a reasonable level of satisfaction.
Because of problems with the efficiency of execution of project by contractors and usually poor supervision of work by practitioners which ultimately impact on the quality of the work, clients believe that *management execution efficiency* of the project should also be considered as an important criterion. Clients also indicated that for all projects, they expect to be satisfied with the performance, not only of the project, but also of the service providers (expectations from service providers). In addition, they also showed that it will be necessary for the execution and completion of the project to satisfy their key needs and motivation for starting the project in the first place (needs and motivation criteria). Therefore for clients, the importance levels of MEE, ESP and N/M, in that order, are virtually indistinguishable, following after *cost* and *quality*. Explicitly thus, clients have confirmed their preparedness to play active roles in the delivery process of the project. In the case of practitioners, the order was N/M, MEE, and ESP, indicating that practitioners still place high premium on clients' needs and motivation.
Practitioners and clients agree that the environmental and social impacts of the project are of little importance at the moment in the Ghanaian construction industry.

PART III: THE ASSESSMENT TOOL

CHAPTER 7: A Contingency-Based Tool for Assessing Construction Project Performance

7.1 Introduction

This chapter is devoted to the explanation of the assessment tool designed for use in assessing the performance of a construction project. It is a major deliverable in this research and specifically addresses the main aim of the research, i.e. "to determine a means by which construction project performance can be assessed at any stage of the project execution with criteria that reflect the perspectives of the client and practitioners as well as the particular circumstances of the project and within different socio-economic settings". This is based on the Performance models developed from the main survey as provided in chapter 5. The chapter begins by showing the characteristics of the tool. It then continues by explaining the procedures in measuring, scoring, and calculating the performance scores of practitioners and also clients. In addition, it provides a guideline of how the factors that influence the indicators are estimated and related to the indicators for the monitoring and controlling part.
This is accomplished by the use of Forms 1 to 4 (Appendix 1, Tables 1 to 4) for practitioners and Forms 1 to 4 also for clients (Appendix 1 tables 6 to 12). Tables 1 and 6 are forms to guide respondents filling Form 1. Form 5 is a decision form for management (Appendix 1, Table 13). In addition, there is a flowchart showing the entire procedure of assessment and monitoring of the project. Finally, the key features of the tool and its importance to clients and practitioners are outlined.

7.2 The Characteristics of the Assessment Tool

The assessment tool is a contingency –based framework for assessing construction project performance. It is so called because it also incorporates the multidimensional concept by lending itself to multiple measures and is based on the demands of the project and its stakeholders. Its guiding principle is to provide a means by which, through the use of measures, construction project could be managed with the help of objective assessment and in a way that will represent the perspectives of the relevant stakeholders and the particular circumstances of the project.
The tool focuses on the perspective of the key stakeholders –clients (the owner and financier) and practitioners (supervisors) based on the models in chapter 5. The contents of these are shown in Table 7.1.
The implementation strategy involves the independent and parallel assessment of practitioners' and clients' perspective of the performance of the project and finally combining them into a shred perspective as shown in Figure 7.1.

Table7.1 Components in the Framework of the Tool

Stakeholder	**Dimension**	**Expectation**	**Measures**	**Factors**
Practitioners	Project Monitoring and Control	Execution Efficiency	*Cost, Quality, Time, MEE, EI, SI*	Related to (*project manager, project, project team, client's org., project external environment)*
Clients	Needs/Motivation	Satisfaction	*Contribution to good governance, Contribution to National Infrastructure, Addressing future Infrastructural needs*	*Project Manager, Architect, QS, Structural Engineer, Contractors, PT, Client's Org., PEE*
	Expectation from Service providers	Performance of employment Obligations	*Project Manager, Architect, QS, Structural Engineer, Contractors*	----
Combined	Shred Perspective	Overall Project Performance	*Combination of the measures from above*	----

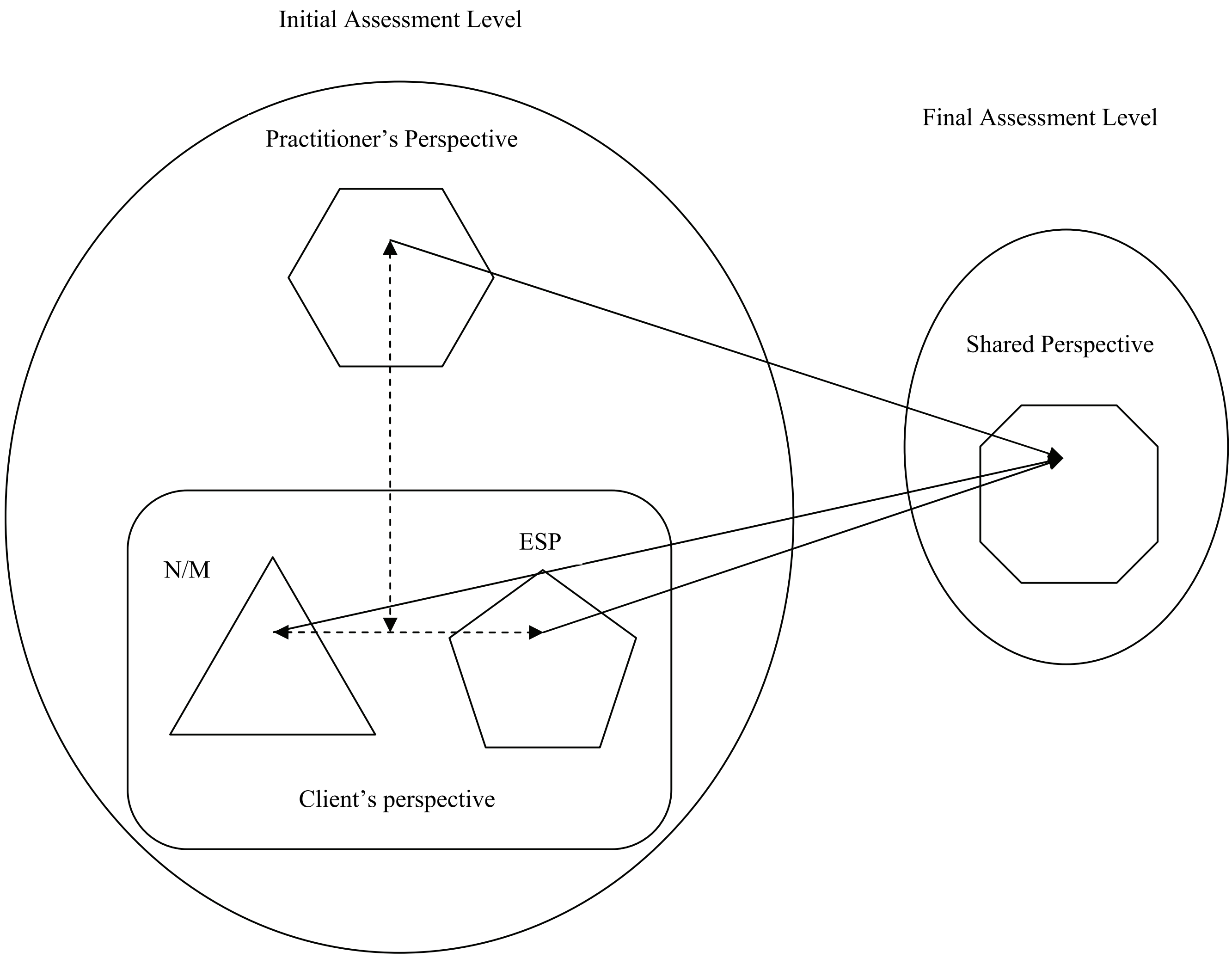

Fig. 7.1 The Implementation Strategy of the Performance Strategic

7.3 Brief Description of Tool Implementation Procedure

In brief, implementing the model goes as follows: An assessor is appointed at the pretender stage whose duty it will be to guide the rest of the project team and the client's representatives to establish the standards or planned performance metrics against which actual performances will be compared. The next step is to agree with them on how often and at what intervals the assessment should take place, for example, monthly, bi-monthly, and quarterly and so on, depending on the nature of the project and its duration. At the agreed dates for assessment, the assessor sends Practitioners Forms 1 and 3 to the Project Manager/Consultant and each member of the Project Team to provide the actual performance figures as actually measured. At the same time, the assessor provides clients' Forms 1 and 3 to the Project Manager/Consultant and the Client Management team in charge of the project to fill in with actual performance figures. In each case, Form 1 provides figures representing *indicators* of performance while form 3 provides figures representing *factors* that influence performance as seen in the indicators. These people are the *respondents* in the assessment procedure.

The assessor computes the *assessment* and *scoring* in Form 2 using figures obtained in Form 1 in each case. The assessor also transfers Figures obtained from Form 3 on to Form 4 where the *factors* are mapped on to the *indicators* they are influencing. Form 4 also provides a means of distinguishing between *external* and *internal* measures. The information from Form 4 is then organised into factors that are having "critical", "high", "medium" or "low" influence on the indicators onto Form 5 in each case. The assessor then calls a meeting consisting of the Project Manager/ Consultant, the Project Team, and the Client's Management team at which he provide his assessment report of the state of affairs of the project. The report would indicate:

1. The overall performance in the perspective of practitioners.
2. The overall performance in the perspective the client showing:

   a. results of Clients' Need/Motivation criteria.

   b: results of Clients' Expectations from Service Providers

3. The result of the Shared Perspective.
4. The need to take action based on information on Form 5. [All responses are averaged by the assessor before scoring]

The implementation steps are outlined in more details below.

7.4 Detailed Procedure in the implementation of the tool

The following steps describe the general procedure for the implementation of the tool.

1 The Pre-determinations: Before putting the tool into operation, it is necessary to pre-determine the following:

i. Weighting of the measures (criteria, indicators) in the relationships

This is achieved by following the model proposed in tables 4.11, and 4.12. The researcher agrees with Atkinson (1999) and Struckenbruk (1987) that the four most important stakeholders to decide criteria are the Project Manager, Top Management, Customer-Client and the Project Team. This should be done at the pre-contract stage.

ii. Agreeing on the periods (intervals) of the assessment

As discussed above, this will depend on the nature and duration of the project. These periods could also be chosen to coincide with the completion of identifiable sections of the project, especially, in situations where it will not be practicable to depend on the duration alone. This should be agreed on between the two the client and practitioners. This is to ensure collaborations and comparison of related information emanating from the assessments.

7.4.1 The Assessment Procedure

The assessment procedure involves firstly, the measurement of the actual performance indicators, scoring them, calculating the weighted scores of each indicator, then calculating the overall performance score of each criterion and, finally, the overall performance score for each perspective as described below.

1. Measure the performance of the Indicators

This is done on Form 1 for practitioners and clients by the respondents for each criterion track and measure the performance of the indicators by identifying the category (Tables 1 and 6 for practitioners and clients respectively) and using the appropriate methods as discussed below. [NB: Action by the respondents on Form 1, see Table 7.2 below for an example of a typical Form 1]. The procedure is as shown below.

i. Identify the category of the indicators

The measurement method used will depend on whether the indicator is a *monetary, quantitative* or *qualitative* measure.

a**. Monetary (M):** These are (indicators against which monetary values can be attached. These include such measurements as related to direct cost and cost related measures.

b. Quantitative (Quan): These are indicators against which monetary values are not applicable, but results or impacts can be quantified e.g. indicators related to time, work done, productivity etc.

c. Qualitative (Qual): These are indicators against which neither monetary values nor quantitative values can be attached. These indicators are measured on a scale (ordinal), e.g. likert scale e.g., building a positive image for the government or assessing the efficiency or effectiveness of the management team.

ii. Measuring

a. Measure the actual value.

b. Compare the actual value with the planned or expected value.

c. Determine the difference between actual and planned/expected value.

NB: Whenever, a listed indicator in the set for a criterion is found to be not applicable or irrelevant its measured value is automatically zero. In such a situation, the weighting for the remaining indicators for the given criterion are re-estimated to balance the equation i.e. $\sum_{i=1}^{n} wi$ = 1 or 100%.

iii. Rules for scale measurement (1-5 scale)

The following rules are recommended for use in situations where scaled (Likert) measurement is the option.

1. Extremely weak performance
2. Poor performance –requires major attention for improvement
3. Good performance
4. Very Good performance
5. Excellent or outstanding Performance

Table 7.2 Example of Form 1(Practitioners')

No.	**Category**	**Type of Measurement**	**Measurement for the present phase**						**Description**	**Remarks**
			1	**2**	**3**	**4**	**5**	**6**		
1	***Cost***									
i	Environmental/Social cost	Actual amount								
ii	Managerial cost	Actual amount								
iii	Legal cost	Actual amount								
iv	Incidental cost	Actual amount								
v	Fluctuation cost	Actual amount								
vi	Total cost overrun	Actual amount								
2	***Time***									
i	Time for valuation and certification	Actual time								
ii	Time for payment of certified work	Actual time								
iii	Incidental times	Actual time								
iv	Time for completing of major specified work sections	Actual time								
3	***Quality***									
i	Reworks (number)	No. of times								
ii	Reworks (extent)	Area								
iii	Material test records	No. of times								
iv	Service test records	No. of times								
v	Engineer's/Architect's approval records	No.								
vi	Engineer's/Architect's disapproval records	No.								
vii	Variation (number)	No. of times								
viii	Variation (extent)	Area								
4	***Mgt. & Execution Efficiency***									
i	Decision making process	*Scaled Mst.								
ii	Communication and responsibility	Scaled Mst.								
iii	Efficiency of project team	Scaled Mst.								
iv	Supervision of contractor	Scaled Mst.								
v	Site meeting regularity	No. of times								

**Scale: 1 = extremely weak performance; 2 = poor performance; 3 = good performance; 4 = very good performance; 5= excellent performance;*

2. Score the Measurements.

This is done on Form 2 (Appendix 1 Tables 3a, b for practitioners, and 9, 10a, b for the client) Score the results of each measured indicator based on the relative performance scale. This brings all measurements into a common denominator (percentages) to facilitate overall assessments. [NB: Action by the assessor; record on Form 2].
The detailed procedure is as follows:

i. General Description of the Performance Scale

A scoring system that adequately reflects the performance of a construction project being assessed is the key to any evaluation system. Scoring the measurement implies the combination of monetary, quantitative and qualitative measurements to achieve an overall assessment of performance. This requires that all measurements are expressed in a common denominator. In this assessment system, all measurements are to be expressed in percentages to achieve this objective.
The process involves the use of the relative performance scale, based on the 'relative scale of preference' in MCA (DTLR, 2001 p49), to bring all measurements into percentages based on the principle of relative strengths or levels of performance (Figure 7.2). This is a scale whose main section is anchored at its ends with the least performance level (0) and the most performance level (100). Scores are assigned to the remaining options so that differences in the numbers represent differences in strength or level of performance.
Performance is scored against a pre-determined standard, target or benchmark. This could be represented by the estimated or planned performance i.e. planned cost, time or other activity level, or agreed previously recorded best practice (from similar projects undertaken or known to either client or practitioners). Later, it should be possible to compare performance standards to institutionally acknowledged best practice in the region or country of the project.

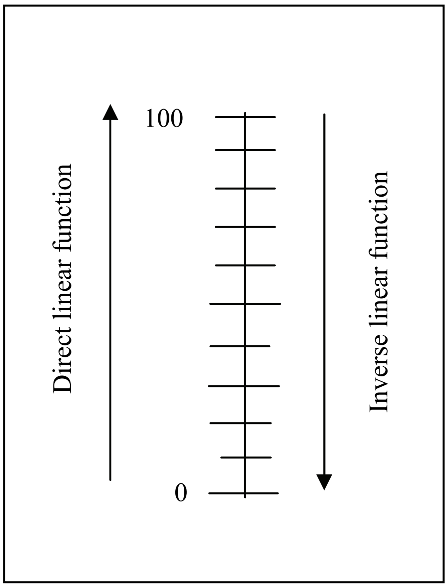

Fig.7.2 The relative performance scale

The framework in this research, however, uses planned or expected values of the project as the main pre-determined standards. This should be agreed as such at the beginning of the project for assessment purposes.

Based on the direction of the relative strength or level of performance, this scale may operate on either of the two functions below.

a. Direct Linear Function (DLF), in which case the highest measurements score towards the 100 and lowest measurements score towards the 0; e.g., scoring efficiency, effectiveness, impacts, quality etc.

b. Inverse Linear Function (ILF), in which case the highest measurements score towards the 0 and lowest measurements score towards the 100; e.g., scoring for cost and time overruns.

The difference scaling method results in numbers that represent relative strength or level of performance for the indicators.

ii. Guidelines for scoring

The framework proposes the following guide for scoring indicators:

a. If an indicators scores less than 50% then it should be taken as a warning sign that something is seriously wrong and that if something is not done there will be a failure in that indicator before the end of the project with its likely consequences on the other aspects of the project.

b. There should be a limit set on the lowest side (Zero mark) beyond which decisions will have to be taken. For e.g. where there are institutional requirement that fluctuations should not exceed certain percentages of the original prices, they should be used to set a limit to the extent of fluctuation. It is recommended that in the absence of any such regulations, the project management team (including the client organization) should set these limits alongside its pre-determined standards and targets. This means scoring on the relative performance scale can be best are best done on the basis of *pro rata*.

iii. Cases of 'Perfect' or 'Superior' Performances

The tool provides allowances for extra normal performances, i.e. 'perfect' or 'superior' performances.

a. Perfect Performance: this is a situation when the measured indicator showed the same figures or values as the standard against which it being compared. In such a situation the relative performance scale will read 100%.

b. Superior Performance: this is a situation when the measured indicators showed figures or values more than the standard against which it being compared; for example when there is a cost savings or time savings etc. In such a situation, it would mean that the relative performance scale will naturally be expected to read more than 100%. However, because the scale is limited to 100, all superior performance will be given the maximum value just like perfect 'perfect' performance. However, the exact values will be recorded and documented as measured on the relevant measurement sheets for information and learning purposes. In a rare situation of superior performance in all the indicators, overall performance in all of the relevant criteria would be expected to exceed 1 or 100%. This should also be treated as perfect performance results, limiting everything to 100% and documenting the raw measurements. In all such situations, it should be necessary to investigate whether the result shows a superior performance or the standards of comparison were, in fact, erroneously low.

iv. Scoring

i. Fix the pre-determined standard at the 100% mark on the scale.
ii. Set the limit of lowest possible measurement at zero.
iii. Assign positions on the scale for all measurements to show their relative performance by *pro rata*.

3. Calculating the Performance Scores

After scoring the measures, the assessor then calculate firstly, the weighted scores of each indicator, then the performance score of each criterion, and finally, the performance score of each perspective.

i. Calculate the weighted score

Calculate the **weighted score** by multiplying the score of each indicator by its weight, leaving the results in terms of percentages. [NB: Action by the assessor; record on Form 2].

.

ii. Determine the performance scores of the Criterion

The assessment is based on the linear additive model. According to this model, "if it can be proved or reasonably assumed, that the measures are preferentially independent of each other and if uncertainty is not formally built into the Multi-criteria analysis model, then the simple linear additive evaluation model is applicable" (DTLR multi-criteria analysis manual). This shows how an option's values on many criteria can be combined into an overall value. This is done by multiplying the value score on each criterion by the weight of that criterion and then adding all these weighted scores together. [NB: Action by the assessor; record on Form 2].
The main items are discussed below.

Add the weighted scores of all the indicators in each criterion to obtain the overall performance (weighted) score of the criterion, Using the established relationships (refer to equation 7.1).

The Performance of any criterion, C, could be expressed as:

$$P_C = w_1I_1 + w_2I_2 + w_3I_3 + \ldots + w_nI_n \qquad \text{7.1}$$

Where, P_C is the performance of the criterion C
W_n = the weighting of the nth indicator.
I_n = the nth indicator.
For each indicator I_n, with weight W_n the weighted score is given by W_nI_n.

iii. Determine the overall Performance in the relevant perspective for each phase

Add all the performance (weighted) scores of each criterion in the perspective to obtain the overall performance (weighted) score in that perspective, using the established relationship. This is illustrated in the equation 7.2.
For each period, e.g. period 1, the overall performance could be calculated as:

$P_{op} = w_1C_1 + w_2C_2 + w_3C_3 + ... + w_nC_n$ 7.2

Where,

W_n = the weight of each criterion,

C_n = the score of each criterion,

P_{op} = the overall performance.

In all relationships above,

$\sum_{i=1}^{n} wi$ = 1 or 100%, and $wi \geq 0$,

and ,

$P_K = \sum_{i=1}^{n} wimi \leq 1$ or 100%,

Where,

P_K = is the performance measurement for a criterion or overall performances;

wi is the weight of a criteria, indicator or factor;

and *mi* represents a score of an indicator or a weighted score of a criterion.

iv. Illustrations Using the Relationships

Equations 7.3 to 7.6 show the actual procedure of adding.

a. For Practitioners, this is reported as:

$P = W_CC_1 + W_TT_1 + W_QQ_1 + W_{MEE}MEE_1 + W_{SI}SI_1 + W_{EI}EI_1$ 7.3

P = [1] + [2] + [3] + [4] + [5] + [6]

Where, 1, 2, 3......6 are weighted performance of the various criteria in practitioners' perspective

b. For Clients, two results are obtained:

i. $N/M = W_{CGG}CGG_1 + W_{CNI}CNI_1 + W_{AFIN}AFIN_1$ ……………………………………….7.4

N/M = (7) + (8) + (9) = [10]

ii. $ESP = W_{ARCH}ARCH_1 + W_{QS}QS_1 + W_{PM/C}PM/C_1 + W_{CE}CE_1 + W_{CON}CON_1$ …………..7.5

ESP = (11) + (12) + (13) + (14) + (15) = [16]

Where, 7, 8 and 9 are calculated performance of the various criteria used to assess client's need/motivation criteria, and 11, 12,......15 are calculated performance of the various criteria used to assess clients expectations from service providers.

These are also used in assessing the shared perspective as shown below.

c. For shared Perspective:

PP = $W_{F\ C}$**[1]** + W_{FT}**[2]** + W_{FQ}**[3]** + W_{FMEE}**[4]** + W_{FSI}**[5]** + W_{FEI}**[6]**+ $W_{FN/M}$**[10]** + W_{FESP}**[16]** ………7.6

Table 7.3 is an example of Form 2

In each case, the results of the overall performance scores of a criterion, for example, or the overall project performance are interpreted in this light:

1. 0% -20%: Extremely weak performance.

2. 21% - 40%: Poor Performance.

3. 41% – 60%: Good Performance.

4. 61% - 80%: Very Good Performance.

5. 81%– 100%: Excellent or outstanding performance.

Table 7.3 Example of Form 2 (Practitioners')

No.	**Category**	**Stdd. Mst.**	**Measurement**			**Score (%)**	**Weight**	**Wgted. Score**	**Criteria**	**Overall Performance**
			Monetary	**Quan**	**Qual**					
1	***Cost***									
i	Environmental/Social cost									
ii	Managerial cost									
iii	Legal cost									
iv	Incidental cost									
v	Fluctuation cost									
vi	Total cost overrun									
2	***Time***									
i	Time for valuation and certification									
ii	Time for payment of certified work									
iii	Incidental times									
iv	Time for completing of major specified work sections									
3	***Quality***									
i	Reworks (number)									
ii	Reworks (extent)									
iii	Material test records									
iv	Service test records									
v	Engineer's/Architect's approval records									
vi	Engineer's/Architect's disapproval records									
vii	Variation (number)									
viii	Variation (extent)									

7.5 Guidelines for Assessing (Measuring and Scoring) the Indicators

Scoring the set of indicators used for this assessment system are done following the three categories discussed above and as shown in Appendix 1 Tables 1 and 6. The approaches to assessing each of the indicators under consideration are described as follows.

7.5.1 Practitioners' Indicators

i. Indicators of Cost

All the indicators here are monetary and are measured as the actual cost incurred. With reference the planned or expected cost as standards these indicators are scored as inverse linear function (ILF). This means that the higher the cost in excess of the standard, the lower the percentage scores.

ii. Indicators of Time

All the indicators the indicators of time (time for evaluation and certification, time for payments of certified work, incidental times, and time for completing major specified works) are quantitative and are measured as the actual time used. With reference to the planned time as the standard, these indicators are scored as ILF.

iii. Indicators of Quality

The indicators of Quality are of varying category. The change order indicators (variation and reworks) are measured in two categories i.e. quantitative and qualitative. The number of reworks and variation are measured as quantitative, while their extent are measured in qualitative. All are scored as ILF. The test records (material and service) and the approval records are measured as quantitative items (actual number). The test records represent positive indicators for quality and direct linear function (DLF). The approval records are measured as the net (positive and negative) and ultimately recorded as DLF.

iv. Indicators of Management and Execution Efficiency

All the indicators under this criterion are measured as qualitative by scale assessment i.e. a likert type scale (e.g. 5 point scale) using questionnaire approach. Here all the relevant stakeholders e.g. client's representative, contractors management team and project management team (for self assessment) are involved. They are measured as DLF.

v. Indicators of Environmental Impact

"Investment on environmental issues" is a monetary indicator and measured as the actual investment incurred. Depending on the objective, this indicator could be scored as a ILF or DLF against the standard. The former is adopted when the objective is to work to standards; the latter is adopted when the objective is to ensure compliance and sensitivity to environmental concerns. The "number of employees with specific environmental task" is a quantitative indicator. It is scored as DLF. In other words, the extent to which the set standard is met shows how sensitive the project is towards environmental issues. "Number of reported incidents is also a quantitative indicator and it is scored as ILF. "Degree of compliance is a qualitative indicator and measured by scale assessment using questionnaire. The respondents in this case are staff from authorities responsible for environmental protection. It is scored as a DLF.

vi. Social Impact

All the indicators under this criterion are quantitative. Each indicator is measured twice, one for positive impact and the other for negative impact. Individually, positive effects are measure as DLF, while negative ones are measured as ILF. The net measure is scored as DLF.

7.5.2 Client's Indicators

a. Needs/Motivation Indicators

i. contributing to Good governance

"Building a positive image about the government" is a qualitative indicator measuring the extent to which the project improves the image of the government. It is measured by scale assessment. The respondents range from the members of the beneficiary community (when it is a project for the community) or nationwide when it has a national asset e.g. construction of a stadium. It is scored as DLF. "Regulating the economy" as an indicator falls under both monetary and quantitative categories: monetary when the value of the project upon completion is assessed as against the cost (especially for bigger or large scale projects); quantitative when the number of people who were directly employed as a result of the project as well as their averages of the period of the project, all scored as DLF. The example, however, focused only on the latter category. "To satisfy social needs" is a qualitative indicator and is measured by scaled assessment. The immediate community members are the respondents. It is scored on DLF.

ii. Contributing to National Infrastructure

The first four indicators (contributing to other project, contributing to critical fields of national interest, adding to national infrastructural stock and developing a new a new technical capacity) are all quantitative and are measured by the actual number of projects, fields and stocks. “Investing excess liquidity in construction” is a monetary indicator measured by the mount of investment made. They are all scored as DLF.

iii. Addressing Future Infrastructural needs

“Providing housing and infrastructure for increasing population”, “providing housing and infrastructure for future expectations”, “providing facilities for expanding government activities” are all quantitative and are measured as actual number provided. “Creating incentive for accelerated national growth” is a qualitative indicator and measured as a scaled assessment. All are scored as DLF.

b. Expectation from Service Providers

The expectations of the client from all the service providers are to be measured by scaled assessment, being qualitative measures. The respondents are all the relevant scale holders: the members from the client’s organisation shall be the key respondents. Each service provider will also be allowed to assess the others. The overall assessments are compared for checks. However, the client’s assessment will be considered for the final scoring. They are all scored as DLF.

7.6 Monitoring and Controlling by the Project Team (Form 3)

The results obtained from the measurements of the indicators lead us to the obvious questions: which factors are causing the results? How influential are they among other factors? How do we manipulate these factors to ensure that we get improved results in the next phase of the assessment? Thus, the second function of the tool is that it assists in the monitoring and controlling of the project to ensure good performance. This is done by relating the factors to the indicators and determining the likely factors that is producing the observed effect on the indicators as measured above. Being purely a management issue, the success of this exercise depends largely on the skill and experience of the project management team and the client’s organisation as, together, they represent the *strategic posture* of the project.

To address this part of the process, each practitioner on the project is called on to make efforts to identify which factor or factors are likely to be influencing the results in each of the indicators, whether these positive or negative factors and to what extent. The assessor provides the two sets of respondents described above with Form 3 (Appendix 1 Tables 4a, b, c, d for practitioners, and 11 for the client)

Form 3 comprises a matrix of indicators on the vertical and factors on the horizontal allowing the respondent to provide a figure showing the extent to which, in their estimate, each of the factors is influencing the indicators. In the end each indicator is also found to be differentially influence by all the factors. [NB: Action by respondents, record on Form 3]. In addition to the empirically determined factors provided, respondents are also allowed to list any new factor or factors they identify during the course of the project as influencing any indicator or indicators. These should be documented as such and be added to the data of factors for analysis and categorisation in the tool for future use.

7.6.1 The Monitoring Procedure

The monitoring procedure follows the following steps.

i. Rules for Estimating the Effect of the Factors

NB: Unlike the indicators and the criteria, all factors should not be pre-weighted at the point of assessment.
The following procedure should be used to fill the forms to determine the factors at play:
1. Map each factor to each indicator
2. In each box indicate the factors' effect on the indicator by marking the following:
a. No Effect- (0)
b. Low Effect:- [(1+): Low positive effect] and (1-): Low negative effect]:–when the effect is very negligible
c. Medium Effect:- [(2+): Medium to High positive effect] and [(2-): Medium to High negative effect]: – if its impact is noticeable but no so significant (needs to be watched)
d. High Effect:- [(3+): High positive effect] and [(3-): High negative effect]:–when the effect on the indicator is very noticeable and works in combination with other factors to produce critical effect.
e. Critical Effect:- [(4+): Critical positive effect] and [(4-): Critical negative effect]: –if its effect is so strong that it alone acts to change the performance of that indicator.
NB: Factors that score 3 and 4 should be considered very influential factors.

ii. Estimate their effect of the factors on the indicators

Make efforts to identify which factor or factors are likely to be influencing the results in each of the indicators. The measurement is done by the individual respondents estimating the effect of each factor on each indicator according to the rules of estimating provided above. Appendix 1Table 4a illustrate how a respondent could fill in his Form 3.

iii. Calculating the Relative Weighted (effect) Scores of the Factors

On the reception of the estimates on the Form 3 from all the respondents, the assessor proceeds to undertake the following calculations.

a. Calculating the relative weighted (effect) score of the factors

In this tool, the relative weighted effect of each factor is defined as the average of the net of all the practitioners' estimated effect of that factor on the specific indicator. In Appendix 1Table 4a, for example, estimates the effect of the factors related to the *project* on the set of indicators of *cost*. it is about averaging each of the raw estimates provided by respondents. These relative weights are sent to Form 4 where the factors are linked with the indicators.

b. Calculate the relative weighted (effect) score of each factor on all indicators in a criterion.

For each factor, this is obtained by calculating the averages of all the net results of the effect of the factor across all the indicators in the criterion. In Appendix 1Table 4a, these are the results in the last rows of each criterion: 5+, 0, 5+, 5+, 3+ and 0 (see Table 7.4 below). These results are important data providing information for documentation for further analysis and learning purposes. Such information overtime will guide project managers as to the general behaviour of these factors in relation to the given indicators.

c. Calculate the relative weighted (effect) of the factor group on each indicator

This is obtained by calculating the averages of all the net effect of all the factors in a factor group on a particular indicator. In Appendix 1Table 4a, these are the results in the last column of each factor group: 3+, 6+, 3-, 9+ and 3+ (see Table 7.4 below). These results are also documented as an important data providing information for documentation for further analysis and learning purposes.

d. Calculate the relative weighted (effect) score of each factor group on each criterion

This is obtained by calculating the average of the net total of each last row of a criterion or last column of a factor group. In Appendix 1Table 4a, we have a result by the respondent as 18+ (see Table 7.4 below). The average of several such results is then calculated to represent the relative weighted effect of that factor group on the criterion *cost*. These are also for documentation and learning purposes.

Equation 7.7 underlines the relationship between a factor group and its set of factors.

Each factor group, G, is expressed as:
$P_{FG} = w_1F_1 + w_2F_2 + w_3F_3 + ... + w_nF_n$ ....7.7.
Where, P_{FG} represents the factor group G.
W_n = the relative weighted score of the *nth* factor.
F_n = the *nth* factor.

In the relationships above,

$\sum_{i=1}^{n} wi$ ε {integers}, and ,

$P_{FG} = \sum_{i=1}^{n} wi$ ε {integers}

Table7.4 Example of Form 3

Criteria	Indicators	FACTORS																			
		Pj							PM/C							PT					
		Pj_1	Pj_2	Pj_3	Pj_4	Pj_5	Pj_6	Σ_{Pj}	PMC_1	PMC_2	PMC_3	PMC_4	PMC_5	PMC_6	$\Sigma_{PM/C}$	PT_1	PT_2	PT_3	PT_4	PT_5	Σ_{PT}
Cost	C_1	2+	1-	0	1-	1+	2+	**3+**		2+											
	C_2	3+	2+	0	0	2+	1-	**6+**													
	C_3	1-	1-	0	1+	1-	1-	**3-**													
	C_4	4+	0	4+	2+	1-	0	**9+**													
	C_5	3-	0	1+	3+	2+	0	**3+**	3-												
	Σ_C	**5+**	**0**	**5+**	**5+**	**3+**	**0**	**18+**													
Time	T_1																				
	T_2																				
	T_3																				
	T_4																				
	Σ_T																				
Quality	Q_1																				
	Q_2																				
	Q_3																				
	Q_4																				
	Q_5																				
	Σ_Q																				
MEE	MEE_1																				
	MEE_2																				
	MEE_3																				
	MEE_4																				
	MEE_5																				
	Σ_{MEE}																				

7.6.2 The Controlling Procedure

1. Relative Weighted Score Summary Form (Form 4, Appendix 1, Tables 5 for practitioners, and 12a, b for clients)

The relative weighted score (R.W.S) results from Form 3 are summarised on Form 4 by the assessor. This form categorises the indictors and factors into four compartments: internal and external environments indicators and factors; positive and negative factors (according to whether they are impacting positively or negatively on related indicators and, good performing and bad performing indicators (shown by +ve or –ve sign respectively).
On this form all the factors that affect an indicator (sometimes the performance of an indicator is influenced by more than one factor) are mapped onto that indicator. The relative weighted score of the indicators show the extent to which that indicator is critical to the overall performance; those of the factor show the extent of influence of the factor over the corresponding indicator among the lot. The assessor then sorts out all the factors and categorise them into critical, High, Medium, and low impacting factors alongside the indicators they are influencing them onto Form 5. On this Form the factors are also grouped according to whether they are internal or external environmental factors. [NB: Action by assessor, record on Form 4]. Table 7.5 is an example of Form 4.

Table 7.5 Example of Table 4 (Clients’).

Performance Indicators			Negative Factors				Positive Factors				Performance Indicators		
	R.W.S	Indicators	Ext. Env. Factors	R.W.S	Int. Env. Factors	R.W.S	R.W.S	Ext. Env. Factors	R.W.S	Int. Env. Factors	Indicators	R.W.S	
			E_{F1}							U_{F1}	U_{I1}		
		E_{I1}	E_{F2}							U_{F2}	U_{I2}		
			E_{F3}							U_{F3}	X_{I3}		
AFIN			E_{F4}							U_{F4}			
		E_{I2}	E_{F5}							U_{F5}	X_{I3}		AFIN
			E_{F6}							U_{F6}			
		E_{I4}	E_{F7}							U_{F7}			
		B_{I1}			B_{F1}			V_{F1}			V_{I1}		
		B_{I2}			B_{F2}			V_{F2}			V_{I2}		
		B_{I3}			B_{F3}			V_{F3}			V_{I3}		
AFIN		B_{I4}			B_{F4}			V_{F4}					AFIN
					B_{F5}			V_{F5}			V_{I4}		
		B_{I5}			B_{F6}			V_{F6}					

* with the client, all other factors except the those related to the client’s own organisation are treated as external factors to the needs/motivation criteria.

3. The Controlling Procedure (Decisions based on Form 5)

The controlling aspect follows recommendations based on Form 5. It allows management to:
i. Strategically manipulate those negative factors that are causing poor performance in certain indicators in order to ensure the achievement of expected results;
ii. Ensure that positive factors are encouraged to continue to influence performance in the expected direction.
With three of the factor groups representing the strategic posture (PM/C, PT, and CLO), it also means that the effort to react strategically, based on the results, will depend not only on what they expect others to do but also on what they have to do. This approach is used throughout the continuous assessment of the project at the pre-determined stages as well as at the final stages. The process is expected to include, but not limited to the steps discussed below.

i. Analyse the factors

The next stage is to analyse those factors which are identified to be impacting positively or negatively on indicators identified to be performing badly or quite well, and so on. These critical factors, originally classified in their factor groups, may relate to either the project's internal or external environment. It therefore requires the project team to find out the true nature of these factors and how they act individually or in combination to impact on the indicators. The following key questions should govern the analyses:
i. Which critical factors are at play on which indicators?
ii. How are they impacting on the indicators (positively or negatively or neutral)?
iii. Are these factors related to the project's internal or external environment?
iv. Are they working alone or in combination with other factors?

ii. Take a decision

Based on the findings from the analyses, management should then proceed to take a strategic decision as to the way forward towards better performance in the next period of the project. This will require a strategic management effort towards the following:
i. Control those factors which are impacting negatively on the indicators.
ii. Promote those factors which are impacting positively on the indicators.
iii. Monitor other factors determined to be neutral.

ii. Take prompt action

To ensure that events conform to plans at the next assessment levels, management must proceed to take prompt action straight away based on the strategic decisions. Required resources must be sort for and the stakeholders, including contractors and the client, should be informed about the true state of affairs based on the performance evaluation conducted and the decisions taken by the project management team. It is about providing the timely information to the effect that: *it has been identified that certain things are not right with some aspects of the project, and that some things needs to be done immediately today in order to avoid a potential disaster tomorrow; and to ensure an expected performance.*
Table 7.6 is an example of Form 5.

Table 7.6 Example of Form 5

No.	Factors		Related Indicators		Remarks
	Critical	**Ext.**		**Type (ext/Int)**	
	Critical	**Int.**			
	High	**Ext.**			
	High	**Int.**			
	Medium	**Ext.**			
	Medium	**Int.**			
	Low	**Ext.**			
	Low	**Int.**			

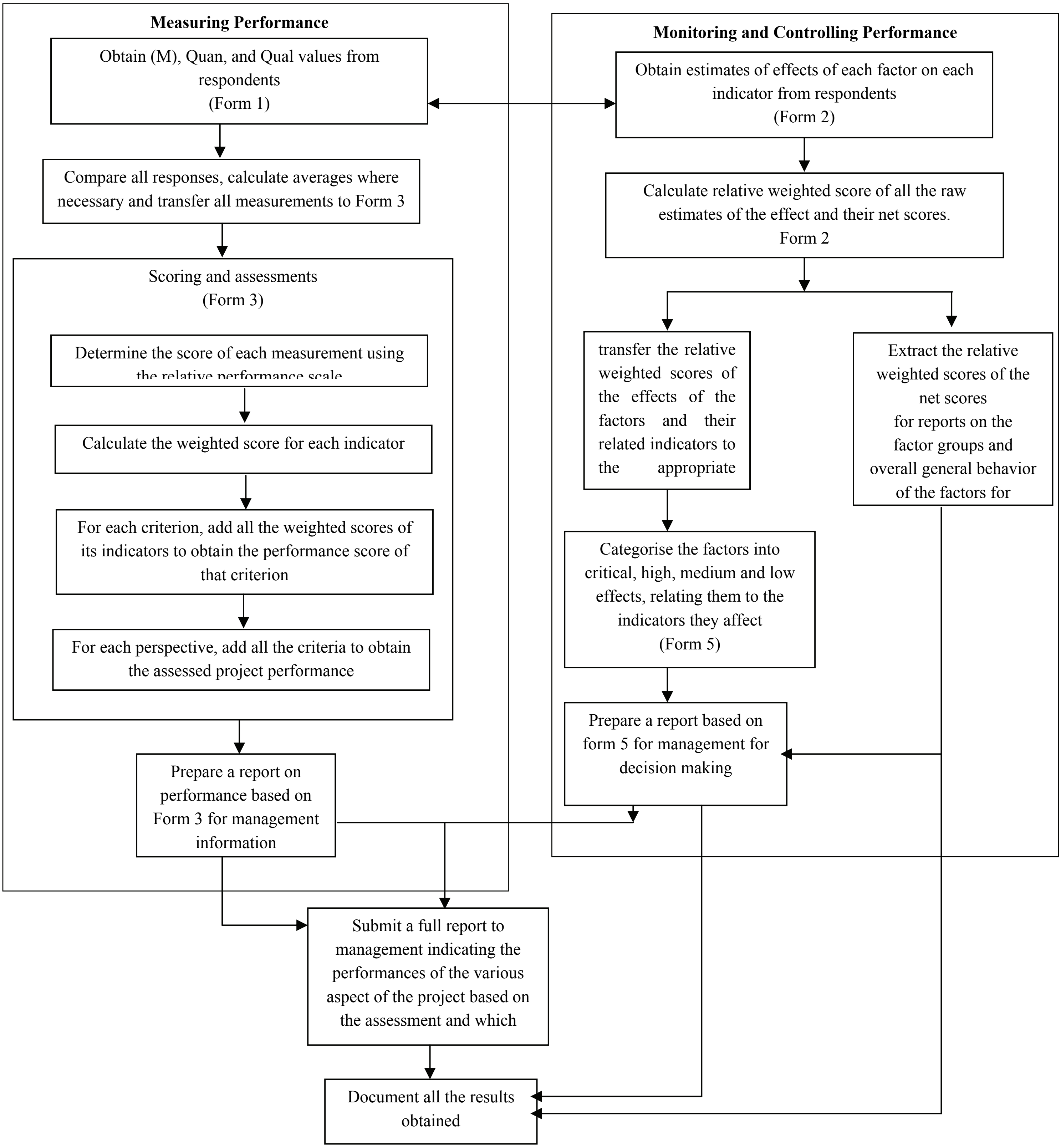

Fig. 7.3 A Flowchart of the main steps in the assessment process

7.7 Key Features and Potential Benefits of the Assessment Tool

The assessment tool under consideration has been designed to satisfy the following objectives:

i. To fall in line with the monitoring and control processes of project management.
ii. To emphasise participatory assessment of key members and stakeholders on the project.
iii. To make the assessment an essential part of the management of the project.
iv. To make it adaptable to any project situation.
V. To ensure continuous assessment.

7.7.1 Features of the Tool

The following are the key distinguishing features of the tool.

i. It is tailored to the project situation

Being a contingency-based tool, it is made flexible to be adaptable to any project anywhere. This is seen in the pre-determination of the performance measures (see tables 4.8 and 4.9 for the model for building the performance measures) and parameters based on the expectations of the project. This means that depending on the type of the project and its probable contingency variables defined by the emphasis of each specific requirement of the client and the external environmental factors prevailing, either all or only some of the indicators may be relevant for use. This is a major distinguishing feature of the tool as compared with the existing ones as discussed in chapter 2 of this thesis. In particular, Shenhar et al. (2002) identify this as a main weakness in most of the existing frameworks.

ii. It allows for an objective assessment and management of construction projects

By working with measures that reflect and describe the true state of the project, by quantifying their performance against set standards, and by taking management decisions and actions based on these findings, the tool provides a means of assessing and managing construction projects objectively. Objectivity is also ensured by the process of data collection and processing for results and decisions. By involving all the relevant participants on the project to estimate the factors at play and their impact, the analysed results provide management with an unbiased report on the true state of affairs for decision making. In addition, by reporting on the "shared perspective" i.e. combining the client's results (representing their perspective) and those of the project management team (practitioners' perspective), opportunity is provided for both intra-triangulation and inter-triangulation of certain portions of both results which further enhances objectivity. A typical area contemplated by this tool is the comparison of the results from “client’s expectations of service providers” and the factors affecting the achievement of client’s needs/motivation criteria –both from the client’s perspective –for intra-triangulation; and factors related to the “project manager”, “the project team”, and “client’s organisation” from practitioner’s perspective for inter-triangulation. This integration of client’s and practitioners’ views in monitoring and controlling also sets the tool apart. Most of the existing tools only measures clients’ satisfaction as part of list of assessment criteria.

iii. It allows predictions to be made on performance

Based on the information obtained after each assessment, the project team is able to predict the possible occurrence in certain aspects of the project, on which bases advice can be given. The results of the analyses of the critical factors affecting the project in identifiable indicators [Form 5] broadly provide the following two statements:

i. Certain factors are positively affecting certain indicators and must be encouraged in order to sustain good results in these indicators so that desired performance can be achieved;

ii. Certain factors are negatively affecting certain indicators and must be discouraged in order to restore good results in those indicators so that desired performance can be achieved.

In effect, these predict the future performance of the project based on prevailing results**.** This is also another gap that the tool proposes to fill. A major problem noted in project performance assessment models is that they do not link the criteria to the factors and hence the models do not form part of an assessment system (Beatham et al., 2004; Takim and Akintoya, 2002).

iv. It allows for learning and improvements in the on-going project as well as future projects

The tool is used for both continuous assessment of the project at pre-determined stages, as well as for final assessment. The results of the assessment of each stage offers opportunity for managements to take decisions and effect strategic changes for the next stages of the project. At the end of the project, the various assessments results and decisions taken are documented as a resource for learning and improvements in future project performance. This becomes a data which will support other research into project management. This feature of the tool sets it apart from all project success and failure considerations which are declared at the end of the project. One of the major challenges faced by project management researchers is the difficulty in getting data on already completed project. Russel et al. (1997) attributed this to the fact that past project records were not in a format suitable to fill in data collection tools. This ability of learning from project is one thing that is lacking in construction project execution as a temporary organisation. Usually, when a project is completed, the team is disbanded, and the only organised part that is left is the edifice that epitomises the concepts of the design. There are usually no concerted efforts to document happenings that will serve as a source of learning.

v. It takes care of the impact of the interactions between the project internal and external environments

The tool takes cognisance of the interactions between the project's internal and external environmental factors and indicators and provides a means by which they can be monitored and controlled for positive impact on the project performance. So long as a factor could be estimated to be impacting on an indicator, the tool allows for this one-to-one mapping relationship between factor-indicator to be regrouped into internal and external factors versus internal and external indicators in the case of practitioners' perspective [Form 4]; and internal and external factors versus client's needs/motivation indicators in the case of the client's perspective. This exercise provides an opportunity for identifications of the interactions between the external and internal environments of the project and how these impact on its performance. It also provides an opportunity to address the management of the project holistically, taking cognisance of the entire project's environment. By separating them into internal and external factors and indicators, the tool is essentially attempting to extend project monitoring and control into an area that is not yet considered by existing models.

vi. It is client's Focus

The tool is designed with clients' ultimate satisfaction in mind. In addition to clients being allowed to assess performance in their own perspective, its use in ensuring objective management as well as expressing the final performance in a shared perspective are all intended to benefit the client. Also, apart from monitoring his own satisfaction and expectation levels, the client is given the benefit of real update from the practitioners' side.

vii. It Address the human elements in Project Performance

One key feature of the tool is that it measures the performance of the core human factors as a means of monitoring project performance and for its management. Most of the factors that it measures as affecting project performance are human related, similarly, the necessary changes that will require for good or improved performance are also mostly human related. This addresses the finding from both theoretical and empirical research that human core factors are leading determinants of construction project performance.

7.7.2 Benefits to the Client

The tool offers some important benefits to the client as outlined below.

i. It offers the opportunity for high involvement of the client in the affairs of the project

By allowing clients to have their own assessment regarding their perspective of project, and by allowing them to take part in some of the assessment of the project, clients are given the opportunity to increase their involvement of the running of the project. This satisfies not only the observation of Latham (1994), but also a major expectation of the representatives of the government client in Ghana as revealed in the results of their interview (see chapter 4) and subsequent surveys. One of the inherent feature of the tool is that it affords the opportunity to also learn, both on the project and afterwards. By involving the client this much, it also affords them the opportunity to learn. As expected by the industry, those clients become initiators, not only for projects but also for improvements (Latham, 1994); these involvements in project management and the knowledge acquisition will certainly equip them for these tasks.

ii. It allows Client's satisfaction criteria to be designed and assessed by Clients

A key distinguishing feature of this tool is that it allows clients to determine their satisfaction criteria and expectations from service providers as well as allowing them to effect the assessment of these. In other words, service providers desire to satisfy their clients is made meaningful by the fact that it is really going to be objectively assessed by the clients in the end. This is in sharp contrast to the usual situations when client's satisfaction is not only considered as an item on project success criteria, but is also determined in the practitioners' perspective.

iii. Clients have the opportunity to ensure better performance from service providers

By agreeing on the specific expectations from the service providers for assessments, monitoring and controlling, clients have been given the rare opportunity to ensure better performance from service providers and, ultimately value for money. It also affords clients the basis for their continuous engagement or otherwise of these service providers. This also sets the tool apart from the rest.

iv. The Concept of the "shared perspective" removes disputes between clients and practitioners

With the ultimate aim of assessing construction projects in a shared perspective (of the client and practitioners), and by involving the client in some of the assessment in practitioners perspective, the tool and its working principle has virtually removed all forms of disputes that usually results when clients disagree with reports given by practitioners on the state of the projects, especially when it involves extra resources. There is also the benefit of increasing collaboration and teamwork between the client and the practitioners through the course of the interim assessments to the final completion and this improves the relationship and understanding between them.

7.7.3 Benefit to Practitioners

The tool is important to the practitioners (the project manager/consultant and the project team) as outlined below.

i. It will give them a further clarification of the project's expectations

The tool provide a means by which the demands of the project as contained in the contract conditions, bills of quantities, specifications, and so on, are further cascaded into performance measures. This puts them in a good position to go the extra mile to satisfy those expectations and to ensure that events occur as planned. This also helps them to be on track. In addition, by ensuring that relevant measures, with their agreed weightings are used as a guide for the management of the project, each practitioner is made to focus on what really matters with regard to the on-going project. This keeps them alert and eliminates the feeling of "the usual routines".

ii. It will give them the needed support for effective decision making

Better decisions for an on-going project are enhanced when they are supported with the right information. The tool allows practitioners to benefit from this information by reporting on (i) the performance of the indicators (ii) by identifying the factors at play, and by relating them in such a way that they will know exactly which aspect of the project to address to ensure good performance of the project.

iii. It will help practitioners to improve upon their capacity and competence

The entire exercise of the implementation of the tool on a project and the documentation allow practitioners to learn from their special interaction with the client (and sometimes contractors), familiarity with the performance measures and their behaviours and interactions, and the overall outcomes. Over time, practitioners will have a wealth of knowledge, skills and capacity to provide better services to clients. The final documents representing the story of the project life-cycle becomes a wealth of knowledge for every participating practitioner.

7.7.4 Some anticipated limitations of the tool

In spite of its potential to address most of the limitations of the existing models, the following limitations are expected from the implementation of the tool.

1. Its use is likely to cause additional cost to the project. This is because the implementation calls for the appointment of an independent assessor to manage the whole assessment procedure throughout the project. It is expected, however, that the benefits will outweigh the cost because, as a results of good front-end management promoted by the tool, and the continuous monitoring and controlling it offers, most of the "fire fighting" activities that emanates from poor and hasty planning will be eliminated. A good preparation at the outset of the project will prevent misunderstandings during the execution stages. These activities inherently, provide clarifications of all the goals of the project and increase participation.
2. In addition, it is likely to increase the volume of work at the pre-tender stages because, apart from contemplating the design and tendering procedure, the Project Manager and the Project Team are expected to undertake the extra work of pre-determining planned/expected standard against which actual performance will be compared. Also, the project team and the project management team from the client's outfit are also given extra work, in addition to their specific roles, of responding to questions and filling assessment forms from the assessor.
3. Another weakness envisaged is that because the tool will be used to assess the project at the pre-determined stages, it means that it will suffer from the limitation of reporting some performance after they had occurred without given room for correction and improvement as on the spot. What happens if in-between the agreed assessment periods "some things" just happened for which a prompt action was required based on assessment? It is expected, however, that once the tool is operationalised in practice, it will undergo needed adaptations to meet this challenges and demands of projects in the long run. For example, based on the notification of the performance assessor, management can organise and take emergency decisions in-between the agreed periods of assessment.

7.8 Conclusion

The contingency-based assessment tool discussed above is aimed at providing an objective, tailor-made and realistic assessment of construction project. This addresses the problem of using the same measures in different socio-economic settings. It works to provide a closer collaboration and integration of the views of the key stakeholders in the management of the project as against the existing fragmentations that exist. By integrating the views of clients and practitioners, the tool has at its great strength the elimination of potential disputes regarding the state of the project. Thus, the tool offers to enhance teamwork in building project execution which is vital to improving overall project performance. By making it a continuous assessment tool, and by providing a means of relating the factors to the affected indicators, the tool provides an opportunity for information-based monitoring and control emanating from the key actors of the project, creating a comprehensive performance assessment system. The declaration of the overall performance level at each stage comprises the performance level of each individual criterion, giving information about which aspect in the project good or bad performance is being achieved, as well as for overall performance. This does away with the success/failure dichotomy which has been described as lagging in their use. By using metrics and records throughout the assessment process the tool automatically provides a comprehensive documentation of all the relevant occurrences among the measures of assessment. This provides the information required during project execution which necessary not only for decision making for the present project but also for learning for improvements in future project execution. This is at the core of the research – a situation that is common in manufacturing industry but lacking in construction. Finally, the assessment tool specifically addresses the main aim of this research, i.e., “to determine a means by which construction project performance can be assessed at any stage of the project execution with criteria that reflect the perspectives of the client and practitioners as well as the particular circumstances of the project and within different socio-economic settings”.

CHAPTER 8 Conclusions and Implications for Research and Industry

8.1 Introduction

This chapter begins by summarising the main research and continued by outlining its main findings and its impact on the present views on the concepts of project performance. It also relates the findings to the greater world by showing its suggested implications, its contribution to knowledge and its general applicability. It highlights the main limitations of the research and then recommends areas where further research is needed. It also recommended a course of action that needs to be followed to ensure the introduction of the concepts and the implementation of the proposed tool in the Ghanaian construction industry.

8.2 Summary of the Research

The research purposed to provide a means of assessing the performance of a construction project throughout its life cycle in separate perspectives of clients and practitioners as defined by contingency variables. In addressing the aim and objectives of the research, the main approach used was to study the state of the art as found in literature mainly from the developed countries. It was then followed by investigating the relevance of these findings in Ghana. This was accomplished by the use of multiple methods. At the end of the empirical study, separate set of criteria were found which reflect the different perspectives of clients and practitioners. In combination, they form a 'shared' perspective of project performance. The study also yield a contingency-based model for building measures and sub-measures usable for assessing construction project as a by-product. Finally, based on the two perspectives, an assessment tool was designed for use in assessing construction project performance in Ghana. The study has come out with some key contributions to knowledge especially in enhancing understanding in construction performance assessment. This study proposes that the successful implementation of this concept and tool in the Ghanaian construction industry will contribute in no small way in bringing about improvements in project execution, developments in the construction industry and thereby, contribute to towards construction industry sustainability in Ghana.

8.3 Summary of the Content and Restatement of aim of the research

This research has given account of the problems associated with construction project assessment in terms of success or failure. The literature review has argued for a paradigm shift towards project performance measurement as the best way to ensure improvements in execution and to ensure that targets are achieved. In so doing, the thesis advocates for the consideration of clients' perspective (not merely satisfaction) of project performance as an

independent assessment, thereby increasing clients' role in the management of the project. This is to be considered alongside practitioners' perspective.
The study, thus, set out "to determine a means by which construction project performance can be assessed at any stage of the project execution with criteria that reflect the perspectives of the client and practitioners as well as the particular circumstances of the project and within different socio-economic settings". Hence, the determination of the perspectives of clients and practitioners form the main aspect of the investigation.

8.4 Key Findings and Deliverables

The research resulted in some key findings, some of which addressed the main aim and objectives set. These describe those which addressed the aims and objectives and research products and those which emanated from the research process.

1 Findings and Deliverables for Aim and objectives

The main deliverables of the research could be summarized as:
(i) Practitioners' perspective of construction project performance in Ghana. (ii) Clients' perspective of construction project performance in Ghana. (iii) The key performance factors. (iv)The means of assessing construction project performance in the two perspectives as described above (an assessment tool). These perspectives are defined by sets of criteria and indicators.
The findings show that the two stakeholder types have different expectations for a project under construction and this influences their perspective of project performance. Practitioners' define the performance of construction project in terms of the expected project and contractual targets of *cost, time* and *quality*, on one hand; the impact of the project on the environment and society (*environmenta*l and *social Impacts*) on another; and finally, how efficient the execution and the management of the project was done (*management and execution efficiency*). Clients, (government) on the hand, have two broad criteria of looking at project performance: whether the service providers are performing satisfactorily as expected (*expectations from service providers*); and whether they (clients) have their needs and motivation for undertaking the project satisfied (*needs/motivation*). These are without prejudice to the fact that clients also show concern about the *cost, time, quality*, and so on criteria of the project as considered by practitioners. To enhance the integration of the management of the project in a unified direction and purpose, the research recommends this assessment to be done in a "shared perspective" as the ultimate representation of overall project performance. This combines all eight criteria in other to ensure monitoring and control of the project performance. Factors that affect the performance of projects in the perspectives of clients and practitioners were also determined. This provided a means of knowing which factors are at play when good or bad performance is being indicated. Finally,

the means of accomplishing all these is built in a contingency-based assessment tool which accomplishes the broad aim of the study.

2 Research Products as Deliverables

i The theoretical framework

A major product of this research is the theoretical framework developed. This framework allows researches in project management to be conducted within the well developed theories of organizations, in particular business organisations. The framework was developed based entirely on the nascent theory of the project as a "temporary organisation" and thus, identifies a strong relationship between the project organization (a temporary organization) and a business organization (a permanent organization). The framework thus enables best practices in manufactory industry (business oriented) to be readily adopted in the construction industry.

ii The Contingency-based model for building measures and sub-measures

The research process also helped in the delivery of a contingency-based model for building measures (criteria and factor groups) and sub-measures (indicators and factors) for use in an assessment tool for a typical project. This followed the process used in this research for building the measures and sub-measures which defined the perspectives of the two stakeholders.

8.5 Implications Suggested by the Findings

1 Multiple perspectives provide better assessment

The evidence from this finding suggest that, like their colleagues in the developed world, clients in developing countries really seek to play a more active role in the management of their projects. It implies that they have not always been satisfied with the performance of their consultants and other service providers.

When the same questions were posed to clients and practitioners, for rankings of the most important criteria, they agreed perfectly only on two out of eight cases: the two least important ones. There also agreed in principle (not in terms of ranking) on the fact that *cost and quality* are the two topmost criteria. The middle ones showed no agreements at all. Thus, to ensure project improvements through performance assessment, a balanced view of assessment results is required. In future, this could involve other stakeholders apart from clients, e.g. taking each practitioners' (Project Managers, Architects, Structural engineers, Quantity Surveyors etc.,) perspective separately instead on grouping them, contractors' perspective as well as other stakeholders of the project .

2 Construction project performance is strongly linked with the performance of the management team

The results of the findings, especially, with regard to the performance factors showed that most of the problems associated with project performance (in practitioners' perspective) are directly human related (factors related to the project manager, factor related to the client's organisation, factors related to the project team) with the other two relating the project and the project's external environment which are mixture of human and non-human factors, agreeing perfectly with the framework of Belassi and Tukel (1996). This finding support the idea in the developed world that human related problems or human factors are the major course of construction failures and disasters .This position of practitioners is collaborated by clients who believe that the attainment of the needs and motivation on project is a function of the performance (or otherwise) of service providers, factors related to their own internal organisation and those related to the external environment. Taking together, these results suggest that the performance of construction project is linked with the performance of all the project management team (project manager/leader, project team, the client, and depending on the procurement route, the contractor).

8.6 Contribution of the research and findings to knowledge

The thesis contribute to knowledge in the following areas.

1 Enhancing our understanding on construction project performance literature and body of knowledge

The research has provided, by empirical evidence, that there are differences between clients and practitioners perspectives in construction project performance, prompting the need to always consider the formers position too. The study has taken some steps towards enhancing our understanding of performance measurement and management as they relate to construction project. It has shown that assessing the performance of a construction project requires a unique approach and diversified concepts. Through the conclusions from literature and the development of the assessment tool, it has also contributed to the growing body of literature regarding construction project performance, particularly, the debate on success or failure; showing that they should neither be looked at in absolute terms nor should they be seen as dichotomous terms, but that both can exist in different degree in a continuum according to which criterion or indicator we are referring to in the assessment process.

By working within the nascent theory of the 'project as a temporary organisation' the research has also contributed to the on-going investigation into the appropriate theoretical basis of project management as a discipline. This has also contributed in providing a bridge

over the ‘gulf’ between the construction industry and the manufactory and other business industries.
Finally, the study has also shown that unlike other projects, construction project performance requires an assessment process which identifies with its one-off nature, its temporariness, its contingent nature, and above all, its relevant stakeholders with diversified background, functions and expectations.

2 General applicability of the method and findings

The methods used in determining the two perspectives in Ghana may be applied in other countries (especially developing) for similar purposes with the appropriate adaptations where necessary. Most readily, the same method could be used to determine the perspective of other stakeholders in construction project execution.
Significantly, assessing project performance in the eight criteria (*cost, time, quality, management and execution efficiency, social impact, environmental impact, clients needs and motivation, clients’ expectations from service providers*) as a ‘shared perspective’ hold promise for its general application everywhere because it address three important aspects necessary for improvements in construction industries:
i. They address the needs of efficient management.
ii. They address the requirements of sustainability.
iii. They address the needs of the client.

3 Contributions of the Models and the Tool

While the model for building assessment measures contributes to ensuring that only the right criteria or indicators are used in assessing any construction project performance, the proposed assessment tool goes further to provide relevant data (through its documentation) from projects which will serve as a source of information on executed projects. A collection of several of these over a period will serve as an important knowledge base in the industry for research and development, improvement in project execution through ‘learning’ from executed projects.

8.7 Limitations of the study

A number of important limitations are identifiable with the current study. The first one has to do with the responses during the survey. It is not possible to ascertain that all the respondents answered the questions with the same level of honesty and openness. In addition, we estimate that no matter how candid respondents may be, the quality of their responses is limited by their ability to recollect from experience and also influenced by their present conditions. The effect of these potential deficiencies, however, is minimised by the multiple research methods used in the investigations. Secondly, given that the entire empirical investigation was done during the period when Ghana was experiencing unprecedented construction activities (2006-2008), it is implied that the trend of the responses will be influenced by this prevailing boom. In other words, a period of slum in the industry, together with its associated constraints, could affect the trend of the results, if not the content. Thirdly, even though it has been suggested in literature that factors of project performance interact with each other as well as with indicators to impact on performance (Belassi and Tukel, 1996), the scope of this research could not allow this aspect to be included in the empirical investigation. This leaves an information gap that is needed to expedite the monitoring and control aspect of the tool. This is because, in spite of the fact that the assessment tool operates on contingency principles and that these interactions are addressed as they occur, such a knowledge base will be a resource that will guide the assessor and those responding to assessment questions, thereby expediting actions. Another problem area has to do with descriptions for the measures and sub-measures. It was found in literature that different authors use different descriptions to define the same things. Those obtained from field study also followed a similar trend. This caused a near endless list of indicators and factors in particular, mostly comprising 'more of the same things'. The problem became aggravated when there was the need to cluster them for assessment purposes. A noteworthy caveat in this regard is that the final set of measures and sub-measures include those whose description are a product of clustering, different from those obtained from literature or obtained from field study. Finally, the focus of the research limited the research to only clients and practitioners, leaving out the third party in the 'tripartite' arrangement –contractors.

These limitations, however, do not undermine the validity of the research and its main findings because, like every scientific research, it purposed to contribute to the continuous quest of investigation, observation, measurement, and examination of some phenomenon for enhanced understanding and insights.

8.8 Recommendations for Further Research

This study brings in its wake several questions recommending further research as outlined below.

There is the need to establish a data bank for indicators and factors for construction project assessment purposes. The data, which will require annual updates should comprise: (i) standard definitions and coding of the measures and sub-measures; (ii) standard definitions and coding of clustered measures and sub-measures; (iii) documented reports of completed projects as provided by the assessment tool.

In addition, there is the need for research and development of software to facilitate the process of clustering based on principles that will ensure that similar measures or sub-measure clustered together will result in the same product with the same name. This will not only expedite the process of selecting indicators for assessing projects but also to ensure uniformity among the various assessments. It is also recommended that a further work be done to determine the relationships among the factors within the same factor groups as well as among factor groups. In addition to this, the relationship between the factors and the various indicators should be determined. These will enhance the understanding of the behaviour of these sub-measures and provide the needed guidelines when it comes to research on the monitoring and control of a project through their assessment.

Another area that requires further exploration is the determination of contractors' perspective of project performance. This will provide the assessment framework with the view of those who have always been part of the subject of assessment as it were "students' input into the assessment process of a school". It is expected that this will give the assessment process a further balanced outlook. Most importantly, the research was carried out against the backdrop that the Ghanaian construction industry still depends heavily on the traditional systems of project execution in which practitioners are employed to supervise and manage the project. With the emergence of management contracts, it will even become necessary to consider the perspective of the contractor who becomes the construction manager.

Finally, it is also recommended that further research be conducted in the following areas:

i. Performance assessment of construction companies.

ii. Performance assessment of construction consultancy firms.

iii. Performance assessment of a countries construction industry.

Finally, the research proposes an empirical research on the relationship between construction project management, system thinking, and environmental theories of the firm. Chapter 1 describes the construction industry and hence its component parts as a system and subsystems respectively within a super-system. Chapter 3 employs organisational environmental theories define the projects external and internal environment. Based on these analyses, the study proposes a research agenda in construction industry which should be empirically aligned with system thinking and environmental theories of organisation; highlighting on the interactions between the parts.

8.9 Introducing the approach to the stakeholders of the Ghanaian construction industry

These findings suggest some interventions in the present project procurement processes in the country. Despite the fact that government projects have often been associated with several examples of poor project performances as indicated in project delays, excessive overruns in cost, project suspensions and outright abandonment, no measures exist to seriously address the situation. Being the main focus and the ultimate beneficiary of this research, and being the main regulator of the industry, it is recommended that the government adopts the front-end management approach being proposed by the assessment tool. The following steps are suggested to follow in order to make project assessment a part and parcel of procurement of construction projects.

8.9.1 Establishment of Construction Industry Development Board.

Firstly, since the tool brings in its wake the strategies that will help in the implementations of policy interventions that will help in the development of the Ghanaian construction industry, it is recommended that the government should set up a Construction Industry Development Board (CIDB) as set in UK and other countries as shown in Table 2.11 of this thesis for similar purpose. This should be given the authority to promote innovations and strategies and to ensure the implementation of such interventions as being proposed by this research. It is recommended that studies be conducted on the functions and modus operandi of these boards and authorities out of which the country can adopt and adapt best practice suitable to its particular environments. Such a board could promote the role of performance assessment in construction industry development by adopting the following steps below:

1. Establishment of an Institution of Construction Performance Measurement

To begin with, professional institutes in the construction industry (GhIS, GhIE, GhIA) should be encouraged to include as part of the professional training and continuing professional development (CPD) the concept of performance assessment and studies in the application of the tool.

ii. An institute of construction performance measurement should eventually be set up for research and development in construction performance measurement and charged with the sole authority to train professionals in construction performance measurement.

2 Employing the services of a Performance Assessor in Project Procurement

Every project should employ the services of a performance assessor as an independent person auxiliary to the project management team. Such a person should be called at the outset during the pre-contract stages for the following assignments.

i. Leading the key stakeholders in building the necessary indicators and their weighting for assessing the project performance based on the expectations of the clients and professional advice of practitioners.

ii. Setting the necessary standards against which assessed performance will be compared.

iii. Leading all the activities involved in the performance assessment process.

iv. Providing real-time performance information to both clients and the Project management team for monitoring, controlling and decision making on the project.

v. Ensuring all documentations of the assessment results, and other relevant information concerning the project in the right format for learning purposes.

Reference

Acharya, N.K, Lee.Y.D., and Im. H.M. (2006), “Investigating Delay Factors in Construction Industry: A Korean Perspective”, Korean Journal of Construction Engineering and Management, Vol. 10, pp.177-190, as quoted in Le-Hoai, L, Lee,Y.D., Lee, J.Y. (2008), “Delay and Cost Overruns in Vietnam Large Construction Projects: A Comparison with other selected Countries”, KSCE Journal of Civil Engineering, 12(6):367-377

Aibinu, A.A. and Odeyinka, A. (2006), “Construction Delays and their Causative Factors in Nigeria”, Journal of Construction Engineering and Management, ASCE, Vol.132, No.7,PP.667-677, , as quoted in Le-Hoai, L, Lee,Y.D., Lee, J.Y. (2008), “Delay and Cost Overruns in Vietnam Large Construction Projects: A Comparison with other selected Countries”, KSCE Journal of Civil Engineering, 12(6):367-377.

Agapiou, A., Clausen, L.E., Flanagan, R., Norman, G., and Notman, D. (1998), “The role of logistics in the materials flow control process”, Construction Management and Economics, Vol. 16, No. 2, pp. 131-137.

Ahadzie, D. (2007), A Model for Predicting the Performance of Project Managers in Mass House Building Projects in Ghana, a PhD Dissertation for the University of Wolverhampton, UK.

Ahadzie, D. (2009), “Ghana in Need of Construction Industry Development Agenda”, Ghana Home Page,

http://www.ghanaweb.com/GhanaHomepage/feature/artikel.php?ID.

Anagnopoulos, K.P. (2004), “Project Management: Epistemological Issues and Standardisation of Knowledge”, Operational Research, an International Journal, 4 (3), 249-260.

Anderson, E.S., Grude, K.V., Haug, T., Turner, J.R. (1987), Goal Directed Project Management, as quoted in Turner, J. R., and Müller, R. (2003) On the Nature of the Project as a Temporary Organisation. International Journal of Project Management, Vol.21, No.1, pp 1-8.

Ankrah, N.A. (2007), An Investigation into the Impact of Culture on Construction Project Performance, A published PhD Thesis, University of Wolverhampton.

Anvuur, A., Kumaraswamy, M. (2006), “Taking Forward Public Procurement Reforms in Ghana”, CIB W107 Construction in Developing Economies International Symposium “Construction in Developing Economies: New Issues and Challenges” January 18th – 20th; 2006 – Santiago, Chile

APCC (2002), Client Skills: Skills required by Government as the Construction Industry Client, Australian Procurement and Construction Council Inc.

Apostolou, D. and Mestas, G. (1999), “Managing Corporate Knowledge: A Comparative Analysis of Experiences in Consulting Firms”, Journal Knowledge and Process Management in two parts as: Apostolou, D. and Mestas, G. (1999), “Managing Corporate Knowledge: a Comparative Analysis of Experiences”: Part II, Knowledge and Process Management, 1999, Vol. 6, No. 4, PP.238-254 & Apostolou, D. and Mestas, G. (1999), “Managing Corporate Knowledge: a Comparative Analysis of Experiences”: Part I, Knowledge and Process Management, 1999, Vol. 6, No. 3, PP.129-238.

Assibey-Mensah, G.O. (2008), “Ghana’s Construction Industry and Global Competition: A research Note”, Journal of Black Studies, Sage Publication.

Ashworth, A. (2004), Cost Studies of Buildings, 4th edition, Pearson Prentice Hall.

Atkinson, R. (1999), "Project Management: Cost, Time and Quality, Two Best Guesses and A Phenomenon, Its Time to Accept Other Success Criteria", International Journal of Project Management, 17 (6)337-42

Baker, B.N., Murphy, D.C. AND Fisher, D. (1983), Factors Affecting Project Success, Project Management Handbook Van Nostrand Reinhold Co., New York.

Bansard D., Cova B., and Salle R. (1993), "Project marketing: beyond competitive bidding strategies", International Business, Review, Vol. 2, No. 2. pp. 125-141, as quoted in Sönderlund, J. (2002), "On the Development of Project Management Research: Schools of Thought and Critique". International Project Management Journal, 8(1), 20-31.

Barnes, N.M.(1989) "Have Projects, Will Manage", BBC2, London, as quoted in Turner, J. R., and Müller, R. (2003), "On the Nature of the Project as a Temporary Organisation", International Journal of Project Management, Vol.21, No.1, pp 1-8.

Beatham, S., Anumba, C., and Thorpe, T., Hedges, I. (2004), "KPIs: a critical appraisal of their use in construction, Benchmarking", An International Journal. Vol. 11 No. 1, 2004. pp. 93-117.

Belassi, W. and Tukel, O.I (1996). "A New Framework For Determining Critical Success/Failure Factors In Projects", International Journal of Project Management, Vol. 14 No.3, Pp.141-51

Benchmarking the Government Client stage 2 study (1999), as quoted in "improving performance: project evaluation and benchmarking", OGC (2007).

Bennett, J., Flanagan, R., Lansley, P., Gray, C. and Atkin, B. (1988), "Building Britain 2001", Centre for Strategic Studies in Construction". University of Reading, Reading.

Bennis W. G. and Slater P. E. (Eds)(1968), The temporary society, New York: Harper & Row, as quoted in Sönderlund, J. (2002), "On the Development of Project Management Research: Schools of Thought and Critique", International Project Management Journal, 8(1), 20-31.

Bernard, H.R. (2002), Research Methods in Anthropology: Qualitative and Quantitative Approaches, 3rd Ed., Rowman and Littlefield Publishers, Inc. 4720 Boston Way.

Bettenhausen, K.L. (1991), "Five Years of Group Research: What Have We Learned and What Needs to be Addressed", Journal of Management, 17 (2), 345-381, as quoted in Harvey, S., Millett, B., and Smith, D. (1998), "Developing Successful Teams in Organisations", Australian Journal of Management & Organisational Behaviour, 1(1), 1-8

Bissah, A.K.F., Wu, X., Zhang, T (2003), "Managing and Resolving Conflict in Project Environment", Conference proceedings, Second International Construction in the 21st Century (CITC-II), "Sustainability and Innovation in Management & Technology.

British Quality Foundation/Construction Productivity Network (BQF/CPN) (2001), KPI –Drivers of Improvement or a Measurement Nightmare, Members' Report 1149, BQF/CPN, Royal Academy of Engineering, London.

Brower, M.J. (1995), "Empowering Teams: What, Why and How", Empowerment in Organisation, 3(1), 13-25.

Brundtland, G (ed) (1987), Our Common Future: The World Commission on Environmental and Development, Oxford University Press.

Brunsson, N. (1985), The Irrational Organization: Irrationality as a Basis for Organizational Action and Change, Chichester, UK: Wiley, as quoted in Packendorff, J. (1995) "Inquiring into the Temporary Organisation: New Directions for Project Management Research", Scandinavian Journal of Management, 4, 319-333.

Bryman A., Bresnen M., Beardsworth A. D., Ford J. and Keil E. T. (1987), 'The concept of the temporary system: the case of the construction project", Research in the Sociology of Organizations, Vol. 5. pp.253-283, as quoted in Sönderlund, J. (2002), "On the Development of Project Management Research: Schools of Thought and Critique. International Project Management Journal, 8(1), 20-31.

Bryman, A (2008), Social Research Methods (3rd Edn), Oxford university Press.

Canadian Council of Forest Ministers (1995), Criteria and indicators for the conservation and sustainable management of temperate and boreal forests: The Montreal Process. Canadian Forest Service, Ottawa, as quoted in Sherry, E. Halseth, R., Fondhal, G., Karjala, M., Leon, B, (2005), "Local-level criteria and indicators: an Aboriginal perspective on sustainable forest management", Institute of Chartered Foresters, Vol. 78. No. 5.

Carr, C. (1992), "Planning Priorities for Empowered Teams", Journal of Business Strategy, 13(5), 43-47, in Harvey, S., Millett, B., and Smith, D. (1998). "Developing Successful Teams in Organisations, Australian Journal of Management & Organisational Behaviour, 1(1),1-8.

Clark K. and Fujimoto T. (1991), Product development performance: strategy, organization and management in the world auto industry, Boston: Harvard Business School, as quoted in Sönderlund, J. (2002), "On the Development of Project Management Research: Schools of Thought and Critique", International Project Management Journal, 8(1), 20-31.

Cleland D. I. and King W. R., (1968), Systems analysis and project management, New York: McGraw-Hill, as quoted in Sönderlund, J. (2002), "On the Development of Project Management Research: Schools of Thought and Critique", International Project Management Journal, 8(1), 20-31.

Cleland, D.I. and King, W.R. (1983), Systems Analysis and Project Management, McGraw,New York, as quoted in Belasi and Tukel (1996), "A new Framework in Determining Critical Success/Failure Factor Framework in Projects", International Project Management, Vol. 14, No.3 pp. 141-151.

Cleland, D.I., and Kerzner, H.A. (1985), A Project Management Dictionary of terms, New York: Van Nostrand Reinhold as quoted in Turner, J. R., and Müller, R. (2003) "On the Nature of the Project as a Temporary Organisation". International Journal of Project Management, Vol.21, No.1, pp 1-8.

Chan, A.P.C and Chan, A.P.L., (2004), "Key Performance Indicators for Measuring Construction Success Benchmarking", An International Journal Vol.11 No. 2, 2004 Pp. 2003-221.

Chimwaso, D.K. (2000), "An Evaluation of Cost Performance of Public Project Case of Botwana", Conference Proceedings, Construction Industry Development in The New Millennium. 2nd

International Conference on Construction Industry Development and 1st Conference of CIB TG 29 on Construction in Developing Countries, Singapore.

Chung, H.W. (1999), Understanding Quality Assurance in Construction, a Practical Guide to ISO 9000, e & FN Spon, NY.

CIB (1999), Managing Construction Industry Development in Developing Countries: Report on the First Meeting of the CIB Task Group 29. Arusha, Tanzania, 21-23 September. Rotterdam, as quoted in Ofori (2001), "indicators for measuring construction industry development", Building Research & Information, Vol. 29, No. 1, pp 40-50

Cobbold, I and Lawrie, G. (2002), "The development of the Balanced Scorecard as a strategic management tool", 2GC Conference Paper presented at PMA Conference, Boston, USA

Cohen, M. D., March, J. G. and Olsen, J. P. (1972), "A Garbage Can Model of Organizational Choice", Administrative Science Quarterly, 17, 1-25, in Lundin, R. A. and Söderholm, A. (1995) A theory of temporary organization, Scandinavian Journal of Management 11, (4), 437-455.

Cook, H.E. (1997), Product Management - Value, quality, cost, price, profit and organization. Chapman & Hall, London, p.411, as quoted in Koskela, L. and Howell, G., (2002a), "The Underlying Theory of Project Management is Obsolete", Proceedings of the PMI \Research Conference, 293-302.

Cooper, R.G., Kleinsmidcht, E. J. (1987), "Success Factors In Product Innovations", Industrial Marketing Management 16 (3), 215-224.

Cova B. and Holstius K. (1993), "How to create competitive advantage in project business", Journal of Marketing Management, Vol. 9, No. 2. pp. 105-121, as quoted in Sönderlund, J. (2002), "On the Development of Project Management Research: Schools of Thought and Critique", International Project Management Journal, 8(1), 20-31.

Cova B., Mazet F. and Salle R. (1994), "From competitive tendering to strategic marketing: an inductive approach", Journal of Strategic Marketing, Vol. 2. pp. 1-19, as quoted in Sönderlund, J. (2002), "On the Development of Project Management Research: Schools of Thought and Critique", International Project Management Journal, 8(1), 20-31.

Creswell, J.W., Clark, V.L.P., Gutmann, M.L., Hanson, W.E. (2003), "Advanced Mixed Methods Research Designs", In Tashakkori, A. and Teddlie, C., (Eds), Handbook of Mixed Methods in Social and Behavioral research, 209-240.

Crown Agents (1998), The World Bank Procurement Audit in Ghana, Value for Money Audit Report for Ghana, Crown Agents for Overseas Governments and Administrations Ltd, UK.

Cyert, R. M. and March, J. G.(1992), A Behavioral Theory of the Firm, 2nd edition, Cambridge: Blackwell, in Lundin, R. A. and Söderholm, A. (1995), "A theory of temporary organization", Scandinavian Journal of Management 11, (4), 437-455.

Czamiawska-Joerges, B., (1988), Ideological Control in Non ideological Organizations. New York: Praeger, in Lundin, R. A. and and Söderholm, A. (1995), "A theory of temporary organization", Scandinavian Journal of Management 11, (4), 437-455.

Dansoh, A (2005), "Strategic Planning for Construction Firms in Ghana", Construction Management and Economics, Vol. 23, No.2, PP. 163-168.

De wit, A. (1988), “Measurement of project Success”, International of Project Management, 6 (3),164-170, Butterworth & co (Publishers) Ltd.

Degado-Gaitan, C.,(2000), “Researching change and changing researcher”, In B.M. Brizuela J.P. Stewart, R.G. Carrillo, and J.G. Berger (Eds), Acts of inquiry in qualitative research (pp. 389-410). Cambridge, M.A: Harvard Education Review.

Dinsmore, P.C., (1999), Winning Business with Enterprise Project Management. AMACOM, AMA Publications, New York. NY 10019.

DTLR, (2001), Multi Criteria Analysis: A Manual. Department of Transport, Local Government and the Regions, London.

Du Plessis, C. D. (2002), Agenda 21 for Sustainable Construction in Developing Countries –A discussion document.

Dvir, D and Shenhar, A (1992), “Measuring the Success of Technology-Based Strategic Business Units”, Engineering Management Journal, Vol.4, No.4, pp. 33-38.

Dvir D., Lipovetsky S., Shenhar A. and Tishler A. (1998), “In search of project classification: a non-universal approach to project success factors”, Research Policy, Vol. 27. pp. 915-935.

Eccles, R.G. (1991), "The performance measurement manifesto", Harvard Business Review, pp.131-7.

Egan, J (1998) Rethinking Construction, Department of the Environment, Transport and the Regions, http://www.construction.detr.gov.uk.

Egemen, M. & Mohamed, A.N. (2006), “Client’s need, wants and expectations from contractors and approach to concepts of repetitive works in the Northern Cyprus construction market”, Building Environment, Vol. 41, pp602-614

Engwall, M., (1992), “Project management and ambiguity: findings from a comparative case study”, In I. Haig and E. Segelod (Eds), Issues in Empirical Investment Research (Amsterdam: Elsevier Science, 173-197, in

Engwall M., (1995), “Jakten på det effektiva projektet, Stockholm: Nerenius and Santérus. (in Swedish, "In search of the effective project")”, as quoted in Sönderlund, J. (2002), “On the Development of Project anagement Research: Schools of Thought and Critique”, International Project Management Journal, 8(1), 20-31.

Eyiah, A K and Cook, P (2003), “Financing small and medium-scale contractors in developing countries: a Ghana case study”, Construction Management and Economics, **21**(4), 357-367.

Packendorff, J. (1995), “Inquiring into the Temporary Organisation: New Directions for Project Management Research”, Scandinavian Journal of Management, No.4, pp.319-333.

Faniran, O. O. (1999), “The Role of Construction Project Planning in Improving Project Delivery in Developing Countries”, Case Study of the Nigeria Construction Industry, Conference Proceeding, “Construction Industry Development in the New Millenium, 2nd International Conference on

Construction Industry Development, and 1[ST] Conference of CIB TG29 on Construction in Developing Countries, 27-29 October, 1999, Singapore.

Faridi, A.S. and El-Sayegh, S.M. (2006), "Significant Factors Causing Delay I the UAE Construction Industry", Construction Management and Economics, Vol. 24, No. 11, pp1167-1176, as quoted in Le-Hoai, L, Lee,Y.D., Lee, J.Y. (2008), "Delay and Cost Overruns in Vietnam Large Construction Projects: A Comparison with other selected Countries", KSCE Journal of Civil Engineering, 12(6):367-377

Fellows, R., Liu, A. (2005), Research Methods for Construction", 2nd Ed, Blackwell Science Ltd, Oxford, UK.

Field, S.W. & Swift, K.G. (1996), "Effecting a Quality Change: An Engineering Approach", Arnold, London. 345-381, as quoted in Harvey, S., Millett, B., and Smith, D. (1998). Developing Successful Teams in Organisation, Australian Journal of Management & Organisational Behaviour, 1 (1), 1-8

Fiedler, F. E. (1964), "A Contingency Model of Leadership Effectiveness", Advances in Experimental Social Psychology (Vol.1). 149-190. New York: Academic Press.

Forsberg, K, Mooz, Hal & Cotterman, H. (1996), Visualizing Project Management, John Wiley & Sons, New York, p.298, as quoted in Koskela, L. and Howell, G., (2002a), "The Underlying Theory of Project Management is Obsolete", Proceedings of the PMI \Research Conference, 2002. pp. 293-302.

Foti, R. (2002). "Priority Decision: Portfolio Management enables Strategic Value Judgments", PM Network, April, pp25-29, as quoted in Storm M.P and Janssen, E.R. (2004), "High Performance Projects: A speculative Model for Measuring and Predicting Project Success", Conference Paper, Submitted to IRNOP VI Project Research Conference Track D: Project Theory.

Herzberg, F., Mausner, B. & Snyderman, B.B. (1959), The Motivation to Work. John Wiley & Sons, New York, as quoted in Robbins, S.P. (2005), Organisational Behaviour, 11th ed., Prentice Hall, New Jersey.

Freeman, M and Beale, P. (1992), "Measuring Project Success", Project Management Journal 23 (1), 8-17.

Frimpong Y., Oluwoye, J and Crawford, L (2003), "Causes of Delay and Cost Overruns in Construction of Groundwater Projects in Developing Countries: Ghana as a Case Study", International Journal of Project Management, Vol. 21 ,pp. 321-326, as quoted in Le-Hoai, L, Lee, Y. D., Lee, J.Y. (2008), "Delay and Cost Overruns in Vietnam Large Construction Projects: A Comparison with other selected Countries", KSCE Journal of Civil Engineering, 12(6):367-377.

Fitzgerald, L., Johnston, R., Brignall, S., Silvestro, R. and Voss, C. (1991), Performance Measurement in Service Business, CIMA, London.

Ghana Budget (2007), Selected Econmic indicators (2001-2007), Appendix 2.

Goodman, A. and Goodman, L. P., (1976), "Some Management issues in Temporary Systems: a study of Professional Development and Manpower -- the Theatre case", Administrative Science Quarterly, Vol. 21, No. 3, pp. 494-501. , as quoted in Lundin, R. A. and Söderholm, A. (1995), "A theory of temporary organization", Scandinavian Journal of Management 11, (4), 437-455.

Goodman, R. A., (1981), Temporary Systems. Professional Development, Manpower Utilization, Task Effectiveness, and Innovation , New York: Praeger, as quoted in Lundin, R. A. and Söderholm, A. (1995), "A theory of temporary organization", Scandinavian Journal of Management 11, (4), 437-455.

Grové, A-S. (2008), Teamwork in 21st Century South African Organisations: Understanding the Expectations on Multiple Levels, A PhD Thesis in Organisational Behaviour in the Faculty of Economic and Management Sciences, University of Pretoria.

Günter, B. and A. Bonaccorsi (Eds.) (1996), "Special issue on project marketing and systems selling", International Business Review, Vol. 5, No. 6., "), as quoted in Sönderlund, J. (2002), "On the Development of Project Management Research: Schools of Thought and Critique", International Project Management Journal, 8(1), 20-31.

Guy, G.B. and Kibert C.J. (1998), "Developing indicators of sustainability: US experience". Building Research and Information, **26**(1), 39–45.

Haig, B.D. (1987), "Scientific Problems and Conduct of research", Education Philosophy and Theory, 19, 22-32

Hall. A.D., and Fagen, R.E., (1956), "Definition of a system", General Systems, Vol.1 pp18-28 as in System Thinking Vol1., General Systems Theory, Cybernetics and Complexity, Edited by Midgley, (2003).

Harvey, S., Millett, B., and Smith, D. (1998), "Developing Successful Teams in Organisations", Australian Journal of Management & Organisational Behaviour,1(1),1-8.

Hill, K., Slivon, C. and Draper, J (2007), "Another Approach to Transforming Project Delivery: Creating a Shared Mind", Proceedings IGLC, Michigan, USA, pp 417-422

Hillebrandt, P. (1984), Economic Theory and the Construction Industry, second Edition, Macmillan, London.

Hodges, J and Baah, A. (2006), National Labour Law Profile: Ghana, Research and Policy Department, Ghana Trade Union Congress.

Hofstede, G. (1978), "The Poverty of Management Control Philosophy", Academy of Management, Review, July, 450-461, as quoted in Koskela, L. and Howell, G., (2002a), "The Underlying Theory of Project Management is Obsolete", Proceedings of the PMI \Research Conference, 293-302.

Hughes, M.W., (1986), "Why Projects Fail: The Effects For Ignoring The Obvious", Journal of Industrial Engineering 18 14-18.

Ibert, O., (2004), Projects and Firms as Discordant Complements: Organisational Learning in the Munich Software Ecology, Research Policy, 33, 1529-1546.

Johnston, R.B. & Brennan, M. (1996), "Planning or Organizing: the Implications of Theories of Activity for Management of Operations", Omega, Int. J. Mgmt. Sc., 24, (4), 367-384.

Jönsson, S. and Lundin, R., (1976), "Problem lOsande utan problem (Problem Solving Without a Problem)", FE-rapport p64, University of Gothenburg, as quoted in Lundin, R. A. and Söderholm, A. (1995), "A theory of temporary organization", Scandinavian Journal of Management 11, (4), 437-455.

Jugdev, K., Thomas, J. and Delisle, C. L. (2001), “Rethinking Project Management: Old truths and new insights”, Project Management, 7(1), 37-43, as quoted in Anagnopoulos, K.P. (2004), “Project Management: Epistemological Issues and Standardisation of Knowledge”, Operational Research. An International Journal, 4(3), 249-260.

Jugdev, K., Müller, R. (2005), “A retrospective look at our evolving understanding of project success”, Project Management Journal, vol. 36, No.4, pp 19-31.

Jugdev, K (2008), “Good Theory: Developing a Foundation for Project Management”, International Journal of Product Development, Vol. 6, No. 2.

Kagioglou, M., Cooper, R., Aouad, G. (2001), “Performance Management in Construction: a conceptual framework”, Construction Management and Economics, Vol. 19, pp85-95.

Kaliba, C, Muya, M. and Mumba, K. (2009), “Cost Escalation and Schedule Delays in Road Construction Projects in Zambia”, International Jourbnal of Project Management, Vol. 27,pp 522-531.

Kashiwai, D.T. (2002), “The difficulty in Implementing Performance Specifications in Construction Industry”, Paper submitted at the International Sympossium of the Working Committee, CIB W92 (Procurement Systems).

Kaplan, R.S., and Norton, D.P. (1996), Translating Strategy into Action: the Balanced Scorecard. Havard Business School Press. Boston, Massachusetts

Kennedy, M.N. (2003), Product Development for the Lean Enterprise, The Oakleaf Press, Richmond, VA.

Klagegg, O. J., Samset, K., and Magnussen, O.M.(2005), “Improving Success in Public Investment Projects: Lessons from Givernemen Initiative in Norway to Improve Quality at Entry”, a paper presented at the 19th IPMA World Congress, 2005.

Koskela, L. (2000), “An exploration towards a production theory and its application to construction”, Espoo, VTT Building Technology, p.296, VTT Publications; 408. WWW:

Koskela, L. and Vrijhoef, R. (2000). “The Prevalent theory of construction is a hindrance for innovation”. www.iglc.net/conference/2000/Papers/KoskelaVrijhoef.pdf. Accessed 1/09/08

Koskela, L. and Howell, G., (2002a), “The Underlying Theory of Project Management is Obsolete”, Proceedings of the PMI \Research Conference, 293-302.

Koskela, L. and Howell, G. (2002b), The Theory of Project Management: Explanation to Novel Methods”, Proceedings of IGLC-10, Aug., Gramado, Brazil.

Koushki, P.A., Al-Rashid, K., and Kartam, N. (2005), “Delays and Cost increases in the Construction of Private Residential Projects in Kuwait”, Construction Management and Economics, Vol. 23, No.3, pp285-294, as quoted in Le-Hoai, L, Lee,Y.D., Lee, J.Y. (2008), “Delay and Cost Overruns in Vietnam Large Construction Projects: A Comparison with other selected Countries”, KSCE Journal of Civil Engineering, 12(6):367-377

Lammerts, van Bueren E.M, Blom, E.M (1997), Hierarchical framework for the formulation of sustainable forest management standards, The Tropendos Foundation.

Latham, M. (1994), Constructing the team, Joint Review of Procurement and Contractual Arrangement in the United Kingdom. Design, Drawing and Print Services.

Le-Hoai, L, Lee,Y.D., Lee, J.Y. (2008), "Delay and Cost Overruns in Vietnam Large Construction Projects: A Comparison with other selected Countries", KSCE Journal of Civil Engineering, 12(6):367-377

Lim, K.C., Mohammed, A.Z., (1999). "Criteria of Project Success: An Exploration Re-Examination". International journal of project management, Vol. 17 No.4, pp.243-8, as quoted in Chan, A.P.C and Chan, A.P.L., (2004). "Key Performance Indicators for Measuring Construction Success". Benchmarking: An International Journal Vol.11 No. 2, 2004 Pp. 2003-221.

Lipovetsky, S., Tishler, Dvir, D., Shenhar,A.J. (1997), "The Relative Importance of Project Success Dimensions". R& D Management 27(2) 97-106.

Lo, T.Y., Fung, I.H., and Tung, K. C.F. (2006), "Contributors to Construction Delays", Journal of Construction Engineering Management, ASCE, Vol. 132, No. 6, pp636-649.

Lundin R. A. and Packendorff J. (Eds) (1994), "Temporary organizations and Project Management", Proceedings of the IRNOP Conference, Umeå Business School, Umeå University, as quoted in Sönderlund, J. (2002), "On the Development of Project Management Research: Schools of Thought and Critique", International Project Management Journal, 8(1), 20-31.

Lundin, R. A. and Söderholm, A. (1995), "A theory of temporary organization", Scandinavian Journal of Management 11(4), 437-455.

Lundin R. A. and Midler C. (1998), "Projects as arenas for renewal and learning processes", Boston: Kluwer Academic Publishers, as quoted in Sönderlund, J. (2002), "On the Development of Project Management Research: Schools of Thought and Critique", International Project Management Journal, 8(1), 20-31.

Lynch, R.L. and Cross, K.F. (1991), Measure Up – the Essential Guide to Measuring Business Performance, Mandarin, London.

Makulwasaatudom, A., Emsley, M., Sinthawanarong, K. (2003), "Critical Factors Influencing Construction Productivity in Thailand", Second International Conference on Construction in the 21st Century (CITC-II) "Sustainability and Innovation in Management and Technology", 10-12 December, Hong Kong.

March, J. G. and Olsen, J. P., (1976), Ambiguity and Choice in Organizations. Oslo: Universitetsforlaget; as quoted in Lundin, R. A. and Söderholm, A. (1995), "A theory of temporary organization", Scandinavian Journal of Management 11(4), 437-455.

Margulies, J.S. & Kleiner, B.H. (1995) New Designs of Work Groups: Applications of Empowerment. Empowerment in Organisations, 3(2), pp.12-18.

Martin, C.C. (1976), Project Management Amaco, New York, as quoted in Belasi and Tukel (1996), "Anew Framework in Determining Critical Success/Failure Factor Framework in Projects", International Project Management, Vol. 14, No.3 pp. 141-151.

Maskell, B. (1996), "Performance measures for world class manufacturing", Management Accounting, May, pp.32-3.

Masurier, J.L (2002), "The Observation Methhod: Asystemic Approach to Managing Construction Project Uncertainties", 2nd International Conference on System Thinking in Management, United

Kingdom, as quoted in Thevedran, V. and Mawdesley, M.J. (2003), "Human Risk Factors in Construction", Second International Conference on Construction in the 21st Century (CITC-II) Sustainability and Innovation in Management and Technology, 10-12 December, 2003, Hong Kong.

Mbachu, J.I.C (2003), Critical Study of Client Needs and Satisfaction in the South African Building Industry. Unpublished PhD Thesis, Faculty of Economics & Building Sciences, University of Port Elizabeth, South Africa.

McDermot (1999), "Strategic and Emergent Issues in Construction Procurement, in S.M. Rowlingson and P. McDermot (eds) 'Procurement Sytems: A Guide to Best Practice in Construction, London E & FN Spon p.79 as quoted in Mbachu, J.I.C (2003), Critical Study of Client Needs and Satisfaction in the South African Building Industry. Unpublished PhD Thesis, Faculty of Economics & Building Sciences, University of Port Elizabeth, South Africa.

Melvile, I.A., and Gordon, I.A., (1983), Professional Practice for Building Works, the Estate Gazzette Limited.

Mendoca, M. and Kanungo, R.N. (1996), "Impact of Culture on Performance Management in Developing Countries", International Journal of Manpower, 17(4/5), 65-75.

Mendoza, G. A., Prabhu, R (2002), "Qualitative multi-criteria approaches to assessing indicators of sustainable forest resource management", Forest Ecology Management, Vol. 174, Issues 1-3, pp329-343.

Mengesha , W.J. (2004), Performance for Public Construction Projects in Developing Countries: Federal Road and Educational Building Projects in Ethiopia, Norweigian University of Science and Technology, Doctoral Thesis, 2004:45.

Mian, D.M, Sherman, S.M., Humphreys, M.F., and Sidwell, A.C. (2004), "Construction Projects Immediate Health Check: A CSF & KPI Approach", Project Management Australia Conference (PMOZ), "Project Powering the Economy"

Midler, C., L 'auto qui n' existait pas: Management des projets et transformation de l'entreprise [The Car that Did Not Exist: Project Management and Company Renewal] (Paris: Inter Editions, 1993), as quoted in Sönderlund, J. (2002), "On the Development of Project Management Research: Schools of Thought and Critique", International Project Management Journal, 8(1), 20-31.

Miles, M. B., (1964), "On temporary systems", In: M. B. Miles (Ed.), Innovation in Education, pp. 437—490, New York: Teachers College Press, as quoted in Lundin, R. A. and Söderholm, A. (1995) A theory of temporary organization, Scandinavian Journal of Management, 11(4), 437-455.

Mohamed, S. (1996), "Benchmarking and Improving construction productivity", Benchmarking for Quality Management and Technology, Vol.3 No3., pp50-58, MCB University Press, 1351-3036.

Morris, P. (1994) The Management of Projects. Thomas Telford, London. p.358, as quoted in Koskela, L. and Howell, G., (2002a) The Underlying Theory of Project Management is Obsolete, Proceedings of the PMI \Research Conference, 293-302.

Morris, P. W. and Hough, G, H (1987), "The Anatomy of Projects", John Wiley and Sons, New York (1987), as quoted in Belasi and Tukel (1996), "Anew Framework in Determining Critical Success/Failure Factor Framework in Projects", International Project Management, Vol. 14, No.3 pp. 141-151.

Morris, P.W.G (2000) Researching the unanswered questions of Project Management. PMI Research Conference, Paris; as quoted in Anagnopoulos (2004), "Project Management: Epistemological Issues and Standardisation of Knowledge", Operational Research. An International Journal, 4(3), 249-260.

Murphy, D.C., Baker, B.N. and Fisher, D, (1974), "Determinants of project success, NSF Reporty NGR 22-003-028, as quoted in Shenhar et al. (2002), "Refining the Search for Project Success Factors: A Multivariate, Typological Approach", R & D Management 32, 2. Blackwell Publishers.

Murphy, K. R., and Cleveland, J. N., (1995) Understanding Performance Appraisal: Social, Organizational ad Goal-based Perspectives, SAGE Publications, Inc., USA.

Murray, M.D., Tookey, J.E., Langford, D.A, Hardcastle, C. (2002), "Construction Procurement Systems: Don't Forget Murphy's Law", Paper submitted at the International Sympossium of the Working Committee, CIB W92 (Procurement Systems).

Mutijwaa, P., and Rwelamila, D (2007), "Project Management Competence in Public Sector Infrastructure Organisation", Construction Management and Economics, Vol. 25, pp55-66

Neely, A., Mills, J., Platts, K., Richards, H. and Bourne, M. (2000), "Performance measurement systems design: developing and testing a processed based approach", International Journal of Operations & Production Management, Vol. 20 No., PP. 1119-45

Neely, A.D., Adams, C. and Kennerly, M. (2002), The Performance Prism, the Scorecard for Measuring and Managing Business Success, FT Prentice Hall, London.

Newcombe R. (2003), "From client to project stakeholders: a stakeholder mapping approach", *Construction Management and Economics* 21:841-848.

Newman, I., and Benz, C.R.,(1998), Qualitative-quantitative research methodology: Exploring the iterative continuum. Carbondale: Southern Illinois University Press.

Newman, I., Ridenour, C.S., Newman, C., DeMarco, Jr. G.M.P., (2003), "Typology of Research Purposes and Its Relationship to Mixed Methods", In Tashakore, A., and Teddlie, C., (Eds), Handbook of Mixed Methods in Social and Behavioural research, pp 167-188.

Njoh, A. J., (1993), "A Client-Satisfaction-Based Model of Urban Public Service Delivery Organisational Effectiveness", Social Indicators Research **32**: 263-296, 1994.

Nkado, R.N. (1998), "Competencies of Professional Quantity Surveyors in a Developing Economy", The Royal Institute of Chartered Surveyors.

O'Brien W., Fischer M. and Jucker J. (1995), "An economic view of project coordination", Construction Management and Economics, Vol. 13. pp. 393-400, as quoted in Sönderlund, J. (2002), On the Development of Project Management Research: Schools of Thought and Critique. International Project Management Journal, 8(1), 20-31.

Ofori, G. (1988), "A central data bank for construction", Habitat International, **12**(1), 87–94.

Ofori, G. (1990), The Construction Industry: Aspect of its economic management, pp 58-83. Singapore University Press.

Ofori, G. (1999), "Satisfying the customer by changing production patterns to realise sustainable construction. Proceedings", Joint Triennial Symposium of CIB Commissions W65 and 55, Cape Town, 5-10 September, Vol. 1, pp. 41-56.

Ofori, G. (2000), “Challenges of Construction Industries in Developing Countries: Lessons from Various Countries”, Conference Paper, Challenges Facing Construction Industries in Developing Countries, 2nd International Conference on Construction in Developing Countries: Challenges facing the construction industry in developing countries 15-17 November 2000, Gabarone, Botswana

Ofori, G. (2001), “Indicators for Measuring Construction Industry Development in Developing Countries”, Building Research & Information, Vol. 29, No. 1, pp 40-50

OGC (2009), Sustainability, Achieving Excellence in Procurement Guide 11, pp8-9. (http://www.ogc.gov.uk/documents/CP0016AEGuide11.pdf. Accessed 10th June , 2009)

Ojiako, U., Johansen, E., Greenwood, D. (2008), “Aqualitative Re-Construction of Measurement Criteria”, Industrial Management and Data Systems, Vol. 108, No.3

Oldfield, A., and Ocock, M. (1997), “Managing Project Risks: The Relevance of Human Factors”, International Journal of Project Management, Vol. 1, No.2, PP. 99-109.

Otieno, F.A.O. (2000), “The role of Monitoring and Evaluation in Projects”, Conference Paper, 2nd International conference on construction in developing countries: challenges facing Construction Industry in developing countries, 2000; Gaborone, Botwana.

Packendorff, J. (1995), “Inquiring into the Temporary Organisation: New Directions for Project Management Research”, Scandinavian Journal of Management, 11(4), 319-333.

Palisi, B. J., (1970), “Some Suggestions about the Transitory-Permanence Dimension of Organizations”, British Journal of Sociology , Vol. 21, pp. 200-206. as quoted in Lundin, R. A. and Söderholm, A. (1995), “A theory of temporary organization”, Scandinavian Journal of Management 11(4), 437-455.

Parmenter, D. (2007), Key Performance Indicators: Developing, Implementing, and Using Winning KPIs, John Wiley & Sons, Inc.

Patanakul , P. and Milosevic, D. (2009), “The Effectiveness in Managing a group of Multiple Projects: Factors of influence and Measurement Criteria”, International Journal of Project Management Vol.27, pp 216-233.

Pillai, A. S., Joshi, A., Rao, K.S. (2002), “erformance measurement of R&D projects in a multiproject, concurrent engineering environment”. International Journal of Project Management, Vol. **20** , pp 165-177

Pinto, J.K., and Kharbanda, O.P. (1995), Successful Project Managers, Leading your team to success, New York: Van Nostrand Reinhold, as quoted in Torp, O., Austeng, K., and Mengesha, W, J. (2004), Critical success factors for project performance: a study from front-end assessment of large public projects in Norway, Concept program/NTNU. Paper for the Nordnet 2004.

Pinto J. K. (1986), Project implementation: a determination of its critical success factors, moderators, and their relative importance across stages in the project life cycle, unpublished PhD dissertation, University of Pittsburgh, Pittsburgh, as quoted in Sönderlund, J. (2002), On the Development of Project Management Research: Schools of Thought and Critique. International Project Management Journal, 8(1), 20-31.

Pinto, J.K and Slevin, D.P. (1987), “Critical Factors in Successful Project Implementation”, IEEE Trans Eng Management.EM-34, 22-27.

Pinto, J.K and Slevin, D.P. (1988), "Project Success, Definition and measurement techniques", Project Management Journal, 19(1), 67-72.

Pinto J. K. and J. E. Prescott , J.E. (1988), "Variations in critical success over the stages of in the project life cycle", Journal of Management, Vol. 14:5-18, as quoted in Sönderlund, J. (2002), "On the Development of Project Management Research: Schools of Thought and Critique", International Project Management Journal, 8(1), 20-31.

Pinto J. K. and Prescott J. E. (1990), "Planning and tactical factors in the project implementation process," Journal of Management Studies, Vol. 27, No. 3. pp. 305-327. as quoted in Sönderlund, J. (2002), "On the Development of Project Management Research: Schools of Thought and Critique", International Project Management Journal, 8(1), 20-31.

Pinto, J. K. and Mantel S.J (1990), "The Causes of Project Failure", IEEE Transactions on Engineering Management.EM-37,269-276.

PMI, (1987), Project Management Body of Knowledge, Drexel Hill: Project Management Institute, in Lundin, R. A. and Söderholm, A. (1995), "A theory of temporary organization", Scandinavian Journal of Management 11(4), 437-455.

PMI (2004), A Guide to the Project Management Body of Knowledge. 3rd Ed, Global Standard, Four Campus Boulevard, Newtown Square, PA 19073-3299, USA.

Ramirez, T.M. (2002), You can't manage What you don't Measure! Measuring Project Performance, PMI.

Riley, M., Clare-Brown, D. (2001), "Comparison of Cultures in Construction and Manufacturing Industries",. ASCE Journal of Management in Engineering, July 2001, 149- 158.

Robbins, S.P. (2005), Organisational Behaviour, 11th ed., Prentice Hall, New Jersey.

Robson, C (2003), Real World Research: A Resource for Social Scientists and Practitioner-Researchers, Oxford, Blackwell Publishers Ltd.

Rowlinson, S. (1999), "A definition of Procurement Systems", in S.M. Rowlingson and P. McDermot (eds) 'Procurement Sytems: A Guide to Best Practice in Construction", London E & FN Spon pp.27 as quoted in Mbachu, J.I.C (2003), Critical Study of Client Needs and Satisfaction in the South African Building Industry. Unpublished PhD Thesis, Faculty of Economics & Building Sciences, University of Port Elizabeth, South Africa.

Russel, J.S., Jaslskis, E.J., and Lawrence, S.P (1997), "Continuous Assessment of Project Performance", Journal of Construction Engineering and Management, Vol. 123, No.1, pp.64-71.

Rwelamila, P.D., Talukkaba, A and Kivaa, T. (2000), "Africa Intellingentsia, -Why have we embraced 'Hyper Barefoot Empiricism' in procurement Practices?", Conference Paper, Challenges Facing Construction Industries in Developing Countries, 2nd International Conference on Construction in Developing Countries: Challenges facing the construction industry in developing countries 15-17 November 2000, Gabarone, Botswana

Ryd, N. (2004), "Facilitating Construction Briefing –from the Client's Perspective", Nordic Journal of Surveying and Real Estate Research, Vol.1, pp. 86-101.

Sadeh, A., Dvir, D., Shenhar, A. (2000), "The Role of Contract Type in Success of R & D Defence Projects under Increasing Uncertainty", Project Management Journal, Vol. 31, No. 3, pp14-21

Sambasivan, M. and Soon, Y.W. (2007), "Causes and Effects of Delays in Malaysia Construction Industry", International Journal of Project Management, Vol.25, pp. 517-526, , as quoted in Le-Hoai, L, Lee,Y.D., Lee, J.Y. (2008), "Delay and Cost Overruns in Vietnam Large Construction Projects: A Comparison with other selected Countries", KSCE Journal of Civil Engineering, 12(6):367-377

Samset, K., Berg, P., and Klakegg, O.J. (2006), "Front end Governance for Major Public Projects", Conference Paper, EURAM 2006 Conference in OSLO, 18th May, 2006.

Schaub, H.G., and Dickson, S.K. (1982), Quebec Bridge, Engineering and Humanities, John Wiley and Sons, USA, as quoted in Thevedran, V. and Mawdesley, M.J. (2003), "Human Risk Factors in Construction", Second International Conference on Construction in the 21st Century (CITC-II) Sustainability and Innovation in Management and Technology, 10-12 December, 2003, Hong Kong.

Seidel, J.V. (1998), Qualitative Data Analysis. www.qualisresearch.com.
Accessed 16/7/09.

Senge, P.M. (2006), The Fifth Discipline: The Art and Practice of the Learning Organisation, Doubleday, USA.

Shaw, A. (1999), A Guide to Performance Measurement and Non-Financial Indicators, The Foundation of Performance Measurement, Mattison Public Relations. www.fpp.com/journal/mattison.htm. Accessed, 10/06/09.

Shen, G.Q.P. (2006), "Ensuring Value for Money: A Value Management Approach to Managing Multiple Stakeholders in briefing Process", Clients Driving Innovation: Moving Ideas into Practice (12-14 March, 2006 Cooperative Research Centre (CRC0 for Construction Innovation).

Shenhar, A. J. and Wideman, R. M. (1996), "Improving PM: Linking success criteria to project type", Paper presented to the Southern Alberta Chapter, Project Management Institute, Symposium "Creating Canadian Advantage through Project, as quoted in Anagnopoulos, K.P. (2004), "Project Management: Epistemological Issues and Standardisation of Knowledge", Operational Research, an International Journal, 4 (3), 249-260.

Management". Shenhar, A.J., Levy, O., Dvir, D. (1996), "Towards a typological theory of Project Management", Research Policy 25(4), 607-632.

Shenhar, A.J., Levy, O., Dvir, D. (1997), "Mapping the dimensions of project Success", Project Management Journal 8 (2) 5-13.

Shenhar, A.J., Dvir, D., Levy, O., Maltz, A.C. (2001), Project Success: A multidimensional Strategic concept. Long Range Planning 34

Shenhar, A.J., Tishler, A, Dvir, D., Lipovetsky, S., Lechler, T. (2002), "Refining the Search for Project Success Factors: A Multivariate, Typological Approach", R & D Management 32, 2. Blackwell Publishers.

Shewhart, W.A. (1931), Economic Control of Quality of Manufactured Product. Van Nostrand, NewYork, p. 501, in Koskela, L. and Howell, G., (2002a), "The Underlying Theory of Project Management is Obsolete", Proceedings of the PMI \Research Conference, pp. 293-302.

Sherry, E. Halseth, R., Fondhal, G., Karjala, M., Leon, B, (2005), “Local-level criteria and indicators: an Aboriginal perspective on sustainable forest management”, Institute of Chartered Foresters, Vol. 78. No. 5.

Shewhart, Walter A. & Deming, W. Edwards. (1939), Statistical Method from the Viewpoint of Quality Control, The Graduate School, The Department of Agriculture, Washington, p.155.

Sinclair, D. and Zairi, M. (1995), “Effective process management through performance measurement. Part III-an integrated model of total quality-based performance measurement”, Business Project Re-engineering & Management Journal, Vol.1 No.3 pp 50-65

Smith, D. (1998), Developing Successful Teams in Organisations, Australian Journal of Management & Organisational Behaviour,1 (1),1-8.

Sönderlund, J. (2002), “On the Development of Project Management Research: Schools of Thought and Critique”, International Project Management Journal, 8(1), 20-31.

Sönderlund, J. (2004), “Building Theories of Project Management: Past Research, Questions for the Future”, International Journal of Project Management, 22, 183-191.

Steckler, A., McLeroy, K.R, Goodman, R.M, Bird, S.T. McCormick, L. (1992), “oward Integrating Qualitative and Qualitative Methods: An Introduction”, Health Education Quarterly, 19 (1):1-8.

Storm M.P and Janssen, E.R. (2004), “High Performance Projects: A speculative Model for Measuring and Predicting Project Success”, Conference paper submitted to IRNOP VI Project Research Conference Track D: Project Theory.

Struckenbruk, L (1987), “Who determines Project Success”, Project Management Institute Seminar/Symposium Montreal Canada, September, 13-21, as quoted in Atkinson, R. (1999), “Project Management: Cost, Time and Quality, Two Best Guesses and A Phenomenon, Its Time To Accept Other Success Criteria”, International Journal of Project Management, 17 (6)337-42

Suh, N. P. (2001), Axiomatic Design: Advances and Applications, Oxford University Press. 503 p, as quoted in Koskela, L. and Howell, G., (2002a), “The Underlying Theory of Project Management is Obsolete”, Proceedings of the PMI \Research Conference, 293-302.

Sweis, G., Sweis, R., Hammad, A.A., and Shboul, A. (2007), “Delays in Construction Projects: The Case of Jordan”, International Journal Project of Management, Article in Press, , as quoted in Le-Hoai, L, Lee,Y.D., Lee, J.Y. (2008), “Delay and Cost Overruns in Vietnam Large Construction Projects: A Comparison with other selected Countries”, KSCE Journal of Civil Engineering, 12(6):367-377

Takim, R. and Akintoye, A. (2002), “Performance Indicators for Successful construction Project Performance. In: Greenwood, D (Ed.), 18th Annual ARCOM Conference, 2-4 September 2002, University of Nurthumbria. Association of Researchers in Construction Management, Vol.2, pp545-55.

Tashakori, A. and Teddlie, C. (Eds). (2003b), Glossary, In Tashakori, A. and Teddlie, C., (Eds), Handbook of Mixed Methods in Social and Behavioral research, p710, In Tashakori, A. and Teddlie, C., (2003) (Eds), Handbook of Mixed Methods in Social and Behavioral research, 671-701.

Thevedran, V. and Mawdesley, M.J. (2003), "Human Risk Factors in Construction", Second International Conference on Construction in the 21st Century (CITC-II) Sustainability and Innovation in Management and Technology, 10-12 December, 2003, Hong Kong.

Todd, J.A., (2008), "Measuring Performance of Sustainable Buildings", Whole Building Design Guide. www.wbdg.org/resources/measperfsustbldgs.php. Accessed, 15/09/08.

Torp, O., Austeng, K., and Mengesha, W, J. (2004), Critical success factors for project performance: a study from front-end assessment of large public projects in Norway, Concept program/NTNU. Paper for the Nordnet 2004.

Tukel, O.I., and Rom, W.O. (1995), "Analysis of the Characteristics of Projects in Diverse Industries", Working Paper, Cleveland State University, Cleveland, Ohio, as quoted in Torp et al. (2004), Critical success factors for project performance: a study from front-end assessment of large public projects in Norway, Concept program/NTNU. Paper for the Nordnet 2004.

Turin, D.A. (1973), The Construction Industry: Its Economic Significance and its Role in Development, University College Environmental Research Group, London.

Turner, J. R. (1993), The Handbook of Project Management. London: McGraw-Hill; 1993.

Turner, J. R (1999) The handbook of project-based management. 2nd Edition, McGraw-Hill, London., as quoted in Anagnopoulos, K.P. (2004) Project Management: Epistemological Issues and Standardisation of Knowledg, Operational Research. An International Journal, 4 (3), 249-260.

Turner, J. R., and Müller, R. (2003), "On the Nature of the Project as a Temporary Organisation", International Journal of Project Management, Vol.21, No.1, pp 1-8.

Van Egmond-de Wilde de Ligny, E.L.C. (1999), Technology Mapping for Technology Management, the Development of Technological Capabilities and the Technology Status in an Industry, and its Aplication for Technology Mapping in the Sector of Dwelling Construction for Lower Income Households in Urban Tanzania and Costa Rica, Unpublished Phd, Delft University, Delft University Press.

Vandevelde, A., Dierdonck, R.V., Debackere, K. (2002), "Practitioners View on Project Performance: A Three-Polar Construct", Vlerick Leuven Gent Management School Fellows, R., Liu, A (2005), Research Methods for Construction. Blackwell Publishing, pp. 3-34

Villagarcia, S., Da Silva, F.B., and Cardoso, F. (2000), "Information Flow Optimisation as a way of improving Building Logistics Performance", Information and Communication in Contract Procurement, Proceedings of CIB W92 Procurement System Sympossium, Sntiago, Chile, April 24-27, 2000, pp. 101-116.

Vroom, V.H. and Yetton, P.W. (1973), Leadership and decision-making. Pittsburgh: University of Pittsburgh Press.

Vulink, M (2004), Technology Transfer in the Construction Industry of Ghana: Human Resource Development through International Collaboration between Foreign and Local Contractors in the Greater Accra Region.

Wallis, C.J (1998), European Charter on Sustainable Design & Construction", Forum on Sustainable Construction Region of Ireland, Sustainable Design International Ltd. 1998. www.sustainable-design.ie/sustain/eurocharter.pdf. Accessed 13/09/08 Ghana Procurement Act (Act 663)

Westring, G (1997), Ghana Public Procurement Reform, An Audit Report prepared for the World Bank, Stockholm: Advokatfirman Cederquist KB.

Weick, K. E. (1979), The Social Psychology of Organizing, New York: Random House.

Wheelwright S. C. and Clark K. B. (1992), Revolutionizing product development, New York: Free Press, as quoted in Sönderlund, J. (2002), "On the Development of Project Management Research: Schools of Thought and Critique", International Project Management Journal, 8(1), 20-31.

Williamson O. E. (1975), Markets and Hierarchies, New York: Free Press, as quoted in Sönderlund, J. (2002), "On the Development of Project Management Research: Schools of Thought and Critique", International Project Management Journal, 8(1), 20-31.

Wilson, F. (1996), "Great Teams Build Themselves Team Performance Management,", An International Journal, vol. 2, No. 2, pp. 27-31,

Winch G. (1989), "The construction firm and the construction project: a transaction cost approach, Construction Management and Economics", Vol. 7, No. 4. pp. 331-345, as quoted in Sönderlund, J. (2002), "On the Development of Project Management Research: Schools of Thought and Critique", International Project Management Journal, 8(1), 20-31.

Winch G. (1995), Project management in construction: towards a transaction cost approach, Le Group Bagnolet, Working Paper, University College London, as quoted in Sönderlund, J. (2002), "On the Development of Project Management Research: Schools of Thought and Critique", International Project Management Journal, 8(1), 20-31.

Winograd, T. & Flores, F. (1986) Understanding Computers and Cognition: A New Foundation forDesig., Ablex, Norwood, p.207, in Koskela, L. and Howell, G., (2002a), "The Underlying Theory of Project Management is Obsolete", Proceedings of the PMI \Research Conference, 293-302.

Woodward, H., PMP (2005), Power Point Presentation to NASA ON March, 23rd, 2005 as quoted in Willard, B.K (2005) Project Success: Looking Beyond Traditional Metrics, Max's Project Management Wisdom.

World Bank (1994), World Development Report 1994: Infrastructure for Development, World Bank, Washinton, D.C

World Bank (1996) Ghana 1996 Country Procurement Assessment Report, Washington, D.C.: The World Bank.

World Bank (2003) Ghana 2003 Country Procurement Assessment Report, Washington, DC: Ghana Country Department, The World Bank

Yisa, S.B., Ndekugri, I and Brian, A. (1996), "A Review of Changes in the UK Construction Industry. Their Implication for the Marketing of Construction Services". European Journal of Marketing. 30 (30) 47-64. MCB University Press.

Yisa, S., Edwards, D.J. (2002), Evaluation of Business Strategies in the UK Construction Engineering Consultancy, Measuring Business Excellence, Vol. 6, No.1.

Zawdie, G., Langford, D. (2000), "The state of construction and infrastructure in sub-Saharan Africa and strategies for a sustainable way forward", paper presented at 2nd International Conference on construction in Developing Countries: Challenges facing the construction industry in developing countries, Gabarone, 15-17 November, available at: www.odsf.co.za/cdproc/2nd_proceedings.html (accessed 31 March 2004),

Zborowski, P, Chossalter, C., Sochaczewski, P.S., Sist, P (1999), Guidelines for applying Multi-criteria assessment of criteria and indicators, Centre For International Forestry Research (CIFOR).

Zhang, Y., Zhang, Y, Zhang, L. (2003), "Study on Reasons for Delays in Civil Engineering Project in China", Conference Proceeding, "Sustainability and Innovation in Management and Technology", 10-12 November 2003, Hong Kong.

Zimring, C. (2008), Facility Performance Evaluation (FPE) Whole Building Design Guide. www.wbdg.org/resource/fpe.php. Accessed, 15/09/08.

APPENDIX 1: The Contingency-Based Assessment Tool

Category	Monetary	QUAN	QUAL	Scaling
i. Cost				
Environmental/Social cost	Actual cost			ILF
Managerial cost	“			ILF
Legal cost	“			ILF
Incidental cost	“			ILF
Fluctuation cost	“			ILF
Total cost overrun	“			ILF
ii. Time				
Time for valuation and certification		Actual time		ILF
Time for payment of certified work				ILF
Incidental times				ILF
Time for completing of major specified work sections				ILF
iii. Quality				
Reworks (number)		No. of times		ILF
Reworks (extent)			Area of rewks	ILF
Material test records		Actual no.		DLF
Service test records		Actual no.		DLF
Engineer’s/Architect’s approval		Actual no.		DLF
Engineer’s/Architect’s disapproval		Actual no.		ILF
Variation (number)		No. of times		ILF
Variation (extent)			Area of var.	ILF
iv. Mgt. & Execution Efficiency				
Decision making process			Scaled mst.	DLF
Communication and responsibility			Scaled mst.	DLF
Efficiency of project team			Scaled mst.	DLF
Supervision of contractor			Scaled mst.	DLF
Site meeting regularity			Scaled mst.	DLF
No. and type of community/social resources affected (-ve effect		Actual no.		

Table 1 Practitioners' Guide For Filling Form 1

No.	**Category**	**Type of Measurement**	**Measurement for the present phase**						**Description**	**Remarks**
			1	**2**	**3**				**1**	**2**
1	***Cost***					1	***Cost***			
i	Environmental/Social cost	Actual amount				i	Environmental/Social cost	Actual amount		
ii	Managerial cost	Actual amount				ii	Managerial cost	Actual amount		
iii	Legal cost	Actual amount				iii	Legal cost	Actual amount		
iv	Incidental cost	Actual amount				iv	Incidental cost	Actual amount		
v	Fluctuation cost	Actual amount				v	Fluctuation cost	Actual amount		
vi	Total cost overrun	Actual amount				vi	Total cost overrun	Actual amount		
2	***Time***					2	***Time***			
i	Time for valuation and certification	Actual time				i	Time for valuation and certification	Actual time		
ii	Time for payment of certified work	Actual time				ii	Time for payment of certified work	Actual time		
iii	Incidental times	Actual time				iii	Incidental times	Actual time		
iv	Time for completing of major specified work sections	Actual time				iv	Time for completing of major specified work sections	Actual time		
3	***Quality***					3	***Quality***			
i	Reworks (number)	No. of times				i	Reworks (number)	No. of times		
ii	Reworks (extent)	Area				ii	Reworks (extent)	Area		
iii	Material test records	No. of times				iii	Material test records	No. of times		
iv	Service test records	No. of times				iv	Service test records	No. of times		
v	Engineer's/Architect's approval records	No.				v	Engineer's/Architect's approval records	No.		
vi	Engineer's/Architect's disapproval records	No.				vi	Engineer's/Architect's disapproval records	No.		
vii	Variation (number)	No. of times				vii	Variation (number)	No. of times		
viii	Variation (extent)	Area				viii	Variation (extent)	Area		

Table 2 Continued. Practitioners' Form 1 Continued

No.	Category	Type of Measurement	Measurement for the present phase						Description	Remarks
			1	2	3	4	5	6		
4	***Mgt. & Execution Efficiency***									
i	Decision making process	*Scaled Mst.								
ii	Communication and responsibility	Scaled Mst.								
iii	Efficiency of project team	Scaled Mst.								
iv	Supervision of contractor	Scaled Mst.								
v	Site meeting regularity	No. of times								
5	***Environmental Impact***									
i	Investment on Environmental Issues	Actual amount								
ii	No. of Employees with specific environmental task	Actual No.								
iii	No. of reported incidents	Actual No.								
iv	Degree of compliance with regulations	Scaled Mst.								
6	***Social Impact***									
i	No. and type of the population affected (+ve effect)	Actual No.								
ii	No. and type of the population affected (-ve effect)	Actual No.								
iii	No. and type of community institutional structures affected (+ve effect)	Actual No.								
iv	No. and type of community institutional structures affected (-ve effect)	Actual No.								
v	No. and type of community/ social resources affected (+ve effect)	Actual No.								
vi	No. and type of community/ social resources affected (-ve effect)	Actual No.								

***Scale:** 1 = extremely weak performance; 2 = poor performance; 3 = good performance; 4 = very good performance; 5= excellent performance;*

Table 3 Practitioners'Form 2

No.	Category	Stdd. Mst.	Measurement			Score (%)	Weight	Wgted. Score	Criteria	Overall Performance
			Monetary	Quan	Qual					
1	***Cost***									
i	Environmental/Social cost									
ii	Managerial cost									
iii	Legal cost									
iv	Incidental cost									
v	Fluctuation cost									
vi	Total cost overrun									
2	***Time***									
i	Time for valuation and certification									
ii	Time for payment of certified work									
iii	Incidental times									
iv	Time for completing of major specified work sections									
3	***Quality***									
i	Reworks (number)									
ii	Reworks (extent)									
iii	Material test records									
iv	Service test records									
v	Engineer's/Architect's approval records									
vi	Engineer's/Architect's disapproval records									
vii	Variation (number)									
viii	Variation (extent)									

Table 3 Continued. Practitioners' Form 2 Continued.

No.	Category	Stdd. Mst.	Measurement			Score (%)	Weight	Wgted. Score	Criteria	Overall Performance
			Monetary	Quan	Qual					
4	***Mgt. & Execution Efficiency***									
i	Decision making process									
ii	Communication and responsibility									
iii	Efficiency of project team									
iv	Supervision of contractor									
v	Site meeting regularity									
5	***Environmental Impact***									
i	Investment on Environmental Issues									
ii	No. of Employees with specific environmental task									
iii	No. of reported incidents									
iv	Degree of compliance with regulations									
6	***Social Impact***									
i	No. and type of the population affected (+ve effect)	+500		+300		+60	33.5	+3.35		
ii	No. and type of the population affected (-ve effect)	-50		-25		-50	33.5			
iii	No. and type of community institutional structures affected (+ve effect)									
iv	No. and type of community institutional structures affected (-ve effect)									
v	No. and type of community/ social resources affected (+ve effect)									
vi	No. and type of community/ social resources affected (-ve effect)									

NB: where indicators are split into +ve and –ve effects, the signs are attached to their measured values with their usual meanings and the net effect weighted score considered in the assessment.

Table 4 Practitioners' Form 3:

Criteria	Indicators	FACTORS																			
		Pj							PM/C							PT					
		Pj_1	Pj_2	Pj_3	Pj_4	Pj_5	Pj_6	Σ_{Pj}	PMC_1	PMC_2	PMC_3	PMC_4	PMC_5	PMC_6	$\Sigma_{PM/C}$	PT_1	PT_2	PT_3	PT_4	PT_5	Σ_{PT}
Cost	C_1	2+	1-	0	1-	1+	2+	**3+**		2+											
	C_2	3+	2+	0	0	2+	1-	**6+**													
	C_3	1-	1-	0	1+	1-	1-	**3-**													
	C_4	4+	0	4+	2+	1-	0	**9+**													
	C_5	3-	0	1+	3+	2+	0	**3+**	3-												
	Σ_C	**5+**	**0**	**5+**	**5+**	**3+**	**0**	**18+**													
Time	T_1																				
	T_2																				
	T_3																				
	T_4																				
	Σ_T																				
Quality	Q_1																				
	Q_2																				
	Q_3																				
	Q_4																				
	Q_5																				
	Σ_Q																				
MEE	MEE_1																				
	MEE_2																				
	MEE_3																				
	MEE_4																				
	MEE_5																				
	Σ_{MEE}																				

Σ_n : net score obtained by algebraic summation for a factor, or factors and factor groups.

Table 4 Continued, Practitioners' Form 3

Criteria	Indicators	FACTORS																			
		Pj							PM/C							PT					
		Pj_1	Pj_2	Pj_3	Pj_4	Pj_5	Pj_6	Σ_{Pj}	PMC_1	PMC_2	PMC_3	PMC_4	PMC_5	PMC_6	Σ	PT_1	PT_2	PT_3	PT_4	PT_5	Σ_{PT}
Env. Impact	EI_1																				
	EI_2																				
	EI_3																				
	EI_4																				
	Σ_{EI}																				
Soc. Impact	SI_1																				
	SI_2																				
	SI_3																				
	Σ_{SI}																				

Table 4 Continued, Practitioners' Form 3 Continued

Criteria	**Indicators**	**FACTORS**													
		CLO							**PEE**						
		CLO_1	**CLO_2**	**CLO_3**	**CLO_4**	**CLO_5**	**CLO_6**	**Σ_{CLO}**	**PEE_1**	**PEE_2**	**PEE_3**	**PEE_4**	**PEE_5**	**PEE_6**	**Σ_{PEE}**
Cost	**C_1**														
	C_2														
	C_3														
	C_4														
	C_5														
	Σ_C														
Time	**T_1**														
	T_2														
	T_3														
	T_4														
	Σ_T														
Quality	**Q_1**														
	Q_2														
	Q_3														
	Q_4														
	Q_5														
	Σ_Q														
MEE	**MEE_1**														
	MEE_2														
	MEE_3														
	MEE_4														
	MEE_5														
	Σ_{MEE}														

Table 4 Continued, Practitioners' Form 3 Continued

Criteria	**Indicators**	**FACTORS**													
		CLO							**PEE**						
		CLO_1	**CLO_2**	**CLO_3**	**CLO_4**	**CLO_5**	**CLO_6**	**Σ_{CLO}**	**PEE_1**	**PEE_2**	**PEE_3**	**PEE_4**	**PEE_5**	**PEE_6**	**Σ_{PEE}**
Env. Impact	**EI_1**														
	EI_2														
	EI_3														
	EI_4														
	Σ_{EI}														
Soc. Impact	**SI_1**														
	SI_2														
	SI_3														
	Σ_{SI}														

Table 5 Practitioners' Form 4[*R.W.S.: *Relative weighted score;* Internal Environmental indicators: *indicators relating to cost, time, quality and MEE;* External environmental indicators: *indicators relating to environmental impact and social impacts*].

	ve tors	Performing	Negative Factors					Positive Factors				Positive Performing In s		
	***R.W.S**	**Indicators**	**Ext. Env. Factors**	**R.W.S**	**Int. Env. Factors**	**R.W.S**	**R.W.S**	**Ext. Env. Factors**	**R.W.S**	**Int. Env. Factors**	**Indicators**	**R.W.S**	
*External environmental indicators			A_{F1}							W_{F1}	W_{I1}		External environmental indicators
		A_{I1}	A_{F2}							W_{F2}	W_{I2}		
			A_{F3}							W_{F3}			
		A_{I2}	A_{F4}							W_{F4}	W_{I3}		
			A_{F5}							W_{F5}			
			A_{F6}							W_{F6}	W_{I4}		
		A_{I3}	A_{F7}							W_{F7}			
			A_{F9}							W_{F9}			
		A_{I4}	A_{F10}							W_{F10}			
			A_{F11}							W_{F11}			
					B_{F1}			X_{F1}			X_{I1}		
					B_{F2}			X_{F2}			X_{I2}		
		B_{I1}			B_{F3}			X_{F3}			X_{I3}		
					B_{F4}			X_{F4}			X_{I4}		
					B_{F5}			X_{F5}					
		B_{I2}			B_{F6}			X_{F6}					
					B_{F7}			X_{F7}			X_{I5}		
		B_{I3}			B_{F8}			X_{F8}					
*Internal env. indicators		C_{I1}	C_{F1}							Y_{F1}	Y_{I1}		Internal env. indicators
		C_{I2}	C_{F2}							Y_{F2}			
		C_{I3}	C_{F3}							Y_{F3}	Y_{I2}		
		C_{I4}	C_{F4}							Y_{F4}	Y_{I3}		
			C_{F5}							Y_{F5}	Y_{I4}		
		D_{I1}			D_{F1}			Z_{F1}			Z_{I1}		
		D_{I2}			D_{F2}			Z_{F2}			Z_{I2}		
					D_{F3}			Z_{F3}			Z_{I3}		
		D_{I3}			D_{F4}			Z_{F4}			Z_{I4}		
		D_{I5}			D_{F5}			Z_{F5}			Z_{I5}		

Table 6 Client's Guide for filling Form 1

Category	Monetary	QUAN	QUAL	Scale
1. Needs/Motivation				
i. Contributing to Good Governance				
Building a positive image about the government			Scaled mst.	DLF
Regulating the economy (direct employment)		Actual no.		"
Regulating the economy (average income per employee.		"		"
To satisfy social need			Scaled mst.	"
Improvement in countries' GDP		% contribution		"
ii. Contributing to National infrastructure			Scaled mst.	"
Contributing to other projects		Actual number		"
Contributing to critical fields of national interest		Actual number		"
Adding to national infrastructural stock		Actual number		"
Developing a new technical capacity	Actual amt.			"
Investing excess liquidity in construction				
iii. Addressing Future Infrastructural needs		Actual number		"
Providing housing and infrastructure for increasing population		Actual number		"
Providing housing and infrastructure for future expectations		Actual number		"
Providing facilities for expanding government activities			Scaled mst.	"

Table 6 Continued, Client’s Guide for filling Form 1 Continued.

Category	Monetary	QUAN	QUAL	Scale
2. Expectation from Service Providers				
i. Quantity Surveyor				
Providing good and reliable financial advice			Scaled assmt	DLF
Efficient execution of the procurement process (especially, tendering)			“	“
Accurate, fair and timely preparation of the valuation certificate			“	“
Efficient performance of duties as per terms and conditions of appointment			“	“
ii. Architect				
Providing acceptable design on time			“	“
Providing team leadership			“	“
Providing timely and comprehensive site instructions			“	“
Effective site supervision and inspection			“	“
Efficient performance of duties as per terms and conditions of appointment			‘”	“
Project Manager /Consultant				
Coordination and Teamwork			“	“
Technical and managerial competence			“	“
Delivery within the project estimated goals: ***time, cost, quality and scope***			“	“
Ensuring compliance of all social and environmental regulations			“	“
Efficient performance of duties as per terms and conditions of appointment			“	“
iv. Consulting Engineers				
Providing timely, Complete, Comprehensive design			“	“
Effective site supervision and inspection			“	“
Provision of timely and comprehensive site instruction			“	“
Efficient performance of duties as per terms and conditions of appointment			“	“
v. Contractor				
Delivery within agreed project time			“	“
Diligence to work			“	“
Coordination of the specialists and sub-contractors’ works			“	“
Financial capacity			“	“
Efficient performance of duties as per terms and conditions of appointment			“	“

Table 7a Client's Form 1A

No.	Category	Type of Measurement	Measurement for the present phase						Description	Remarks
			1	2	3	4	5	6		
CA	***Needs/Motivation***									
1	***Contribution to good governance***									
i	Building a positive image about the government	Scaled Mst.								
ii	Regulating the economy (direct employment)	Actual No.								
iii	Regulating the economy (average income per employee)	Actual Amount.								
iv	To satisfy social need	Scaled Mst.								
v	Improvement in countries' GDP	Actual %								
2	***ii. Contributing to National infrastructure***									
i	Contributing to other projects	No. of project								
ii	Contributing to critical fields of national interest	Actual No.								
iii	Adding to national infrastructural stock	Actual No.								
iv	Developing a new technical capacity	Actual No.								
v	Investing excess liquidity in construction	Actual amount								
3	***iii. Addressing Future Infrastructural needs***									
i	Providing housing and infrastructure for increasing population	Actual No.								
ii	Providing housing and infrastructure for future expectations	Actual No								
iii	Providing facilities for expanding government activities	Actual No								
iv	Creating incentive for accelerated national growth	Scaled Mst.								

Table 7b Client's Form1B

No.	Category	Type of Measurement	Measurement for the present phase						Description	Remarks
			1	**2**	**3**	**4**	**5**	**6**		
CB	**Expectation from Service Providers**									
1	***Quantity Surveyor***									
i	Providing good and reliable financial advice	Scaled Mst.								
ii	Efficient execution of the procurement process (especially, tendering)	Scaled Mst.								
iii	Accurate, fair and timely preparation of the valuation certificate	Scaled Mst.								
iv	Efficient performance of duties as per terms and conditions of appointment	Scaled Mst.								
2	***Architect***									
i	Providing acceptable design on time	Scaled Mst.								
ii	Providing team leadership	Scaled Mst.								
iii	Providing timely and comprehensive site instructions	Scaled Mst.								
iv	Effective site supervision and inspection	Scaled Mst.								
v	Efficient performance of duties as per terms and conditions of appointment	Scaled Mst.								
3	***Project Manager /Consultant***	.								
i	Coordination and Teamwork	Scaled Mst.								
ii	Technical and managerial competence	Scaled Mst.								
iii	Delivery within the project estimated goals: *time, cost, quality and scope*	Scaled Mst.								
iv	Ensuring compliance of all social and environmental regulations	Scaled Mst.								
v	Efficient performance of duties as per terms and conditions of appointment	Scaled Mst.								

Table 7b continued. Client's Form 1B.

No.	Category	Type of Measurement	Measurement for the present phase						Description	Remarks
			1	2	3	4	5	6		
CB	**Expectation from Service Providers**									
4	***Consulting Engineers***									
i	Providing timely, Complete, Comprehensive design	Scaled Mst.								
ii	Effective site supervision and inspection	Scaled Mst.								
iii	Provision of timely and comprehensive site instruction	Scaled Mst.								
iv	Efficient performance of duties as per terms and conditions of appointment	Scaled Mst.								
5	***Contractor***									
i	Delivery within agreed project time	Scaled Mst.								
ii	Diligence to work	Scaled Mst.								
iii	Coordination of the specialists and sub-contractors' works	Scaled Mst.								
iv	Financial capacity	Scaled Mst.								
v	Efficient performance of duties as per terms and conditions of appointment	Scaled Mst.								

Table 8a Client's Form 2A

No.	Category	Stdd	Measurement			Score	Weight	Wgted. Score	Criteria	Overall
CA	**Needs/Motivation**	**Mst.**	**Mone-tary**	**Quan**	**Qual**	**(%)**				**Performance**
1	***Contribution to Good Governance***									
i	Building a positive image about the government									
ii	Regulating the economy									
iii	To satisfy social need									
iv	Improvement in countries' GDP									
2	***Contribution to National infrastructure***									
i	Contributing to other projects									
ii	Contributing to critical fields of national interest									
iii	Adding to national infrastructural stock									
iv	Developing a new technical capacity									
v	Investing excess liquidity in construction									
3	***Addressing Future Infrastructural needs***									
i	Providing housing and infrastructure for increasing population									
ii	Providing housing and infrastructure for future expectations									
iii	Providing facilities for expanding government activities									
iv	Creating incentive for accelerated national growth									

Table 8b Continued: Client's Form 2B

No.	Category	Stdd. Mst.	Measurement			Score (%)	Weight	Wgted. Score	Criteria	Overall Performance
CB	**Expectation from Service Providers**		**Mone-tary**	**Quan**	**Qual**					
1	***Quantity Surveyor***									
i	Providing good and reliable financial advice									
ii	Efficient execution of the procurement process (especially, tendering)									
iii	Accurate, fair and timely preparation of the valuation certificate									
iv	Efficient performance of duties as per terms and conditions of appointment									
2	***Architect***									
i	Providing acceptable design on time									
ii	Providing team leadership									
iii	Providing timely and comprehensive site instructions									
iv	Effective site supervision and inspection									
v	Efficient performance of duties as per terms and conditions of appointment									

Table 8b Continued: Client's Form 2B

No.	Category	Stdd. Mst.	Measurement			Score(%)	Weight	Wgted. Score	Criteria	Overall performance
			Mone-tary	Quan	Qual					
3	***Project Manager /Consultant***									
i	Coordination and Teamwork									
ii	Technical and managerial competence									
iii	Delivery within the project estimated goals: ***time, cost, quality and scope***									
iv	Ensuring compliance of all social and environmental regulations									
v	Efficient performance of duties as per terms and conditions of appointment									
4	***Consulting Engineers***									
i	Providing timely, Complete, Comprehensive design									
ii	Effective site supervision and inspection									
iii	Provision of timely and comprehensive site instruction									
iv	Efficient performance of duties as per terms and conditions of appointment									
5	***Contractor***									
i	Delivery within agreed project time									
ii	Diligence to work									
iii	Coordination of the specialists and sub-contractors' works									
iv	Financial capacity									
v	Efficient performance of duties as per terms and conditions of appointment									

Table 9 Client’s Form 3

Criteria	**FACTORS**								
	Indicators	**QS**	**Arch.**	**PM**	**Con**	**PT**	**CLO**	**PEE**	Σ_F
Contribution to good governance	CGG_1								
	CGG_2								
	CGG_3								
	CGG_4								
	CGG_5								
	Σ_{CGG}								
Contributing to National infrastructure	CNI_1								
	CNI_2								
	CNI_3								
	CNI_4								
	CNI_5								
	Σ_{CNI}								
Addressing Future Infrastructural needs	$AFIN_1$								
	$AFIN_2$								
	$AFIN_3$								
	$AFIN_4$								
	Σ_{AFIN}								

Table 10a Client's Form 4

Performance Indicators			Negative Factors				Positive Factors				Performance Indicators		
	R.W.S	Indicators	Ext. Env. Factors	R.W.S	Int. Env. Factors	R.W.S	R.W.S	Ext. Env. Factors	R.W.S	Int. Env. Factors	Indicators	R.W.S	
			A_{F1}							U_{F1}	U_{I1}		
		A_{I1}	A_{F2}							U_{F2}	U_{I2}		
			A_{F3}							U_{F3}			
		A_{I2}	A_{F4}							U_{F4}	X_{I3}		
CGG			A_{F5}							U_{F5}			CGG
		A_{I4}	A_{F6}							U_{F6}			
			A_{F7}							U_{F7}			
		A_{I5}	A_{F8}							U_{F8}	U_{I5}		
					B_{F1}			V_{F1}			V_{I1}		
					B_{F2}			V_{F2}			V_{I2}		
		B_{I1}			B_{F3}			V_{F3}			V_{I3}		
					B_{F4}			V_{F4}			V_{I4}		
CGG					B_{F5}			V_{F5}					CGG
		B_{I2}			B_{F6}			V_{F6}					
					B_{F7}			V_{F7}			V_{I5}		
		B_{I3}			B_{F8}			V_{F8}					
		C_{I1}	C_{F1}							W_{F1}	W_{I1}		
		C_{I2}	C_{F2}							W_{F2}	W_{I2}		
			C_{F3}							W_{F3}	W_{I3}		
			C_{F4}							W_{F4}	W_{I4}		
CNI		C_{I3}	C_{F5}							W_{F5}			CNI
		C_{I4}	C_{F6}							W_{F6}	W_{I5}		
		C_{I5}	C_{F7}							W_{F7}	W_{I6}		
		C_{16}	C_{F8}							W_{F1}			
		D_{I1}			C_{F7}			X_{F2}			X_{I1}		
					D_{F1}			X_{F3}			X_{I2}		
		D_{I2}			D_{F2}			X_{F4}			X_{I3}		
CNI		D_{I3}			D_{F3}			X_{F5}					CNI
		D_{I4}			D_{F4}			X_{F6}			X_{I5}		
		D_{I5}			D_{F5}			X_{F7}			X_{I6}		

Table 10b Client's Form 4

Performance Indicators			**Negative Factors**				**Positive Factors**				**Performance Indicators**		
	R.W.S	**Indicators**	**Ext. Env. Factors**	**R.W.S**	**Int. Env. Factors**	**R.W.S**	**R.W.S**	**Ext. Env. Factors**	**R.W.S**	**Int. Env. Factors**	**Indicators**	**R.W.S**	
			E_{F1}							U_{F1}	U_{I1}		
		E_{I1}	E_{F2}							U_{F2}	U_{I2}		
			E_{F3}							U_{F3}	X_{I3}		
AFIN			E_{F4}							U_{F4}			
		E_{I2}	E_{F5}							U_{F5}	X_{I3}		**AFIN**
			E_{F6}							U_{F6}			
		E_{I4}	E_{F7}							U_{F7}			
		B_{I1}			B_{F1}			V_{F1}			V_{I1}		
		B_{I2}			B_{F2}			V_{F2}			V_{I2}		
		B_{I3}			B_{F3}			V_{F3}			V_{I3}		
AFIN		B_{I4}			B_{F4}			V_{F4}					**AFIN**
					B_{F5}			V_{F5}			V_{I4}		
		B_{I5}			B_{F6}			V_{F6}					

* with the client, all other factors except the those related to the client's own organisation are treated as external factors to the needs/motivation criteria.

Table 11 Form 5 [Usable for Practitioners or client for Management Decision making]

No.	**Factors**		**Related Indicators**		**Remarks**
	Critical	**Ext.**		**Type (ext/Int)**	
	Critical	**Int.**			
	High	**Ext.**			
	High	**Int.**			
	Medium	**Ext.**			
	Medium	**Int.**			
	Low	**Ext.**			
	Low	**Int.**			

APPENDIX 2: Questionnaire for Practitioners 1

Section 1: Background

1. What is your profession? If more than one please rank them according to which one you are most active: 1=most active, then 2, 3, 4 etc
Architect
Quantity surveyor
Project manager
Construction manager
Structural engineer
Service engineer (underline to specify: electrical, mechanical, others…………….)

- Please list others which are relevant (in your opinion) in Ghana but not listed here
- …… …… …… ………………………………………………………………………………

2. To which professional association do you belong? If more than one rank them according to which one you are most active.
GIA
GhIS
GIE
Others (please specify):

3. For how long have you been in professional practice?

- <5 years
- 5-10 years
- >10 years

4. Kindly indicate your status in your organization:

- Director/principal partner
- Associate partner
- Senior staff
- Trainee/intern
- Others (please specify):

Section 2: **Performance dimensions**

1. In which dimensions do you measure the success (or failure) of projects you supervise? Select as many as are relevant in Ghana.

- Cost
- Time
- Quality
- Client satisfaction
- Other (specify)

2. Other non-traditional dimensions for assessing project performance are emerging. Please select those which in your opinion are relevant in Ghana.

- Knowledge creation
- Business success
- Innovation and learning
- Financial/ commercial success
- Future perspective
- Project execution efficiency
- Market impact
- Managerial
- Organizational
- Personal growth (of key participants)
- Completeness of design
- Buidability
- Meeting design goals
- Benefit to end user
- Benefit to national infrastructure (development)
- Environmental impact assessment
- Overall success.

3. Can you please explain why in your opinion none or some of the above is not relevant in Ghana?
…………………………………..………………………………………………………………………
……
……
……
.

4. Criteria for assessing performance.

The following criteria are normally used to access the performance of a project in a particular dimension as above. Please select those ones which in your opinion are relevant in Ghana or which if included could help bring about improvements in the construction industry in Ghana. You are requested to select by ticking first the dimension (to show your agreement or otherwise) and then the criteria you agree with. You perceived dimension and criteria could be added.

a. Dimension: Cost
Criteria:

- Variation between contract sum and final account
- Costs relation to the environmental issues
- Managerial costs (consultancies etc)
- Costs in relation to insurance claims
- Fluctuations costs
- Variation costs
- Legal costs
- Dispute costs
- Accident costs

- Costs of reworks
- List others which are relevant (in your opinion) in Ghana but not listed here
- …………………………………………………………………………………………………… …………………………………………………………………………………………………… …………………………………………………………………………………………………… …………………………………………………………………………………………………..

b. Dimension: Time

Criteria:

- Variation between estimated and actual completion time
- Actual commencement time
- Time for evaluation and certification
- Actual time for honouring certificates as against agreed
- Actual times for completion of planned activities as against schedules
- Actual times for site meetings as against estimated
- Dispute resolution times
- Time for arrival of supplies (materials)
- Times for inclement weather
- Times for industrial activities/strikes etc.
- Times taken by accidents and injuries
- Times for rework
- Time for addressing environmental issues
- Please list others which are relevant (in your opinion) in Ghana but not listed here
- …………………………………………………………………………………………………… …………………………………………………………………………………………………… …………………………………………………………………………………………………… ………………………………………………………………………………………………….

c. Dimension: Technical quality

Criteria:

- Major variation between original design and actual completed work
- Number of reworks
- Extent of reworks
- Records of material tests
- Records of service tests
- Record of engineers'/architects' approvals
- Records of engineers disapprovals
- Records for variations orders
- Technical specifications for variations
- Please list others which are relevant (in your opinion) in Ghana but not listed here
- …………………………………………………………………………………………………… …………………………………………………………………………………………………… …………………………………………………………………………………………………… ………………………………………………………………………………………………

d. Dimension: Managerial

Criteria:

- Risk management
- Budget management
- Test management
- Communication with team and workers
- Personnel management
- Decision making procedures
- Communication and reports
- Configuration control

- Resource and schedule control
- QS services
- Architectural services
- Engineering services
- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ………………………………………………………………………………………………… ………………………………………………………………………………………………… ………………………………………………………………………………………………… ………………………………………………………………………………………………… …………………

e. Dimension: Innovation and learning

Criteria:

- Uniqueness of the project
- Creating a spin-off to other products
- Allowing a considerable learning effect during product development
- Through variations
- Resulting from site condition challenges
- Resulting from buildability challenges
- Resulting from contract peculiarities
- Resulting from project typology
- Resulting from personnel management issues
- Resulting from external environmental issues (e.g. politics, economics etc)
- Resulting from project management challenges
- Resulting from disputes
- Resulting from safety issues
- Developing a new technology
- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ………………………………………………………………………………………………… ………………………………………………………………………………………………… ………………………………………………………………………………………………… ………………………………………………………………………………………………… ………

f. Dimension: Environmental impact assessment (EIA)

Criteria:

- Construction waste handling
- Records of communal/societal complaints regarding environmental issues
- Records from E I A departments
- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ………………………………………………………………………………………………… ………………………………………………………………………………………………… ………………………………………………………………………………………………… ………………………………………………………………………………………………… ………

g. Dimension: Project execution efficiency

Criteria:

- Contractors diligence to work
- Contractors response to architects/engineers instructions
- Number of reworks
- Extent of reworks
- Site organisation
- Frequency of variation orders
- Consistency of variation orders
- Regularity of site meetings
- Relationship between expected and actual outputs
- Time for honouring payment certificates
- Effective health and safety measures
- Project going on schedule
- Project going with budget
- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ……………………………………………………………………………………………………… ……………………………………………………………………………………………………… ……………………………………………………………………………………………………… ……………………………………………………………………………………………………… ………

Section 3.This section relate to the clients business motives and perspectives of undertaking a business. Please, select those measures which are relevant.

h. Dimension: Customer perspective

Criteria:

- Initial cost to end user
- Cost-in-use to end user
- Functionality to end user: location, comfort, aesthetics, utility, etc.
- Solving customer problems
- Reflection of the desired corporate image
- Aesthetic appeal (design, concept, finishing)
- Adequacy of service installations -electrical and mechanical(positioning, quality, and functioning
- Adequacy of internal functional areas (spatial adequacy/optimum layout)
- Adequacy of security facilities (quality, positioning and functions of gadgets for fire fighting, & burglar alarm/fencing)
- Adequacy of external functional area (spatial adequacy and layout of parking lots, garages, gardens/ landscaping, etc)
- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ……………………………………………………………………………………………………… ……………………………………………………………………………………………………… ……………………………………………………………………………………………………… ……………………………………………………………………………………………………

i. Dimension: Financial/ commercial

Criteria:

- Commercial results
- Cash-flow generation
- Profit generation
- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ……………………………………………………………………………………………………… ……………………………………………………………………………………………………… ……………………………………………………………………………………………………… ………………………………………………………………………………………

j. Dimension: Contribution to business.
Criteria:

- Building a positive image of the client's company
- Contributing to the innovation profile of the company
- Causing the firm's growth
- Acquiring greater market share
- Having a large impact on the company's future
- Creating a new market
- Creating a large market
- Creating a new product line
- Developing a new technology
- Competitive advantage
- Improvement in organization's performance
- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
…………………………………………………………………………………………………

k. Dimension: Benefit to national infrastructure
Criteria:

- Developed a new technological capability
- Contributed to critical fields of national interest
- Decreases dependence on outside sources or help
- Contributing to other projects
- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
…………………………………………………………………………………………………

l. Dimension: Future perspective
Criteria:

- Long term benefits
- Preparing organization for future
- Preparing technological infrastructure for the future
-
- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
…………………………………………………………………………………………………

Section 3: Factors

The following are factors which influence the success or failure of construction (performance factors). They have been grouped according to factor groups (2).

Please select those you perceive to be relevant in Ghana and rank them according to how critical they are in determining the performance of projects. (**Note:** 4= very important; 3: important; 2: of little importance; 1: not important). Please skip the question if find it irrelevant.

1. Factors related to the project

	Levels of importance			
	4	3	2	1
Project type				
Project value				
Uniqueness of project activities				
Project duration				
Urgency				

- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ………

2. Factors related to the project manager/consultant

	Levels of importance			
	4	3	2	1
Ability to coordinate				
Ability to delegate authority				
Ability to take decisions when necessary				
Ability to trade-off among competing requirements				
Competence				
Commitment				

- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ……

3. Factors related to the project team members

	Levels of importance			
	4	3	2	1
Technical background				
Communication				
Relationship among them				
Commitment				
Competence				
Ability to work as a team				

- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ………

4. Factors related to the client organisation

	Levels of importance			
	4	3	2	1
Top management support throughout the project life				
Project organization structure				
Functional manager's support				
Relationship with project tam members				

- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ………

5. Factors related to the environment

	Levels of importance			
	4	3	2	1
Political				
Economic				
Social environment				
Technological environment				
Nature/weather				
client				
competitors				
Sub-contractors				

- Please list others which are relevant (in your opinion) in Ghana but not listed here

- ……
……
……
……………………………………………………………………

Section 2.0: The following factors have been identified to be the underlying intermediate factors that indicate the main factors. Please select those ones you perceive to be relevant and rank them. . (**Note:** 4= very important; 3: important; 2: of little importance; 1: not important). Please skip the question if you find it irrelevant.(1)

	Levels of importance			
	4	3	2	1
Client consultation & acceptance				
Effective planning & scheduling				
Effective coordinating and communication				
Effective control & monitoring				
Effective use of technology				
Resource sharing documentation				
Variations				
Work breakdown structure				
Quality management				
Project preliminary estimates				
Availability of resources –human, financial, raw materials				
Client attitude towards payments –consultancy fees, interim certificates etc				
Financial management				
Risk management				
Start-up difficulties				
Bureaucracy				

- Please list others which are relevant (in your opinion) in Ghana but not listed here

……
……
……
……………………………………………………

Section 4: Procurement type and project performance. This section seeks to establish the effect of procurement on project performance. Whenever your opinion is sought, please select one of the options. Please skip the question if you have no idea.

1. Which of these procurement types are relevant (being practiced) in Ghana?
   - Traditional competitive tendering
   - Negotiated contract
   - Serial tendering
   - Design and Build

- Management contracts
- Indefinite quantity indefinite delivery (IQID)
- Build Own Operate Transfer (BOOT)
- Build Own Operate (BOO)
- Design Build Operate (DBO)
- Lease Own Operate (LOO)
- Build, Operate and Renewal of Concession
- Build, Rent and Transfer
- Build Transfer and Operate
- Design, Build, Finance and Operate
- Design, Construct, Manage and Finance
- Modernise, Operate and Transfer
- Rehabilitate, Own and Transfer
- Please list others which are operational in Ghana but have not been listed here:

  ……………………………………………………………………………………………………
  ……………………………………………………………………………………………………
  ………………..

2. Two schools of thought exist regarding the effect of procurement on project performance (success or failure). What is your opinion about the statement: **"the type of procurement chosen does have effect on the performance of the project (success or failure)?"**

- Strongly agree
- Agree
- Somehow agree
- Disagree
- Some of the types

3. If in your opinion some type of procurements is a factor influencing project performance, please list:

  ……………………………………………………………………………………………………
  ……………………………………………………………………………………………………
  ……………………………………………

4. If you agree that procurement type have effect on project performance, please indicate which way.

- When it is new to the environment
- When it is too complex to run
- When it does not fit in the existing construction industry structure
- When it does not fit in the socio-economic setting
- When it is misapplied
- When terms are not strictly adhered to
- Please, state others reasons.

……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
…………………………………………………………………………………………………….

5. Is it an issue in Ghana that procurement type can lead to project success or failure?

- Yes

- No
- Somehow

Section 4: Client's requirements and Satisfaction criteria

The following list represents some of the needs, objectives and expectations of clients, motivating them to procure buildings. On the four-point scale shown, kindly rate their levels of importance according to your perception. (**Note:** 4= very important; 3: important; 2: of little importance; 1: not important). Please skip the question if you find it irrelevant.

1. Real estate Developer:

Needs/objectives	Levels of importance			
	4	3	2	1
For Profit				
Speculative purposes, anticipating demand				
To maintain/improve market share				
To achieve sales targets				

- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ……………………………………………………………………………………………………… ……………………………………………………………………………………………………… ……………………………………………………………………………………………………… ………………………………………………………………………………………………………

2. Government Department/Agency

Needs/objectives	Levels of importance			
	4	3	2	1
To satisfy social need				
To regulate the economy e.g. create jobs, inject funds etc.				
To generate income				
For prestige, national pride				
To satisfy international objective				

- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ……………………………………………………………………………………………………… ……………………………………………………………………………………………………… ……………………………………………………………………………………………………… ………………………………………………………………………………………………………

3. Investor

Needs/objectives	Levels of importance			
	4	3	2	1
For business expansion, market share improvement, competitive				
For diversification purposes				
To match fund liability with property asset base				
To minimize investment risks believing that property is a comparatively low risk and stable investment vehicle				
To achieve capital growth/ long-term retention of funds against inflation				
To achieve desired returns on investment/ profitability levels				
Speculative, to meet anticipated demand				

- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ……

4. Owner occupier

Needs/objectives	Levels of importance			
	4	3	2	1
For business expansion/market share improvements, competitive position				
To minimize rental costs in long-term leasehold, resulting from leasehold decision				
To improve on capital assets of the firm				
To enhance corporate image				
To acquire or extend infrastructure facilities with a view to enhancing business process				

- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ……

Section 3.2 .The following is about clients' expectation/requirements of service providers. Kindly indicates their levels of importance. (**Note:** 4= very important; 3: important; 2: of little importance; 1: not important). Please skip the question if you find it irrelevant.

1. **Quantity Surveying services**

Expectations/ requirement	Levels of importance			
	4	3	2	1
Accurate and reliable budget estimate				
Efficiency (timely job execution)				
Competency (expertise and experience)				
Ability to foresee and budget for potential inflation				
Efficient performance of duties as per terms and conditions of appointment				

- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
…………………………………………………………………………………………………

2. Design Services (Architectural)

Expectations/ Requirements	Levels of importance			
	4	3	2	1
Flexibility in design (to accommodate future changes)				
Buildability of design				
Efficiency (supervision, instructions etc.)				
Aesthetic appeal				
Delivery within time				
Efficient performance of duties as per terms and conditions of appointment				

- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
…………………………………………………………………………………………………

3. Project Management Services

Expectation/ Requirement	Levels of importance			
	4	3	2	1
Technical and managerial competencies/ experience				
Team work and efficient co-ordination				
Delivery within time, cost and cost targets				
Manage clients changes efficiently				
Efficient performance of duties as per terms and conditions of appointment				

- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
…………………………………………………………………………………………………

4. Consulting Engineers

Expectation/ Requirement	Levels of importance			
	4	3	2	1
Safe and economic design				
Sustainability/flexibility in design and construction				
Timely delivery				
Workable				
Efficient performance of duties as per terms and conditions of appointment				

- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ……
……
……
……………………………………………………………………………………………………

5. Contracting Services

Expectation/ Requirement	Levels of importance			
	4	3	2	1
Delivery within agreed time, quality and cost targets				
Minimise cost (avoiding on site and material waste				
Technical and managerial competence				
Accommodating client changes in good faith				
Efficient coordination of the specialist and sub-contractors' works				
Financial capacity and adequate guarantee against own and sub-contractors' default				
Efficient performance of duties as per terms and conditions of appointment				

- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ……
……
……
……………………………………………………………………………………………………

6. Clients' Responsibility

Needs/objectives	Levels of importance			
	4	3	2	1
Reasonable expectation				
Seeking professional advice in investment decisions				
Disclosing all motives for investment at the outset to project team				
Fulfilment of contractual obligation				
Employment of specialists in the management and executions of all critical aspects of the work				

- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ……
……
……
……………………………………………………………………………………………………

Thank You.

APPENDIX 3: Practitioners' Questionnaire 2

Section A.

Dimension of Project Performance.

Please **select** and **rank** your selection; alternatively, **skip** by leaving the spaces empty.

[4 =very important; 3 = important; 2 = of little importance; 1 = not important]

Table 1

Criteria	**Level of importance**			
	4	**3**	**2**	**1**
Cost				
Time				
Technical Quality				
Client Satisfaction				
Managerial				
Innovation and learning				
Environmental Impact Assessment (EIA)				
Project Execution Efficiency				
Customer Perspective				
Financial/ Commercial				
Contribution to Business				
Benefit to National Infrastructure				
Future Perspective				

- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ……………………………………………………………………………………………………… ……………………………………………………………………………………………………… ……………………………………………………………………………………………………… ………………………………………………………………………………………

I. Criteria for assessment in selected dimension.

1. Cost.

Criteria	**Level of Importance**			
	4	3	2	1
Variation between contract sum and final account				
Costs relation to the environmental issues				
Managerial costs (consultancies etc)				
Costs in relation to insurance claims				
Fluctuations costs				
Variation costs				
Legal costs				
Dispute costs				
Accident costs				
Cost of incompletion				
Cost of capital				
Cost of land/site				

- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ……

2. Time.

Criteria	**Level of Importance**			
	4	3	2	1
Variation between estimated and actual completion time				
Actual commencement time				
Time for evaluation and certification				
Actual time for honouring certificates as against agreed				
Actual times for completion of planned activities as against schedules				
Actual times for site meetings as against estimated				
Dispute resolution times				
Time for arrival of supplies (materials)				
Times for inclement weather				
Times for industrial activities/strikes etc.				
Time for resource mobilisation				
Time for executing variation				
Time for issuing and implementing site proceeding				

- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ………

3. Technical Quality

Criteria	Level of Importance			
	4	3	2	1
Major variation between original design and actual completed work				
Number of reworks				
Extent of reworks				
Records of material tests				
Records of service tests				
Record of engineers'/architects' approvals				
Records of engineers disapprovals				
Records for variations orders				
Technical specifications for variation				

- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ……… ……… ……… ………………………………………………………………………………………

4. Managerial

Criteria	Level of Importance			
	4	3	2	1
Risk management				
Budget management				
Test management				
Communication with team and workers				
Personnel management				
Decision making procedures				
Communication and reports				
Configuration control				
Resource and schedule control				
QS services				
Architectural services				
Engineering services				

- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ……… ……… ……………………………………………

5. Innovation and Learning.

Criteria	Level of Importance			
	4	3	2	1
Uniqueness of the project				
Creating a spin-off to other products				
Allowing a considerable learning effect during product development				
Through variations				
Resulting from site condition challenges				
Resulting from buildability challenges				
Resulting from contract peculiarities				
Resulting from project typology				
Resulting from personnel management issues				
Resulting from external environmental issues (e.g. politics, economics etc)				
Resulting from project management challenges				
Resulting from disputes				
Resulting from safety issues				
Developing a new technology				

- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ……

6. EIA

Criteria	Level of Importance			
	4	3	2	1
Construction waste handling				
Records of communal/societal complaints regarding environmental issues				
Records from E I A department				

- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ……

7. Project Execution Efficiency

Criteria	Level of Importance			
	4	3	2	1
Contractors diligence to work				
Contractors response to architects/engineers instructions				
Number of reworks				
Extent of reworks				
Site organisation				
Frequency of variation orders				
Consistency of variation orders				
Regularity of site meetings				
Relationship between expected and actual outputs				
Time for honouring payment certificates				
Effective health and safety measures				
Project going on schedule				
Project going with budget				
Proper budgeting preceding project				
Complete designs before proceeding				
Approval from statutory body to precede execution				

- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ……

8. Customer Perspective

Criteria	Level of Importance			
	4	3	2	1
Initial cost to end user				
Cost-in-use to end user				
Functionality to end user: location, comfort, aesthetics, utility, etc.				
Solving customer problems				
Reflection of the desired corporate image				
Aesthetic appeal (design, concept, finishing)				
Adequacy of service installations -electrical and mechanical(positioning, quality, and functioning				
Adequacy of internal functional areas (spatial adequacy/optimum layout)				
Adequacy of security facilities (quality, positioning and functions of gadgets for fire fighting, & burglar alarm/fencing)				
Adequacy of external functional area (spatial adequacy and layout of parking lots, garages, gardens/ landscaping, etc)				

- Please list others which are relevant (in your opinion) in Ghana but not listed here

- …………………………………………………………………………………………………… …………………………………………………………………………………………………… …………………………………………………………………………………………………… ………………………………………………………………………………

9. Financial/ Commercial

Criteria	**Level of Importance**			
	4	3	2	1
Commercial results				
Cash-flow generation				
Profit generation				

- Please list others which are relevant (in your opinion) in Ghana but not listed here
- …………………………………………………………………………………………………… …………………………………………………………………………………………………… …………………………………………………………………………………………………… ………………………………………………………………………………

10. Contribution to Business

Criteria	**Level of Importance**			
	4	3	2	1
Building a positive image of the client's company				
Contributing to the innovation profile of the company				
Causing the firm's growth				
Acquiring greater market share				
Having a large impact on the company's future				
Creating a new market				
Creating a large market				
Creating a new product line				
Developing a new technology				
Competitive advantage				
Improvement in organization's performance				

- Please list others which are relevant (in your opinion) in Ghana but not listed here
- …………………………………………………………………………………………………… …………………………………………………………………………………………………… …………………………………………………………………………………………………… ………………………………………………………………………………

11. Benefit to National Infrastructure

Criteria	**Level of Importance**			
	4	3	2	1
Developed a new technological capability				
Contributed to critical fields of national interest				
Decreases dependence on outside sources or help				
Contributing to other projects				
Adding onto infrastructural stocks				
Indicator towards good governance				

- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ………

12. Future Perspective

Criteria	**Level of Importance**			
	4	3	2	1
Long term benefits				
Preparing organization for future				
Preparing technological infrastructure for the future				
Creating incentives for accelerated national development				

- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ………

SECTION B 1: The following are factors which influence the success or failure of construction (performance factors). They have been grouped according to factor groups

Please **select** and **rank** your selection; alternatively, **skip** by leaving the spaces empty. **[4 = very important; 3 = important; 2 = of little importance; 1 = not important]**

1. Factors related to the project

	Level of importance			
	4	3	2	1
Project type				
Project value				
Uniqueness of project activities				
Project duration				
Urgency				
Project location				
Contractor's experience				
Project definition				
Buildability				
Project Density				

- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ………

2. Factors related to the project manager/consultant

	Level of importance			
	4	3	2	1
Ability to coordinate				
Ability to delegate authority				
Ability to take decisions when necessary				
Ability to trade-off among competing requirements				
Competence				
Commitment				
Knowledge in/about local condition				
Ability to lead				
Strong sense of accountability				
Arbitration skills				
Communicate effectively				
Perception of his role and responsibilities				

- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ………

3. Factors related to the project team members

	Level of importance			
	4	3	2	1
Technical background				
Communication				
Relationship among them				
Commitment				
Competence				
Ability to work as a team				

- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ………

4. Factors related to the client organisation

	Level of importance			
	4	3	2	1
Top management support throughout the project life				
Project organization structure				
Functional manager's support				
Relationship with project team members				
Ability to take decisions				
Technical ability				
Understanding project cycle and procedures				
Relationship with the contractor				

- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ………

5. Factors related to the Project External environment

	Level of importance			
	4	3	2	1
Political				
Economic				
Social environment				
Technological environment				
Nature/weather				
client				
competitors				
Sub-contractors				
Suppliers of building materials				
Availability of skilled labour				

- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ……… ……… ……… ……………………………………………………………………

SECTION B2: The following factors have been identified to be the underlying intermediate factors (also called systems response) that indicate the effect of the main factors. They are factors which represent the stands in between the main factors and the criteria they influence.
Please **select** and **rank** your selection; alternatively, **skip** by leaving the spaces empty. **[4 = very important; 3 = important; 2 = of little importance; 1 = not important]**

Intermediate Factors

Intermediate factors or Systems response	**Level of importance**			
	4	3	2	1
Client consultation & acceptance				
Effective planning & scheduling				
Effective coordinating and communication				
Effective control & monitoring				
Effective use of technology				
Resource sharing documentation				
Variations				
Work breakdown structure				
Quality management				
Project preliminary estimates				
Availability of resources –human, financial, raw materials				
Client attitude towards payments –consultancy fees, interim certificates etc				
Financial management				
Risk management				
Start-up difficulties				
Bureaucracy				

- Please list others which are relevant (in your opinion) in Ghana but not listed here

……
……
……
…………………………………………………

SECTION C.: Procurement type and project performance. This section seeks to establish the effect of procurement on project performance. Whenever your opinion is sought, please select one of the options. Please skip the question if you have no idea.

1. Which of these procurement types are in use (being practiced) in Ghana? Rank your choice in order of popularity i.e. 1 =most popular, then 2, 3, 4, 5, 6, and so on as many as you select.

No.	Procurement Type	Rank
1	Traditional competitive tendering	
2	Negotiated contract	
3	Serial tendering	
4	Design and Build	
5	Management contracts	
6	Indefinite quantity indefinite delivery (IQID)	
7	Build Own Operate Transfer (BOOT)	
8	Build Own Operate (BOO)	
9	Design Build Operate (DBO)	
10	Lease Own Operate (LOO)	
11	Build, Operate and Renewal of Concession BORC)	
12	Build, Rent and Transfer (BRT)	
13	Build Transfer and Operate (BTO)	
14	Design, Build, Finance and Operate (DBFO)	
15	Design, Construct, Manage and Finance (DCMF)	
16	Modernise, Operate and Transfer (MOT)	
17	Rehabilitate, Own and Transfer (ROT)	

- Please list others which are operational in Ghana but have not been listed here:

  ………
  ………
  ………………..

2. Two schools of thought exist regarding the effect of procurement on project performance (success or failure). What is your opinion about the statement: **“the type of procurement chosen does have effect on the performance of the project (success or failure)?”**

- Strongly agree
- Agree
- Somehow agree
- Disagree
- Some of the types

4. If you agree that procurement type have effect on project performance, please indicate which way.
Please **select** and **rank** your selection; alternatively, **skip** by leaving the spaces empty. **[4 = Strongly Agree; 3 = Agree; 2 = Somehow Agree; 1 = Disagree]**

Criteria	**Level of important**			
	4	3	2	1
When it is new to the environment				
When it is too complex to run				
When it does not fit in the existing construction industry structure				
When it does not fit in the socio-economic setting				
When it is misapplied				
When terms are not strictly adhered to				

5. Is it an issue in Ghana that procurement type can lead to project success or failure?

- Yes
- No
- Somehow

APPENDIX 4: Practitioners' Questionnaire 3

Section 1: Background

1. What is your profession? If more than one please "***circle***" the one you are most active and ***"tick"*** the rest.

- Architect
- Quantity surveyor
- Project manager

2. Do you belong to a professional association? If yes, select by ticking. If more than one please "***circle***" the one you are most active and ***"tick"*** the rest.

- GhIA (Ghana Institution of Architects)
- GhIS (Ghana Institution of Surveyors)
- PMI (Project Management Institute)
- IPMA (International Project Managers Association)

3. For how long have you been in professional practice?

- <5 years
- 5-10 years
- >10 years

4. Kindly indicate your status in your organization:

- Director/principal partner
- Associate partner
- Senior staff
- Trainee/intern
- Other (please specify):

5. Which types of Government projects (buildings) do you normally undertake? Please select as many as are applicable.

- Large scale Residential houses (not including storey type)
- Large scale residential houses (only storey type)
- Large scale residential houses (all types)
- Office accommodation
- Hostels, Hotels etc.
- Industrial buildings
- Institutional buildings e.g. School, hospitals etc.
- Self-occupying housing
- Others (Please state)……..

Example of How to answer the questions:

1: ***Overall Objectives*: RENTING A HOUSE**

The following has been identified as the criteria to consider when choosing a house to rent. Not all of them are of equal importance. Please, divide 100 points over the following dimensions giving more points to those dimensions that you think are more important in consideration.

Table 1. OVERALL OBJECTIVE: RENTING A HOUSE.

No	Criteria	Rating
1	Location	23
2	Price	30
3	Distance	20
4	Contract	27

SECTION A1: Relative Importance of the various Performance Criteria with respect to Performance Assessment

1. <u>Overall Objective</u>: THE OVERALL PERFORMANCE OF THE PROJECT

Question. 1. The following have been selected as the main criteria for assessing project performance. Not all of them are of equal importance. Please, divide 100 points over the listed Criteria giving more points to those which you think are more important.

Table 2 Overall Objective: Overall project Performance

No	Criteria	Rating
1	Cost	
2	Time	
3	Quality	
4	Environmental Impact	
5	Social Impact	
6	Management & Execution Efficiency	

SECTION A2. Assessing the Relative Importance of Indicators for Performance Assessment Criteria

1*: <u>Overall Objective:</u> COST OF THE PROJECT*

Question. 1. The following have been selected as the main indicators for the ***cost of a project***. Not all of them are of equal importance. Please, divide 100 points over the listed indicators giving more points to those which you think are more important.

Table 3 Overall Objective: Cost of the Project

No	Indicators	Rating
1	Environmental/Social costs	
2	Managerial Costs*	
3	Legal costs. *	
4	Incidental costs *	
5	Fluctuation costs	
6	Total Cost overrun*	

* ***Managerial Costs***: cost for employing the services of project management team and other project team members; ii. ***Legal Cost***: *disputes, insurance claims, etc*
iii. Incidental Cost: *costs relating to accidents, inclement weather, industrial actions etc.*
iv. Total cost overrun: *variation between contract sum and final accounts, variation costs*

2: __Overall Objective__: TIME (DURATION) OF THE PROJECT

Question. 2. The following have been selected as the main indicators for the ***time of a project***. Not all of them are of equal importance. Please, divide 100 points over the listed indicators giving more points to those which you think are more important.

Table 4 Overall Objective: Time or Duration of the Project

No	Indicators	Rating
1	Times for valuation and certification	
2	Times for payment of certified work	
3	Incidental times*	
4	Times for completing major specified sections of the works	

**** Incidental Times:** –times for inclement weather, industrial actions, and accidents*

3: __Overall Objective__: QUALITY OF THE PROJECT

Question. 3. The following have been selected as the main indicators for the ***quality of a Project***. Not all of them are of equal importance. Please, divide 100 points over the listed indicators giving more points to those which you think are more important.

Table 5 Overall Objective: Quality of the Project

No	Indicators	Rating
1	Reworks (number and extent)	
2	Material tests records	
3	Services tests records*	
4	Engineers'/architect' approvals'/ disapprovals Record	
5	Variations (number and extent)	

*Service tests records: tests for electrical installations, plumbing installation etc.

4: __Overall Objective__: MANAGEMENT AND EXECUTION EFFICIENCY (MEE)

OF THE PROJECT

Question. 4. The following have been selected as the main indicators for the ***Management and Execution Efficiency of a Project***. Not all of them are of equal importance. Please, divide 100 points over the listed indicators giving more points to those which you think are more important.

Table 6 Overall Objective: Management and Execution Efficiency of a Project

No	Indicators	Rating
1	Decision making process	
2	Communication and reports	
3	Efficiency of project team	
4	Supervision of contractor	
5	Inspection and approval of works	
6	Site meetings regularity	

5: __Overall Objective__: ENVIRONMENTAL IMPACT OF THE PROJECT

Question. 5. The following have been selected as the main indicators for the ***Environmental Impact of a project***. Not all of them are of equal importance. Please, divide 100 points over the listed indicators giving more points to those which you think are more important.

Table 7 Overall Objective: Environmental Impact of a project

No	Indicators	Rating
1	Investments on environmental issues*	
2	Number of employees with specific environmental tasks*	
3	Number of reported incidents*	
4	Degree of compliance with regulations	

Investments on environmental issues**: *extra investments environmentally friendly designs, materials and method of execution; waste handling and management; energy utilisation.* **Number of employees with specific environmental tasks:** *extra inputs of employees to ensure environmental compliant during project implementation.* ***Number of reported incidents: *complaints with regard to dust, noise, water and air pollution etc.*

6: <u>Overall Objective</u>: SOCIAL IMPACT OF THE PROJECT

Question. 6. The following have been selected as the main indicators for the **Social *Impact resulting from the Project***. Not all of them are of equal importance. Please, divide 100 points over the listed indicators giving more points to those which you think are more important.

Table 8 Overall Objective: Social Impact resulting from the Project

No	Indicators	Rating
1	Number of the population affected. *	
2	Number and type of community* institutional structures affected	
3	Types and amount of community/ social resources affected*	

** **Number of the population affected**: population change, relocation, influx or outflow of temporary works, seasonal residents etc. **Number and type of community institutional structure affected**: Economic (employment/income characteristics) ,Political (size and structure of districts/ municipal, metropolitan assemblies), Education (schools, change in student population, attendance), Health(changes in health conditions),religious and other interest groups; **Types and amount of Social resources affected**: infrastructure, land use, patterns, and cultural, historical and archaeological resources*

Section B1. Factors Affecting Project Performance

1: __Overall Objective__: FACTORS RELATED TO THE PROJECT TEAM

Question. 1. The following have been selected as the main factors that relate to, and may affect, the performance of the ***project team*** on a typical project. Not all of them have equal effect. Please, divide 100 points over the listed factors giving more points to those which you think are more important.

Table 9 Overall Objective: Factors Related to the Project Team

No	Factors	Rating
1	Technical background (education)	
2	Relationship among team members	
3	Commitment of team members	
4	Ability to work as a team	
5	Competence of the team	

2: __Overall Objective__: FACTORS RELATED TO THE PROJECT MANAGER/

MAIN CONSULTANT

Question. 2. The following have been selected as the main factors that relate to, and may affect, the performance of the ***project Manger/Main Consultant*** on a typical project. Not all of them have equal effect. Please, divide 100 points over the listed factors giving more points to those which you think are more important.

Table 10 Overall Objective: Factors Related to the Project Manager/Main Consultant

No	Factors	Rating
1	Ability to coordinate	
2	Ability to delegate authority	
3	Ability to lead	
4	Arbitration skills	
5	Ability to communicate	
6	Knowledge and Skills about project	

3: Overall Objective: FACTORS RELATED TO THE PROJECT

Question. 3. The following have been selected as the main factors that relate to the ***project and*** may impact its execution on a typical project. Not all of them have equal effect. Please, divide 100 points over the listed factors giving more points to those which you think are more important.

Table 11 Overall Objective: Factors Related to the Project

No	Factors	Rating
1	Project size	
2	Project value	
3	Urgency for completion	
4	Project Uniqueness	
5	Project complexity	
6	Life cycle	

4: Overall Objective: FACTORS RELATED TO THE CLIENT'S ORGANISATION

Question. 4. The following have been selected as the main factors that relate to, and may affect, the performance of the ***Client's Organisation*** on a typical project. Not all of them have equal effect on the project. Please, divide 100 points over the listed factors giving more points to those which you think are more important.

Table 12 Overall Objective: Factors Related to the *Client's Organisation*

No	Factors	Rating
1	Top Management Support	
2	Client's Organisational structure	
3	Relationship with project Team	
4	Ability to take decisions (especially financial)	
5	Relationship with the contractor	
6	Sensitivity to environmental and social issues	

5: <u>Overall Objective</u>: FACTORS RELATED TO THE PROJECT EXTERNAL ENVIRONMENT

Question. 5. The following have been selected as the main factors that relate to the ***External Environment*** and may impact on a typical project. Not all of them have equal effect on projects. Please, divide 100 points over the listed factors giving more points to those which you think are more important.

Table 13 Overall Objective: Factors Related to the *External Environment*

No	Factors	Rating
1	Political	
2	Economic	
3	Social environment	
4	Nature/ Weather	
5	Availability of labour, Material and Plants	

Section B2: Effect of the Factor Groups on project performance with respect to the various criteria.

1: <u>Overall Objective</u>: EFFECT OF THE MAIN FACTORS ON THE COST OF THE

PROJECT.

Question 1. The following have been selected as the main factors that affect the performance of the Project in terms of its ***Cost.***. Not all of them have equal influence on ***Cost.*** Please, divide 100 points over the listed factors giving more points to those which you think are more important.

Table 14 Overall Objective: ***Effect of the Main Factors on the Cost of the Project.***

No	Factors	Rating
1	the Project Manager	
2	the Project Team	
3	the Project	
4	the Client's Organisation	
5	Project's External Environment*	

*Project's external environment: Political, economic, social and cultural environments

2: <u>Overall Objective</u>: EFFECT OF THE MAIN FACTORS ON THE TIME

(DURATION) OF THE PROJECT.

Question 2. The following have been selected as the main factors that affect the performance of the Project in terms of its ***Time.*** Not all of them have equal influence on ***Time.*** Please, divide 100 points over the listed factors giving more points to those which you think are more important.

Table 15 Overall Objective: ***Effect of the Main Factors on the Time of the Project.***

No	Factors	Rating
1	the Project Manager	
2	the Project Team	
3	the Project	
4	the Client's Organisation	
5	Project's External Environment*	

*Project's external environment: Political, economic, social and cultural environments

*3: <u>Overall Objective</u>: **EFFECT OF THE MAIN FACTORS ON THE QUALITY***

OF THE PROJECT.

Question 3. The following have been selected as the main factors that affect the performance of the Project in terms of its ***Quality.*** Not all of them have equal influence on ***Quality.*** Please, divide 100 points over the listed factors giving more points to those which you think are more important.

Table 16 Overall Objective: ***Effect of the Main Factors on the Quality of the Project.***

No	Factors	Rating
1	the Project Manager	
2	the Project Team	
3	the Project	
4	the Client's Organisation	
5	Project's External Environment*	

*Project's external environment: Political, economic, social and cultural environments

*4: <u>Overall Objective</u>: **EFFECT OF THE MAIN FACTORS ON THE***

MANAGEMENT AND EXECUTION EFFICIENCY OF THE PROJECT.

Question 4. The following have been selected as the main factors that affect the performance of the Project in terms of its ***Management and Execution Efficiency.*** Not all of them have equal influence on ***Management and Execution Efficiency of the project.*** Please, divide 100 points over the listed factors giving more points to those which you think are more important.

Table 17 Overall Objective: ***Effect of the Main Factors on the Management and Execution Efficiency of the Project.***

No	Factors	Rating
1	the Project Manager	
2	the Project Team	
3	the Project	
4	the Client's Organisation	
5	Project's External Environment*	

*Project's external environment: Political, economic, social and cultural environments

5: __Overall Objective__: EFFECT OF THE MAIN FACTORS ON THE

SOCIAL IMPACT OF THE PROJECT.

Question 5. The following have been selected as the main factors that affect the performance of the Project in terms of its ***Social Impact.***. Not all of them have equal influence on ***Social Impact.*** Please, divide 100 points over the listed factors giving more points to those which you think are more important.

Table 17 Overall Objective: ***Effect of the Main Factors on the Social Impact of the Project.***

No	Factors	Rating
1	the Project Manager	
2	the Project Team	
3	the Project	
4	the Client's Organisation	
5	Project's External Environment*	

*Project's external environment: Political, economic, social and cultural environments

6: __Overall Objective__: EFFECT OF THE MAIN FACTORS ON THE

ENVIRONMENTAL IMPACT OF THE PROJECT.

Question 6. The following have been selected as the main factors that affect the performance of the Project in terms of its ***Environmental Impact.***. Not all of them have equal influence on ***Environmental Impact.*** Please, divide 100 points over the listed factors giving more points to those which you think are more important.

Table 18 Overall Objective: ***Effect of the Main Factors on the Environmental Impact of the Project.***

No	Factors	Rating
1	the Project Manager	
2	the Project Team	
3	the Project	
4	the Client's Organisation	
5	Project's External Environment*	

*Project's external environment: Political, economic, social and cultural environments

APPENDIX 5: Clients' Interview

Section 1: Background

A. Government Agency

1. What is the main business or nature or type of your organization?

- Government Institution
- Government department
- Local government
- Government ministry

2. What types of buildings do you mainly undertake?

- Office buildings (new): a. more frequently. b. less frequently. c. only
- Office buildings (rehabilitation): a. more frequently. b. less frequently. c. only
- Residential buildings for staff (new): a. more frequently. b. less frequently. c. only
- Residential buildings for staff (rehabilitation): a. more frequently. b. less frequently. c. only
- School buildings: a. more frequently b. less frequently. c. only
- Other (please specify)

B. Personal Information

3. What is your position in this organisation?
4. For how long have you been working in this position?

Section 2 Main interview

i. Roles

1. Would you want to play a more active role during project execution than you are doing now?
2. Given the opportunity, what would you have to change about your role in project implementation during the execution period as a client?

ii. Indicators and criteria for satisfaction of project performance

3. Do you have a specific expectation(s) or criteria you want any project you undertake to meet? If yes, can you list some of them?
4. Have you ever been dissatisfied about any of your projects? Can you please recall what the cause was?
5. How do you determine your satisfaction or otherwise of an executed project?
6. In addition to assessing projects performance in terms of cost (budget), time (duration) and quality (design and technical specifications) etc., can you outline other reasons for undertaking projects?
7. Given the opportunity, how would you want your projects to be assessed? Only at the end of project for the overall performance? Continuous assessment? Can you give reasons?

iii. Views about practitioners/ consultants

8. Do consultants make your ultimate satisfaction their priority?
9. In your opinion, which of these do you expect much from regarding successful project performance: (i) consultants (ii) contractors
10. Would you want that consultants' performance be assessed?
11. If yes, should this be continuous, or only at the end of the project for overall performance?

Thank you for your time!

APPENDIX 6: Clients' Questionnaires 1

Section 1: Background

1. What is your profession? If more than one please rank them according to which one you are most active: 1=most active, then 2, 3, 4 etc

- Architect
- Quantity surveyor
- Project management

2. To which professional association do you belong? If more than one rank them according to which one you are most active.

- GhIA
- GhIS
- GhIE
- PMI
- IPMA

3. For how long have you been in professional practice?

- <5 years
- 5-10 years
- >10 years

4. Kindly indicate your status in your organization:

- Director/principal partner
- Associate partner
- Senior staff
- Trainee/intern
- Other (please specify):

5. Which type of Client are you? Please as many as are applicable.

- A developer
- An Investor
- Owner occupier
- Government Agency

6. Which types of buildings do you normally undertake? Please select as many as are applicable.

- Large scale Residential houses (not including storey type)
- Large scale residential houses (only storey type)
- Large scale residential houses (all types)
- Office accommodation
- Hostels, Hotels etc.
- Industrial buildings
- Institutional buildings e.g. School, hospitals etc.
- Self-occupying housing
- Others (Please state)……..

Section 2. 0: Client's requirements and Satisfaction criteria

The following list represents some of the needs, objectives and expectations of clients, motivating them to procure buildings. On the four-point scale shown, kindly rate their levels of importance. (**Note:** 4= very important; 3: important; 2: of little importance; 1: not important).

1. Real estate Developer:

Needs/objectives	Levels of importance			
	4	3	2	1
For Profit				
Speculative purposes, anticipating demand				
To maintain/improve market share				
To achieve sales targets				

- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ……………………………………………………………………………………………… ……………………………………………………………………………………………… ……………………………………………………………………………………………… ………………………………………………………………………………………………

2. Government Department/Agency

Needs/objectives	Levels of importance			
	4	3	2	1
To satisfy social need				
To regulate the economy e.g. create jobs, inject funds etc.				
To generate income				
For prestige, national pride				
To satisfy international objective				

- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ……………………………………………………………………………………………… ……………………………………………………………………………………………… ……………………………………………………………………………………………… ………………………………………………………………………………………………

3. Investor

Needs/objectives	Levels of importance			
	4	3	2	1
For business expansion, market share improvement, competitive				
For diversification purposes				
To match fund liability with property asset base				
To minimize investment risks believing that property is a comparatively low risk and stable investment vehicle				
To achieve capital growth/ long-term retention of funds against inflation				
To achieve desired returns on investment/ profitability levels				
Speculative, to meet anticipated demand				

- Please list others which are relevant (in your opinion) in Ghana but not listed here

- ……………………………………………………………………………………………………… ……………………………………………………………………………………………………… ……………………………………………………………………………………………………… ………………………………………………………………………………………………

4. Owner occupier

Needs/objectives	Levels of importance			
	4	3	2	1
For business expansion/market share improvements, competitive position				
To minimize rental costs in long-term leasehold, resulting from leasehold decision				
To improve on capital assets of the firm				
To enhance corporate image				
To acquire or extend infrastructure facilities with a view to enhancing business process				

- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ……………………………………………………………………………………………………… ……………………………………………………………………………………………………… ……………………………………………………………………………………………………… ………………………………………………………………………………………………

Section 3.0 .Client's Expectation from Service Providers.

The following is about clients' expectation/requirements of service providers. Kindly indicates their levels of importance. (**Note:** 4= very important; 3: important; 2: of little importance; 1: not important). In addition rate severally and jointly, the levels of performance of the service providers in meeting these requirements (Note: 4: very satisfactory; 3: satisfactory; 2: somewhat satisfactory; 1: dissatisfactory)

1. **Quantity Surveying services**

Expectations/ requirement	Levels of importance				Performance Levels			
	4	3	2	1	4	3	2	1
Accurate and reliable budget estimate								
Efficiency (timely job execution)								
Competency (expertise and experience)								
Ability to foresee and budget for potential inflation								
Efficient performance of duties as per terms and conditions of appointment								
Overall assessment of performance								

- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ……………………………………………………………………………………………………… ……………………………………………………………………………………………………… ……………………………………………………………………………………………………… ………………………………………………………………………………………………

2. Design Services (Architectural)

Expectations/ Requirements	Levels of importance				Performance Levels			
					4	3	2	1
Flexibility in design (to accommodate future changes)								
Buildability of design								
Efficiency (supervision, instructions etc.)								
Aesthetic appeal								
Delivery within time								
Efficient performance of duties as per terms and conditions of appointment								
Overall assessment of performance								

- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ……………………………………………………………………………………………………… ……………………………………………………………………………………………………… ……………………………………………………………………………………………………… ………………………………………………………………………………………………

3. Project Management Services

Expectation/ Requirement	Levels of importance				Performance Levels			
	4	3	2	1	4	3	2	1
Technical and managerial competencies/ experience								
Team work and efficient co-ordination								
Delivery within time, cost and cost targets								
Manage clients changes efficiently								
Efficient performance of duties as per terms and conditions of appointment								
Overall assessment of performance								

- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ………

4. Consulting Engineers

Expectation/ Requirement	Levels of importance				Performance Levels			
	4	3	2	1	4	3	2	1
Safe and economic design								
Sustainability/flexibility in design and construction								
Timely delivery								
Workable design								
Efficient performance of duties as per terms and conditions of appointment								
Overall assessment of performance								

- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ………

5. Contractors

Expectation/ Requirement	Levels of importance				Performance Levels			
	4	3	2	1	4	3	2	1
Delivery within agreed time, quality and cost targets								
Minimise cost (avoiding on site and material waste								
Technical and managerial competence								
Accommodating client changes in good faith								
Efficient coordination of the specialist and sub-contractors' works								
Financial capacity and adequate guarantee against own and sub-contractors' default								
Efficient performance of duties as per terms and conditions of appointment								
Overall assessment of performance								

- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
…………………………………………………………………………………………………

6. Clients' Responsibility (Yours)

Needs/objectives	Levels of importance				Performance Levels			
	4	3	2	1	4	3	2	1
Reasonable expectation								
Seeking professional advice in investment decisions								
Disclosing all motives for investment at the outset to project team								
Budgeting sufficient time and funds for detailed feasibility studies/market research at the outset								
Striving to cultivate synergy amongst project team members, through strong emphases on teamwork, equality and fairness								
Assessing levels of similar development springing up, or having been slated for near future development with a given node, before investing								
Fulfilment of contractual obligation								
Employment of specialists in the management and executions of all critical aspects of the work								
Overall assessment of performance								

- Please list others which are relevant (in your opinion) in Ghana but not listed here
- ……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
…………………………………………………………………………………………………

Section 4.0 Procurement preferences.

Which of these procurement types do you prefer? Where more than one rank your choice in order of preference i.e. 1 =most popular, then 2, 3, 4, 5, 6, and so on as many as you select.

No.	Procurement Type	Rank
1	Traditional competitive tendering	
2	Negotiated contract	
3	Serial tendering	
4	Design and Build	
5	Management contracts	
6	Indefinite quantity indefinite delivery (IQID)	
7	Build Own Operate Transfer (BOOT)	
8	Build Own Operate (BOO)	
9	Design Build Operate (DBO)	
10	Lease Own Operate (LOO)	
11	Build, Operate and Renewal of Concession BORC)	
12	Build, Rent and Transfer (BRT)	
13	Build Transfer and Operate (BTO)	
14	Design, Build, Finance and Operate (DBFO)	
15	Design, Construct, Manage and Finance (DCMF)	
16	Modernise, Operate and Transfer (MOT)	
17	Rehabilitate, Own and Transfer (ROT)	

- Can you state any reasons for your preference?
- Please state list others which you prefer but is not included in the options.

  ………
  ………
  ………………..

2. Two schools of thought exist regarding the effect of procurement on project performance (success or failure). What is your opinion about the statement: **"the type of procurement chosen does have effect on the performance of the project (success or failure)?"**

- Strongly agree
- Agree
- Somehow agree
- Disagree
- Some of the types

4. If you agree that procurement type have effect on project performance, please indicate which way.
Please **select** and **rank** your selection; alternatively, **skip** by leaving the spaces empty. **[4 = Strongly Agree; 3 = Agree; 2 = Somehow Agree; 1 = Disagree]**

Criteria	**Level of importance**			
	4	3	2	1
When it is new to the environment				
When it is too complex to run				
When it does not fit in the existing construction industry structure				
When it does not fit in the socio-economic setting				
When it is misapplied				
When terms are not strictly adhered to				

5. Is it an issue in Ghana that procurement type can lead to project success or failure?

- Yes
- No
- Somehow

Thank You.

APPENDIX 7: Clients' Questionnaires 2

Section 1: Background

1. What is your profession? If more than one please "***circle***" the one you are most active and "***tick***" the rest.

- Architect
- Quantity Surveyor
- Project Manger
- Planner
- Others…………….

3. For how long have you been in professional practice?

- <5 years
- 5-10 years
- >10 years

4. Kindly indicate your status in your organization:

- Director/principal partner
- Associate partner
- Senior staff
- Trainee/intern
- Other (please specify):

5. Which types of buildings do you normally undertake? Please select as many as are applicable.

- Large scale Residential houses (not including storey type)
- Large scale residential houses (only storey type)
- Large scale residential houses (all types)
- Office accommodation
- Hostels, Hotels etc.
- Industrial buildings
- Institutional buildings e.g. School, hospitals etc.
- Self-occupying housing
- Others (Please state)……..

Section A1. **Section A1: Identifying government's (Client's) Needs/Motivation for Undertaking a Project**

Example

1: ***Overall Objectives*: *RENTING A HOUSE***

The following has been identified as the criteria to consider when choosing a house to rent. Not all of them are of equal importance. Please, divide 100 points over the following dimensions giving more points to those dimensions that you think are more important in consideration.

Table 1 OVERALL OBJECTIVE: RENTING A HOUSE.

No	Criteria	Rating
1	Location	25
2	Price	30
3	Distance	20
4	Contract	25

Section A1: Identifying government's (Client's) Needs/Motivation for Undertaking a Project

1: ***<u>Overall Objectives</u>*: *CLIENT'S NEEDS/MOTIVATIONM FOR UNDERTAKING A PROJECT***

Question. 1. The following have been selected as the main criteria for satisfying the needs of, or motivation for, the government of Ghana for undertaking a project (building). Not all of them are of equal importance. Please, divide 100 points over the listed Criteria giving more points to those which you think are more important.

Table 2 Overall Objective: Needs/Motivation

No	Criteria	Rating
1	Contributing to good governance	
2	Contributing to National Infrastructure	
3	Addressing future infrastructural expectations	

Section A2: Identifying government's (Client's) Needs/Motivation for Undertaking a Project

1: <u>Overall Objective</u>: CONTRIBUTING TO GOOD GOVERNANCE.

Question 1. One of the main criteria for the government of Ghana in undertaking a project (building) is ***good governance***. The following have been selected as the main indicators for ***good governance*** in this respect. Not of them are of equal importance. Please, divide 100 points over the listed indicators giving more points to those which you think are more important.

Table 3 Overall Objective: Good Governance

No	Indicators	Rating
1	Building a positive image for the government	
2	Creating job employment	
3	Regulating the economy	
4	Improvement in country's GDP	
5	To satisfy social need	

2: <u>Overall Objective</u>: CONTRIBUTING TO NATIONAL INFRASTRUCTURE..

Question 2. One of the main criteria for the government of Ghana in undertaking a project (building) is ***Contributing to National Infrastructure***. The following have been selected as the main indicators for ***Contributing to National Infrastructure*** in this respect. Not all of them are of equal importance. Please, divide 100 points over the listed indicators giving more points to those which you think are more important.

Table 4 Overall Objective: Contributing to National Infrastructure.

No	Indicators	Rating
1	Adding to national physical infrastructural stocks	
2	Developing a new technical capability	
3	Contributing to other projects	
4	Contributing to critical fields of national interest	
5	Investing excess liquidity in infrastructure	

3: <u>Overall Objective</u>: ADDRESSING FUTURE INFRASTRUCTURAL NEEDS

Question 3. One of the main criteria for the government of Ghana in undertaking a project (building) is ***Addressing future Infrastructural Needs***. The following have been selected as the main indicators for ***Addressing future Infrastructural Needs*** in this respect. Not all of them are of equal importance. Please, divide 100 points over the listed indicators giving more points to those which you think are more important.

Table 5 Overall Objective: Addressing Future Infrastructural Needs

No	Indicators	Rating
1	Providing housing and infrastructure for increasing population	
2	Providing housing and infrastructure for future expectations	
3	Creating incentive for accelerated national growth	
4	Providing facilities for expanding government activities	

Section B1: The Client's expectations from Service providers

1: <u>Overall Objective</u>: CLIENT'S EXPECTATIONS FROM THE QUANTITY SURVEYOR

Question 1. In employing the services of a ***Quantity Surveyor*** for a building project the Client (government) has some expectations from them. The following have been selected as the main expectations. Not all of them are of equal importance. Please, divide 100 points over the listed expectations giving more points to those which you think are more important.

Table 6 Overall Objective: Client's Expectations from the Quantity Surveyor

No	Expectations	Rating
1	Providing good and reliable financial advice	
2	Efficient execution of the procurement process (especially, tendering)	
3	Accurate, fair and timely preparation of the valuation certificate	
4	Efficient performance of duties as per terms and conditions of appointment	

2: <u>Overall Objective</u>: CLIENT'S EXPECTATIONS FROM THE ARCHITECT

Question 2. In employing the services of a ***Architect*** for a building project the Client (government) has some expectations from them. The following have been selected as the main expectations. Not all of them are of equal importance. Please, divide 100 points over the following expectations giving more points to those which you think are more important.

Table 7 Overall Objective: Client's Expectations from Architect

No	Expectations	Rating
1	Providing acceptable design on time	
2	Providing team leadership	
3	Providing timely and comprehensive site instructions	
4	Effective site supervision and inspection	
5	Efficient performance of duties as per terms and conditions of appointment	

3: __Overall Objective__: CLIENT'S EXPECTATIONS FROM THE PROJECT MANAGER/MAIN CONSULTANT

Question 3. In employing the services of a ***Project Manager/Main Consultant*** for a building project the Client (government) has some expectations from them. The following have been selected as the main expectations. Not all of them are of equal importance. Please, divide 100 points over the following expectations giving more points to those which you think are more important.

Table 8 Overall Objective: Clients' Expectations from the Project Manager/Main Consultant

No	Expectations	Rating
1	Coordination and Teamwork	
2	Technical and managerial competence	
3	Delivery within the project estimated goals: ***time, cost, quality and scope***	
4	Ensuring compliance of all social and environmental regulations	
5	Efficient performance of duties as per terms and conditions of appointment	

4: __Overall Objective__: CLIENT'S EXPECTATIONS FROM THE CONSULTING ENGINEER

Question 4. In employing the services of a ***Consulting Engineer*** for a building project the Client (government) has some expectations from them. The following have been selected as the main expectations. Not all of them are of equal importance. Please, divide 100 points over the following expectations giving more points to those which you think are more important.

Table 9 Overall Objective: Clients' Expectations from the Consulting Engineer

No	Expectations	Rating
1	Providing timely, Complete, Comprehensive design	
2	Effective site supervision and inspection	
3	Provision of timely and comprehensive site instruction	
4	Efficient performance of duties as per terms and conditions of appointment	

5: <u>Overall</u>
<u>Objective</u>: CLIENT'S EXPECTATIONS FROM THE CONTRACTOR.

Question 5. In employing the services of a ***Contractor*** for a building project the Client (government) has some expectations from them. The following have been selected as the main expectations. Not all of them are of equal importance. Please, divide 100 points over the following expectations giving more points to those which you think are more important.

Table 10 Overall Objectives: Clients' Expectations from the Contractor

No	**Expectations**	**Rating**
1	Delivery within agreed project time	
2	Diligence to work	
3	Coordination of the specialists and sub-contractors' works	
4	Financial capacity	
5	Efficient performance of duties as per terms and conditions of appointment	

Section B2 Influence of identifiable factors on Project Performance

1. <u>Overall Objective</u>: INFLUENCE ON OVERALL PROJECT PERFORMANCE

Question 1. The ***service providers*** usually engaged by the client (government) as well as **other factors** contribute to the overall performance of projects. Not all contribute equally to the overall performance.
Please, divide 100 points over the following ***service providers*** giving more points to those which you think are more important when it comes to contributing the overall goal of project performance.

Table 11 Overall Objective: Influence of Service Providers

No	Factors	Rating
1	Quantity Surveyor	
2	Architect	
3	Project Manager	
4	Consulting Engineer	
5	Contractor	
6	Project Team	
7	Client's Organisation	
8	External Environment	

2: <u>Overall Objective</u>: EFFECT OF THE MAIN FACTORS ON THE PROJECT

IN CONTRIBUTING TO GOOD GOVERNANCE.

Question 2. The following factors (relating to service providers and others) have been identified as the main factors that affect the performance of the Project in terms of its ***Contributing to Good Governance.*** Not all of them have equal influence on the ***Contributing to Good Governance.*** Please, divide 100 points over the listed factors giving more points to those which you think are more important.

Table 12 Overall Objective: ***Effect of the Main Factors on project's Contributing Good Governance.***

No	Factors	Rating
1	Quantity Surveyor	
2	Architect	
3	Project Manager	
4	Consulting Engineer	
5	Contractor	
6	Project Team	
7	Client's Organisation	
8	External Environment	

2: <u>Overall Objective</u>: EFFECT OF THE MAIN FACTORS ON THE PROJECT

IN CONTRIBUTING TO NATIONAL INFRASTRUCTURE

Question 2. The following factors (relating to service providers and others) have been identified as the main factors that affect the performance of the Project in terms of its ***Contributing to National Infrastructure.*** Not all of them have equal influence on ***Contributing to National Infrastructure.*** Please, divide 100 points over the listed factors giving more points to those which you think are more important.

Table 13 Overall Objective: ***Effect of the Main Factors on project's Contribution to National Infrastructure.***

No	Factors	Rating
1	Quantity Surveyor	
2	Architect	
3	Project Manager	
4	Consulting Engineer	
5	Contractor	
6	Project Team	
7	Client's Organisation	
8	External Environment	

3: <u>Overall Objective</u>: EFFECT OF THE MAIN FACTORS ON THE PROJECT

IN ADDRESSING FUTURE INFRASTRUCTURAL NEEDS.

Question 3. The following factors (relating to service providers and others) have been identified as the main factors that affect the performance of the Project in terms of its ***Addressing future Infrastructural needs.*** Not all of them have equal influence on the project in ***Addressing future Infrastructural needs.*** Please, divide 100 points over the listed factors giving more points to those which you think are more important.

Table 14 Overall Objective: ***Effect of the project in Addressing future Infrastructural needs.***

No	Factors	Rating
1	Quantity Surveyor	
2	Architect	
3	Project Manager	
4	Consulting Engineer	
5	Contractor	
6	Project Team	
7	Client's Organisation	
8	External Environment	

Section C. Service Providers Influence on Project Performance

1. <u>Overall Objective</u>: CLIENT'S SATISFACTION ACROSS THE PRODUCT

LIFE CYCLE

Question 1. The level of satisfaction of the needs of the government as a client may vary across the project life cycle. Not all of them are of equal importance. Please, divide 100 points over the following ***Project life cycle*** giving more points to those stages which you think give more satisfaction to the client (government).

Table 15 Overall Objective: Influence of Service Providers

No	Expectations	Rating
1	Inception stage	
2	Execution Stage	
3	Commissioning Stage	
4	Use stage	

Section D Important Criteria to the Client for Satisfaction and Project Performance

1. <u>Overall Objective</u>: Project Performance Criteria

Question 1. The following has been identified variously used as criteria for project performance. Not all of them are of equal importance to the client (government)
Not all of them are of equal importance. Please, divide 100 points over the listed criteria giving more points to those which you think are more important.

Table 16 Overall Objective: Project Performance

No	Expectations	Rating
1	Cost	
2	Time	
3	Quality	
4	Environmental Impact	
5	Social Impact	
6	Management & Execution Efficiency	
7	Service providers*	
8	Client's Needs	

* This represents the overall performance of all whose services are engaged to execute the project: *Quantity Surveyor, Architect, Project Manager/Main Consultant, Consulting Engineer, Contractor.*

1. Section E. Trade-offs between Criteria

Question 1. ***Cost*** and ***Time*** are selected as the easily quantifiable criteria among the rest. You are expected to indicate in percentage terms how much more
(in percentages e.g. 10%, 20%, 50% etc.) you will be prepared to spend on Cost and Time to achieve enhanced performance of the others.

Table 17 Trade-offs between Cost, Time and other criteria.

Criteria	**Cost**	**Time**
Environmental Impacts		
Social Impact		
Quality		
Service Providers		
Time		xxx
Cost	xxx	

APPENDIX 8: Analyses of Practitioners' Responses for Questionnaires 1

Section A. Dimension and Criteria

Table1a Traditional Dimensions

No.	Dimension	Response	%	Rank
1	Cost	63	97	2
2	Time	65	100	1
3	Quality	50	77	3
4	Clients' Satisfaction	41	63	4

Table1b. Non-Traditional Dimensions

No.	Dimension	Response	%	Rank
1	**Knowledge creation**	27	41.5	7
2	**Business success**	27	41.5	7
3	Innovation and learning	30	46.2	6
4	Financial/ commercial success	30	46.2	6
5	Future perspective	20	30.8	11
6	Project execution efficiency	45	69.2	2
7	**Market impact**	25	38.5	8
8	Managerial	31	47.7	5
9	**Organizational**	20	30.8	11
10	**Personal growth (of key participants)**	22	33.9	9
11	**Completeness of design**	21	32.3	10
12	**Buidability**	36	55.5	4
13	**Meeting design goals**	36	55.4	4
14	**Benefit to end user**	55	84.6	1
15	Benefit to national infrastructure (development)	37	56.9	3
16	Environmental impact assessment	37	56.9	3
17	Overall success.	22	33.9	9

Table 2 Cost

No.	Criteria	Response	%	Rank
1	Variation between contract sum and final account	55	84.6	1
2	Costs relation to the environmental issues	17	26.2	6
3	Managerial costs (consultancies etc)	37	56.9	3
4	Costs in relation to insurance claims	20	30.8	5
5	Fluctuations costs	48	73.9	2
6	Variation costs	48	73.9	2
7	Legal costs	15	23.1	7
8	Dispute costs	5	7.69	8
9	Accident costs	29	44.6	4
10	Costs of reworks	29	44.6	4

Table 3 Time

No.	Criteria	Response	%	Rank
1	Variation between estimated and actual completion time	65	100	1
2	Actual commencement time	31	47.7	7
3	Time for evaluation and certification	40	61.5	4
4	Actual time for honouring certificates as against agreed	56	86.2	2
5	Actual times for completion of planned activities as against schedules	45	69.2	3
6	Actual times for site meetings as against estimated	33	50.8	6
7	Dispute resolution times	22	33.9	
8	Time for arrival of supplies (materials)	35	53.9	5
9	Times for inclement weather	20	30.8	9
10	Times for industrial activities/strikes etc.	25	38.5	8
11	Times taken by accidents and injuries	10	15.4	12
12	Times for rework	19	29.2	10
13	Time for addressing environmental issues	12	18.5	11

Table 4 Technical Quality

No.	Criteria	Response	%	Rank
1	Major variation between original design and actual completed work	55	84.6	1
2	Number of reworks	28	43.1	6
3	Extent of reworks	35	53.8	5
4	Records of material tests	45	69.2	4
5	Records of service tests	42	64.6	
6	Record of engineers'/architects' approvals	47	72.3	3
7	Records of engineers disapprovals	47	72.3	3
8	Records for variations orders	45	69.2	4
9	Technical specifications for variations	52	80.0	2

Table 5 Managerial

No.	Criteria	Response	%	Rank
1	Risk management	25	38.5	6
2	Budget management	39	60.0	3
3	Test management	8	13.3	7
4	Communication with team and workers	30	46.2	5
5	Personnel management	45	69.2	2
6	Decision making procedures	38	58.5	4
7	Communication and reports	38	58.5	4
8	Configuration control	8	12.3	7
9	Resource and schedule control	38	58.5	4
10	QS services	50	76.9	1
11	Architectural services	45	69.2	2
12	Engineering services	45	69.2	2

Table 6 Innovation and Learning

No.	Criteria	Response	%	Rank
1	Uniqueness of the project	37	56.9	2
2	Creating a spin-off to other products	30	46.2	5
3	Allowing a considerable learning effect during product development	23	35.4	7
4	Through variations	23	35.4	7
5	Resulting from site condition challenges	38	58.5	1
6	Resulting from buildability challenges	32	49.2	4
7	Resulting from contract peculiarities	35	53.8	3
8	Resulting from project typology	27	41.5	6
9	Resulting from personnel management issues	30	46.2	5
10	Resulting from external environmental issues (e.g. politics, economics etc)	38	58.5	1
11	Resulting from project management challenges	35	53.9	3
12	Resulting from disputes	8	12.3	8
13	Resulting from safety issues	23	35.4	
14	Developing a new technology	32	49.2	4

Table 7 Environmental Impact Assessment s

No.	Criteria	Response	%	Rank
1	Construction waste handling	50	76.9	1
2	Records of communal/societal complaints regarding environmental issues	43	66.2	2
3	Records from E I A	27	41.5	3

Table 8 Project Execution Efficiency

No.	Criteria	Response	%	Rank
1	Contractors diligence to work	50	76.9	1
2	Contractors response to architects/engineers instructions	50	76.9	1
3	Number of reworks	25	38.5	8
4	Extent of reworks	30	46.2	6
5	Site organisation	45	69.2	2
6	Frequency of variation orders	27	41.5	7
7	Consistency of variation orders	27	41.5	7
8	Regularity of site meetings	37	56.9	5
9	Relationship between expected and actual outputs	43	66.2	3
10	Time for honouring payment certificates	45	69.2	2
11	Effective health and safety measures	27	41.5	7
12	Project going on schedule	42	64.6	4
13	Project going with budget	45	69.2	2

Table 9 Customer Perspective

No.	Criteria	Response	%	Rank
1	Initial cost to end user	42	64.6	1
2	Cost-in-use to end user	33	50.8	6
3	Functionality to end user: location, comfort, aesthetics, utility, etc.	39	60.0	3
4	Solving customer problems	37	46.2	4
5	Reflection of the desired corporate image	37	56.9	4
6	Aesthetic appeal (design, concept, finishing)	37	56.9	4
7	Adequacy of service installations -electrical and mechanical(positioning, quality, and functioning	33	50.8	6
8	Adequacy of internal functional areas (spatial adequacy/optimum layout)	33	50.8	6
9	Adequacy of security facilities (quality, positioning and functions of gadgets for fire fighting, & burglar alarm/fencing)	35	58.9	5
10	Adequacy of external functional area (spatial adequacy and layout of parking lots, garages, gardens/ landscaping, etc)	40	61.5	2

Table 10 Financial and Commercial

No.	Criteria	Response	%	Rank
1	Commercial results	35	53.9	2
2	Cash-flow generation	45	69.2	1
3	Profit generation	25	38.5	3

Table 11 Contribution to Business

No.	Criteria	Response	%	Rank
1	Building a positive image of the client's company	48	73.8	1
2	Contributing to the innovation profile of the company	42	64.6	2
3	Causing the firm's growth	27	41.5	7
4	Acquiring greater market share	25	38.5	8
5	Having a large impact on the company's future	27	41.5	7
6	Creating a new market	32	49.2	4
7	Creating a large market	25	38.5	8
8	Creating a new product line	30	46.1	5
9	Developing a new technology	25	38.5	8
10	Competitive advantage	35	53.8	3
11	Improvement in organization's performance	29	44.6	6

Table 12 Benefit to National Infrastructure

No.	Criteria	Response	%	Rank
1	Developed a new technological capability	26	46.0	4
2	Contributed to critical fields of national interest	35	53.8	3
3	Decreases dependence on outside sources or help	38	55.4	1
4	Contributing to other projects	38	55.4	1

Table 13 Future Perspective

No.	Criteria	Response	%	Rank
1	Long term benefits	50	76.9	1
2	Preparing organization for future	37	56.9	2
3	Preparing technological infrastructure for the future	32	49.2	3

Section B Factors Groups

Table 14 Factors Related to Project

No.	Factors	Rankings								Total	
		4		3		2		1			
		No.	%	No.	%	No.	%	No.	%	No.	%
1	Project Type	30	46.2	20	30.8	0	0.0	8	12.3	58	89.2
2	Project Value	25	38.5	8	12.3	13	20	5	7.7	51	78.5
3	Uniqueness of Project Activities	13	20.0	8	12.3	17	26.1	10	15.4	48	73.8
4	Project Duration	13	20.0	22	33.9	15	23.1	0	0.0	50	76.9
5	Urgency	17	26.2	15	23.1	7	10.8	8	12.3	47	72.3

Table 15 Factors Related to Project Manger

No.	Factors	Rankings								Total	
		4		3		2		1			
		No.	%	No.	%	No.	%	No.	%	No.	%
1	Ability to coordinate	30	46.2	15	23.1	2	3.1	0	0.0	47	72.3
2	Ability to delegate authority	22	33.9	30	46.2	5	7.7	8	12.3	65	100.0
3	Ability to take decisions when necessary	40	61.5	17	26.1	5	15.4	2	3.1	64	98.5
4	Ability to trade-off among competing requirements	32	49.2	21	32.3	10	15.4	2	3.1	65	100.0
5	Competence	47	72.3	10	15.4	2	3.01	0	0.0	59	90.8
6	Commitment	31	47.9	15	23.1	8	12.3	5	7.7	61	93.8

Table 16 Factors Related to Project Team Members

No.	Factors	Rankings								Total	
		4		3		2		1			
		No.	%	No.	%	No.	%	No.	%	No.	%
1	Technical background	60	92.3	5	7.7	0	0.0	0	0.0	65	100.0
2	Communication	30	46.1	25	38.5	5	7.7	2	3.1	62	95.3
3	Relationship among them	25	38.5	22	33.9	10	15.4	0	0.0	57	87.7
4	Commitment	30	46.1	20	30.8	10	15.4	2	3.1	62	95.3
5	Competence	41	63.0	15	23.1	7	10.8	0	0.0	64	98.5

Table 17 Factors Related to Client's Organisation

No.	Factors	Rankings								Total	
		4		3		2		1			
		No.	%	No.	%	No.	%	No.	%	No.	%
1	Top management support throughout the project life	42	64.6	12	18.5	7	10.8	2	3.1	63	96.9
2	Project organization structure	18	27.7	30	46.1	10	15.4	5	7.7	63	96.9
3	Functional manager's support	24	36.9	22	33.9	13	20.0	5	0.0	64	98.5
4	Relationship with project team members	24	36.9	30	46.1	7	10.8	0	0.0	61	93.8

Table 18 Factors Related to the External Environment

No.	Factors	Rankings								Total	
		4		3		2		1			
		No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	No.	%
1	Political	35	53.9	17	26.2	4	6.2	7	10.8	63	96.9
2	Economic	35	53.9	17	26.2	4	6.2	2	3.1	58	89.3
3	Social environment	20	30.8	17	26.2	22	33.9	2	3.1	61	93.8
4	Technological environment	11	16.9	16	24.6	31	47.7	0	0.0	58	89.2
5	Nature/weather	10	15.4	15	23.1	21	32.3	7	10.7	63	96.9
6	Client	30	46.2	10	15.4	2	3.1	5	7.7	57	87.7
7	Competitors	8	12.3	22	33.8	7	10.7	12	18.5	49	75.4
8	Sub-contractors	8	12.3	27	41.5	4	6.2	12	18.5	51	78.5

Table 19 Intermediate Factors

No.	Factors	Rankings								Total	
		4		3		2		1			
		No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	No.	%
1	Client consultation & acceptance	40	61.5	15	23.1	0	0.0	0	0.0	55	84.6
2	Effective planning & scheduling	43	66.2	12	18.5	0	0.0	0	0.0	55	84.6
3	Effective coordinating and communication	13	20.0	20	30.8	0	0.0	0	0.0	33	50.8
4	Effective control & monitoring	35	53.9	15	23.1	2	3.1	0	0.0	57	87.7
5	Effective use of technology	20	30.8	15	23.1	13	20.0	2	3.1	50	76.9
6	Resource sharing documentation	2	3.1	27	41.5	13	20.0	0	0.0	42	64.6
7	Variations	20	30.8	17	26.2	10	15.4	0	0.0	47	72.3
8	Work breakdown structure	17	26.2	20	30.8	10	15.4	5	7.7	52	80.0
9	Quality management	20	30.8	30	46.2	7	10.8	0	0.0	57	87.7
10	Project preliminary estimates	22	33.9	22	33.9	5	7.7	2	3.1	51	78.5
11	Availability of resources –human, financial, raw materials	37	56.9	12	18.5	5	7.7	0	0.0	54	83.1
12	Client attitude towards payments –consultancy fees, interim certificates etc	40	61.5	12	18.5	2	3.1	0	0.0	54	83.1
13	Financial management	25	38.5	25	38.5	5	7.7	0	0.0	55	84.6
14	Risk management	8	12.3	25	38.5	15	23.1	3	4.6	51	78.5
15	Start-up difficulties	12	18.5	25	38.5	12	18.5	8	12.3	57	87.7
16	Bureaucracy	15	23.1	17	26.2	15	23.1	7	10.8	54	83.1

Section C. Procurement as a Factor

Table 20 Procurement

No.	Procurement Types	No.	%	Rank
1	Traditional competitive tendering	50	76.0	1
2	Negotiated contract	47	72.3	2
3	Serial tendering	15	23.1	6
4	Design and Build	30	24.6	3
5	Management contracts	22	33.1	4
6	Indefinite quantity indefinite delivery (IQID)	0	0.0	10
7	Build Own Operate Transfer (BOOT)	22	33.9	4
8	Build Own Operate (BOO)	15	23.1	6
9	Design Build Operate (DBO)	17	26.2	5
10	Lease Own Operate (LOO)	10	15.4	8
11	Build, Operate and Renewal of Concession	7	10.8	9
12	Build, Rent and Transfer	30	46.2	3
13	Build Transfer and Operate	7	10.8	9
14	Design, Build, Finance and Operate	7	10.8	9
15	Design, Construct, Manage and Finance	12	18.5	7
16	Modernise, Operate and Transfer	10	15.4	8
17	Rehabilitate, Own and Transfer	15	23.1	6

Table 21 Does Procurement have effect on Project Performance?

No.	Indicators	Response	%	Rank
1	Strongly agree	17	26.2	1
2	Agree	12	18.5	2
3	Somehow agree	10	15.4	3
4	Disagree	12	18.5	2
5	Some of the types	2	3.1	4

Table 22 Conditions under which Procurement Affect Project

No.	Indicators	Response	%	Rank
1	When it is new to the environment	17	26.2	3
2	When it is too complex to run	17	26.2	3
3	When it does not fit in the existing construction industry structure	22	33.9	2
4	When it does not fit in the socio-economic setting	15	23.9	4
5	When it is misapplied	25	38.5	1
6	When terms are not strictly adhered to	17	26.2	3

Table 23 Does Procurement Lead to Project Success/failure?

No.	Indicators	Response	%	Rank
1	Yes	48	73.9	1
2	No	2	3.1	3
3	Somehow	10	15.4	2

Section D Estimating Clients' Requirements and Satisfaction Criteria

Table 24 Real Estate Developers

No.	Needs/Objectives	Rankings								Total	
		4		3		2		1			
		No.	%	No.	%	No.	%	No.	%	No.	%
1	For Profit	37	56.9	0	0.0	0	0.0	0	0.0	37	56.9
2	Speculative purposes, anticipating demand	10	15.4	27	41.6	2	3.1	0	0.0	39	60.0
3	To maintain/improve market share	5	7.7	15	1523.1	12	18.5	7	10.8	39	60.0
4	To achieve sales targets	17	26.2	2	3.1	12	18.5	7	10.8	38	58.5

Table 25 Government Agencies

No.	Needs/Objectives	Rankings								Total	
		4		3		2		1			
		No.	%	No.	%	No.	%	No.	%	No.	%
1	To satisfy social need	37	56.92	7	10.77	0	0.0	0	0.0	44	67.7
2	To regulate the economy e.g. create jobs, inject funds etc.	20	30.8	25	38.46	2	3.1	0	0.0	47	72.3
3	To generate income	11	16.9	20	30.8	7	10.8	7	10.8	45	69.2
4	For prestige, national pride	7	10.8	20	30.8	12	18.5	2	3.1	41	63.1
5	To satisfy international objective	5	7.7	25	38.5	15	23.1	2	3.1	47	72.3

Table 26 Investors

No.	Needs/Objectives	Rankings								Total	
		4		3		2		1			
		No.	%	No.	%	No.	%	No.	%	No.	%
1	For business expansion, market share improvement, competitive	25	38.5	14	21.5	0	0.0	0	0.0	39	60.0
2	For diversification purposes	8	12.3	11	16.9	6	9.2	0	0.0	25	38.5
3	To match fund liability with property asset base	11	16.9	6	9.2	7	10.8	2	3.1	26	40.0
4	To minimize investment risks believing that property is a comparatively low risk and stable investment vehicle	14	21.5	9	13.8	7	10.8	0	0.0	30	46.2
5	To achieve capital growth/ long-term retention of funds against inflation	14	21.5	12	18.5	7	10.8	0	0.0	33	50.8
6	To achieve desired returns on investment/ profitability levels	15	23.1	2	3.1	2	3.1	0	0.0	19	29.2
7	Speculative, to meet anticipated demand	12	18.5	14	21.5	10	15.4	4	6.2	40	61.5

Table 27 Owner Occupiers

No.	Needs/Objectives	Rankings								Total	
		4		3		2		1			
		No.	%	No.	%	No.	%	No.	%	No.	%
1	For business expansion/market share improvements, competitive position	17	26.2	15	23.1	5	7.7	2	3.1	39	60.0
2	To minimize rental costs in long-term leasehold, resulting from leasehold decision	7	10.8	21	32.3	2	3.1	2	3.1	32	49.2
3	To improve on capital assets of the firm	10	15.4	12	18.5	7	10.8	0	0.0	29	44.6
4	To enhance corporate image	4	6.2	15	23.1	5	7.7	0	0.0	24	36.9
5	To acquire or extend infrastructure facilities with a view to enhancing business process	17	26.2	28	43.1	2	3.1	2	3.1	49	75.4

Section E. Estimating Client's Expectations from Service Providers

Table 28 Quantity Surveyors

No.	Needs/Objectives	Rankings								Total	
		4		3		2		1			
		No.	%	No.	%	No.	%	No.	%	No.	%
1	Accurate and reliable budget estimate	40	61.5	5	7.7	3	4.6	0	0.0	48	73.8
2	Efficiency (timely job execution)	30	46.2	25	23.1	3	4.6	0	0.0	58	89.2
3	Competency (expertise and experience)	20	30.8	25	38.5	3	4.6	3	4.6	51	78.5
4	Ability to foresee and budget for potential inflation	20	30.8	22	33.9	0	0.0	0	0.0	44	67.7
5	Efficient performance of duties as per terms and conditions of appointment	20	30.8	20	30.8	3	4.6	0	0.0	43	66.1

Table 29 Architects

No.	Needs/Objectives	Rankings								Total	
		4		3		2		1			
		No.	%	No.	%	No.	%	No.	%	No.	%
1	Flexibility in design (to accommodate future changes)	20	30.8	12	18.5	2	3.1	0	0.0	34	52.3
2	Buildability of design	25	38.5	15	23.1	2	3.1	0	0.0	42	64.6
3	Efficiency (supervision, instructions etc.)	22	33.9	15	23.1	5	7.8	0	0.0	44	67.7
4	Aesthetic appeal	17	26.2	10	15.4	10	15.4	0	0.0	37	56.9
5	Delivery within time	25	38.5	15	23.1	0	0.0	2	3.1	42	64.6
6	Efficient performance of duties as per terms and conditions of appointment	23	35.4	10	15.4	2	3.1	0	0.0	35	53.8

Table 30 Project Managers

No.	Needs/Objectives	Rankings								Total	
		4		3		2		1			
		No.	%	No.	%	No.	%	No.	%	No.	%
1	Technical and managerial competencies/ experience	28	43.1	10	15.4	3	4.6	0	0.0	41	63.1
2	Team work and efficient co-ordination	25	38.5	15	23.1	4	6.2	1	1.5	45	69.2
3	Delivery within time, cost and cost targets	35	53.8	12	18.5	0	0.0	0	0.0	47	72.3
4	Manage clients changes efficiently	22	33.9	20	30.8	0	0.0	0	0.0	44	67.7
5	Efficient performance of duties as per terms and conditions of appointment	30	46.2	12	18.5	4	6.2	0	0.0	46	70.8

Table 32 Consulting Engineers

No.	Needs/Objectives	Rankings								Total	
		4		3		2		1			
		No.	%	No.	%	No.	%	No.	%	No.	%
1	Safe and economic design	25	38.5	10	15.4	0	0.0	0	0.0	35	53.8
2	Sustainability/flexibility in design and construction	17	26.2	25	38.5	0	0.0	0	0.0	42	64.6
3	Timely delivery	1	1.5	25	38.5	13	20.0	4	6.2	33	50.8
4	Workable	2	3.1	13	20.0	26	40.0	3	4.6	44	67.6
5	Efficient performance of duties as per terms and conditions of appointment	10	15.4	0	0.0	7	10.8	0	0.0	17	26.2

Table 32 Contracting Service

No.	Needs/Objectives	Rankings								Total	
		4		3		2		1			
		No.	%	No.	%	No.	%	No.	%	No.	%
1	Delivery within agreed time, quality and cost targets	35	53.9	7	10.7	3	4.6	0	0.0	45	69.2
2	Minimise cost (avoiding on site and material waste	20	30.8	12	18.5	4	6.2	0	0.0	36	55.4
3	Technical and managerial competence	25	38.5	17	26.2	4	6.2	0	0.0	46	70.8
4	Accommodating client changes in good faith	12	18.5	20	26.2	5	7.7	1	1.5	38	58.5
5	Efficient coordination of the specialist and sub-contractors' works	12	18.5	20	30.8	4	6.2	0	0.0	36	55.4
6	Financial capacity and adequate guarantee against own and sub-contractors' default	15	23.1	15	23.1	7	10.7	0	0.0	37	56.9
7	Efficient performance of duties as per terms and conditions of appointment	30	46.2	5	7.7	10	15.4	0	0.0	45	69.2

Table 33 Client's Responsibility

No.	Needs/Objectives	Rankings								Total	
		4		3		2		1			
		No.	%	No.	%	No.	%	No.	%	No.	%
1	Reasonable expectation	17	26.2	20	30.8	1	1.5	0	0.0	38	58.5
2	Seeking professional advice in investment decisions	25	38.1	15	23.1	4	6.2	0	0.0	44	67.6
3	Disclosing all motives for investment at the outset to project team	15	23.1	12	18.4	10	15.4	7	10.8	44	67.6
4	Fulfilments of contractual obligation	22	33.9	15	23.1	7	10.8	0	0.0	44	67.6
5	Employment of specialists in the management and executions of all critical aspects of the work	10	15.4	17	26.2	0	0.0	0	0.0	37	56.9
6	Reasonable expectation	22	33.9	0	0.0	0	0.0	0	0.0	22	33.9

APPENDIX 9: Analyses of Practitioners' Responses for Questionnaires 2

Table 1 Main Measures of Assessment

Measures	**Level of Importance**				**µ**	**σ**	**t-values**
Criteria	**4**	**3**	**2**	**1**			
Cost	25	3	0	0	3.89	0.31	15
Time	21	3	4	0	3.61	0.74	4.357
Technical Quality	17	9	1	1	3.50	0.74	3.550
Client Satisfaction	15	11	2	0	3.46	0.64	3.855
Managerial	8	8	10	2	2.78	0.98	-1.185
Innovation and learning	2	9	15	2	2.39	0.74	-4.357
Environmental Impact Assessment (EIA)	6	9	10	3	2.65	0.95	-1.987
Project Execution Efficiency	9	13	6	0	3.11	0.74	0.769
Customer Perspective	6	9	10	3	2.65	0.95	-1.987
Financial/ Commercial	5	13	8	2	2.75	0.84	-1.567
Contribution to Business	3	11	11	3	2.50	0.84	-3.154
Benefit to National Infrastructure	4	11	11	2	2.61	0.84	-2.499
Future Perspective	4	8	14	2	2.50	0.84	-3.154
Cost							
Variation between contract sum and final account	21	4	2	1	3.61	0.78	4.088
Costs relation to the environmental issues	6	8	12	2	2.64	0.91	-2.073
Managerial costs (consultancies etc)	7	12	7	2	2.86	0.89	-0.848
Costs in relation to insurance claims	4	9	12	3	2.50	0.88	-3
Fluctuations costs	15	9	3	1	3.36	0.83	2.287
Variation costs	19	7	2	0	3.61	0.63	5.108
Legal costs	0	6	18	4	2.07	0.60	-8.132
Dispute costs	0	5	15	8	1.89	0.68	-8.549
Accident costs	0	8	13	7	2.03	0.74	-6.854
Cost of incompletion	4	12	8	4	2.57	0.92	-2.465
Cost of capital	9	11	5	3	2.93	0.98	-0.386
Cost of land/site	7	13	7	1	2.93	0.81	-0.465
Time							
Variation between estimated and actual completion time	19	6	3	0	3.57	0.69	4.382
Actual commencement time	15	11	2	0	3.46	0.64	3.855
Time for evaluation and certification	10	9	9	0	3.03	0.84	0.225
Actual time for honouring certificates as against agreed	14	7	7	0	3.25	0.84	1.567
Actual times for completion of planned activities as against schedules	8	11	4	5	2.78	1.07	-1.063
Actual times for site meetings as against estimated	2	11	8	7	2.28	0.94	-4.033
Dispute resolution times	2	10	8	8	2.21	0.96	-4.346
Time for arrival of supplies (materials)	12	10	3	3	3.10	0.99	0.570
Times for inclement weather	4	10	7	7	2.39	1.03	-3.117
Times for industrial activities/strikes etc.	1	10	11	6	2.21	0.83	-4.994
Time for resource mobilisation	7	15	1	5	2.86	1.01	-0.75
*Time for executing variation/**rework***	4	19	2	3	2.86	0.80	-0.941
Time for issuing and implementing site proceeding	9	9	4	6	2.75	1.14	-1.158

Table 1 continued.

Measures	Level of Importance				µ	σ	t-values
Quality	**4**	**3**	**2**	**1**			
Major variation between original design and actual completed work	14	11	3	0	3.39	0.68	3.034
Number of reworks	6	13	6	3	2.78	0.92	-1,236
Extent of reworks	6	11	9	2	2.75	0.89	-1,491
Records of material tests	10	7	9	2	2.89	0.99	-0,570
Records of service tests	8	8	8	4	2.71	1.05	-1,441
Record of engineers'/architects' approvals	9	8	11	0	2.93	0.86	-0,441
Records of engineers disapprovals	6	9	11	2	2.68	0.90	-1,880
Records for variations orders	10	12	6	0	3.14	0.75	1
Technical specifications for variation	9	10	7	2	2.93	0.94	-0,402
Managerial							
Risk management	8	16	3	1	3.11	0.74	0.769
Budget management	18	9	1	0	3.61	0.57	5.667
Test management	6	12	8	2	2.79	0.87	-1.294
Communication with team and workers	13	12	3	0	3.36	0.68	2.785
Personnel management	9	15	4	0	3.18	0.67	1.411
Decision making procedures	8	14	5	1	3.03	0.79	0.238
Communication and reports	9	14	5	0	3.14	0.70	1.072
Configuration control	4	13	7	4	2.61	0.91	-2.268
Resource and schedule control	9	16	3	0	3.21	0.63	1.800
QS services	19	8	1	0	3.64	0.56	6.088
Architectural services	22	6	0	0	3.78	0.42	9.950
Engineering services	13	10	4	1	3.25	0.84	1.567
Innovation and Learning							
Uniqueness of the project	15	6	5	2	3.21	0.99	1.140
Creating a spin-off to other products	1	17	6	4	2.53	0.79	-3.100
Allowing a considerable learning effect during product development	4	14	8	2	2.71	0.81	-1.867
Through variations	0	15	11	2	2.46	0.64	-4.448
Resulting from site condition challenges	9	9	9	1	2.93	0.90	-0.420
Resulting from buildability challenges	6	14	6	2	2.86	0.85	-0.891
Resulting from contract peculiarities	5	13	8	2	2.75	0.84	-1.567
Resulting from project typology	5	14	5	4	2.71	0.94	-1.613
Resulting from personnel management issues	2	14	10	2	2.57	0.74	-3.057
Resulting from external environmental issues (e.g. politics, economics etc)	11	8	6	3	2.96	1.03	-0.182
Resulting from project management challenges	6	15	6	1	2.93	0.77	-0.493
Resulting from disputes	5	9	11	3	2.57	0.92	-2.465
Resulting from safety issues	3	14	10	1	2.68	0.72	-2.353
Developing a new technology	6	10	11	1	2.75	0.84	-1.567
EIA							
Construction waste handling	10	12	4	2	3.07	0.90	0.420
Records of communal/societal complaints regarding environmental issues	5	13	8	2	2.75	0.84	-1.5679
Records from E I A department	5	10	12	1	2.68	0.00	-2.077

Table 1 continued.

Key Measures	Level of Importance				μ	σ	t-values
	4	3	2	1			
PEE							
Contractors diligence to work	20	8	0	0	3.71	0.46	8.216
Contractors response to architects/engineers instructions	18	10	0	0	3.64	0.49	6.971
Number of reworks	6	12	8	2	2.78	0.88	-1.294
Extent of reworks	7	14	5	2	2.93	0.86	-0.441
Site organisation	12	12	3	1	3.25	0.80	1.655
Frequency of variation orders	12	9	7	0	3.18	0.82	1.154
Consistency of variation orders	13	10	4	1	3.25	0.84	1.5679
Regularity of site meetings	8	14	4	2	3.00	0.86	0
Relationship between expected and actual outputs	14	10	2	2	3.28	0.90	1.686
Time for honouring payment certificates	15	11	2	0	3.46	0.64	3.855
Effective health and safety measures	10	10	7	1	3.03	0.88	0.214
Project going on schedule	14	8	5	1	3.25	0.89	1.491
Project going with budget	16	12	0	0	3.57	0.50	6
Proper budgeting preceding project	15	9	4	0	3.39	0.74	2.819
Complete designs before proceeding	14	9	5	0	3.32	0.78	2.202
Customer Perspective							
Initial cost to end user	15	8	5	0	3.36	0.38	2.423
Cost-in-use to end user	9	9	8	2	2.89	- 0.11	-0.593
Functionality to end user: location, comfort, aesthetics, utility, etc.	12	12	3	1	3.25	0.25	1.655
Solving customer problems	9	16	0	3	3.11	0.11	0.648
Reflection of the desired corporate image	7	12	7	2	2.86	- 0.14	-0.848
Aesthetic appeal (design, concept, finishing)	12	16	0	0	3.43	0.43	4.500
Adequacy of service installations -electrical and mechanical (positioning, quality, and functioning)	13	11	4	0	3.32	0.32	2.353
Adequacy of internal functional areas (spatial adequacy/optimum layout)	10	9	9	0	3.03	0.04	0.225
Adequacy of security facilities (quality, positioning and functions of gadgets for fire fighting, & burglar alarm/fencing)	11	9	8	0	3.11	0.11	0.682
Adequacy of external functional area (spatial adequacy and layout of parking lots, garages, gardens/ landscaping, etc)	8	10	10	0	2.93	- 0.07	-0.465
Finance and Commerce							
Commercial results	9	8	11	0	2.93	0.86	-0.441
Cash-flow generation	11	9	8	0	3.11	0.83	0.682
Profit generation	12	9	7	0	3.18	0.82	1.154

Table 1 continued

Key Measures	Level of Importance				µ	σ	t-values
	4	3	2	1			
Contribution to Business							
Building a positive image of the client's company	13	8	4	3	3.11	1.03	0.550
Contributing to the innovation profile of the company	7	12	7	2	2.86	0.89	-0.848
Causing the firm's growth	7	11	10	0	2.89	0.78	-0.721
Acquiring greater market share	11	11	6	0	3.18	0.77	1.223
Having a large impact on the company's future	8	12	8	0	3.00	0.77	0
Creating a new market	6	11	8	3	2.71	0.94	-1.613
Creating a large market	5	9	12	2	2.61	0.87	-2.375
Creating a new product line	5	8	11	4	2.50	0.96	-2.749
Developing a new technology	8	6	11	3	2.68	1.03	-1.667
Competitive advantage	8	11	6	3	2.86	0.97	-0.779
Improvement in organization's performance	10	8	6	4	2.86	1.08	-0.701
Benefit to National Infrastructure							
Developed a new technological capability	6	11	10	1	2.78	0.83	-1.362
Contributed to critical fields of national interest	7	10	7	2	2.85	0.92	-0.849
Decreases dependence on outside sources or help	7	9	10	2	2.75	0.93	-1.425
Contributing to other projects	5	10	11	2	2.64	0.87	-2.173
Adding onto infrastructural stocks	9	8	10	1	2.89	0.92	-0.619
Indicator towards good governance	7	8	8	5	2.61	1.06	-1.950
Future Perspective							
Long term benefits	15	12	0	1	3.46	0.69	3.545
Preparing organization for future	8	16	2	2	3.07	0.81	0.465
Preparing technological infrastructure for the future	7	9	11	1	2.78	0.87	-1.294
Creating incentives for accelerated national development	10	8	8	2	2.93	0.98	-0.386

Table 2 Factors tat Affect Project Performance

Key Measures	Level of Importance				µ	σ	t-values
Factors Related to the Project	**4**	**3**	**2**	**1**			
Project type	14	8	6	0	3,28	0.811	1.866
Project value	14	8	5	1	3,25	0.89	1.491
Uniqueness of project activities	11	11	6	0	3,19	0.77	1.223
Project duration	10	12	5	1	3,11	0.83	0.682
Urgency	9	13	4	2	3,04	0.88	0.214
Project location	8	13	5	2	2,96	0.88	-0.214
Contractor's experience	17	11	0	0	3,61	0.50	6.460
Project definition	10	13	4	1	3,14	0.80	0.941
Buildability	11	14	2	1	3,25	0.75	1.760
Project Density	6	14	6	2	2,86	0.85	-0.891
Factors Related to the Project Manager/Consultants							
Ability to coordinate	25	3	0	0	3,89	0.31	15
Ability to delegate authority	11	14	2	1	3,25	0.75	1.760
Ability to take decisions when necessary	16	12	0	0	3,57	0.50	6.00
Ability to trade-off among competing requirements	8	16	4	0	3,14	0.65	1.162
Competence	18	10	0	0	3,64	0.49	6.971
Commitment	17	9	2	0	3,53	0.64	4.448
Knowledge in/about local condition	9	10	8	1	2,96	0.88	-0.214
Ability to lead	15	10	3	0	3,43	0.69	3.286
Strong sense of accountability	8	12	7	1	2,96	0.84	-0.225
Arbitration skills	5	12	9	2	2,71	0.85	-1.769
Communicate effectively	14	12	1	1	3,39	0.74	2.819
Perception of his role and responsibilities	11	13	3	1	3,21	0.79	1.441
Factors Related to the Project Team							
Technical background	21	7	0	0	3,75	0.44	9
Communication	16	12	0	0	3,57	0.50	6
Relationship among them	11	15	2	0	3,32	0.61	2.780
Commitment	21	6	1	0	3,71	0.53	7.071
Competence	21	7	0	0	3,75	0.44	9
Ability to work as a team	18	9	0	1	3,57	0.69	4.382
Factors Related to the Client Organisation							
Top management support throughout the project life	23	4	1	0	3,78	0.50	8.337
Project organization structure	8	17	3	0	3,18	0.61	1.544
Functional manager's support	8	17	3	0	3,18	0.61	1.544
Relationship with project team members	12	14	2	0	3,36	0.62	3.041
Ability to take decisions	20	6	2	0	3,64	0.62	5.473
Technical ability	15	11	1	1	3,43	0.74	3.057
Understanding project cycle and procedure	9	17	2	0	3,25	0.58	2.260
Relationship with contractor	8	18	2	0	3,21	0.57	1.996
Factors Related to the External Environment							
Political	16	8	4	0	3,43	0.74	3.057
Economic	15	10	3	0	3,43	0.69	3.286
Social environment	6	16	6	0	3	0.67	0
Technological environment	7	17	4	0	3,11	0.63	0.901
Nature/weather	8	8	11	1	2,82	0.90	-1.04
client	12	13	2	1	3,28	0.76	1.982
competitors	5	16	5	2	2,86	0.80	-0.941
Sub-contractors	8	13	7	0	3,03	0.74	0.254
Suppliers of building materials	13	10	5	0	3,28	0.76	1.982
Availability of skilled labour	13	11	2	2	3,25	0.89	1.491

Table 2 Continued

Key Measures	Level of Importance				μ	σ	t-values
Intermediate Factors	**4**	**3**	**2**	**1**			
Client consultation & acceptance	11	16	1	0	3,36	0.56	3.382
Effective planning & scheduling	17	10	1	0	3,57	0.57	5.279
Effective coordinating and communication	17	8	3	0	3,5	0.69	3.813
Effective control & monitoring	15	12	1	0	3,5	0.58	4.582
Effective use of technology	6	18	4	0	3,07	0.60	0.625
Resource sharing documentation	3	13	11	1	2,64	0.73	-2.585
Variations	5	13	8	2	2,75	0.84	-1.567
Work breakdown structure	9	15	4	0	3,18	0.67	1.411
Quality management	11	17	0	0	3,39	0.50	4.180
Project preliminary estimates	12	12	4	0	3,28	0.71	2.121
Availability of resources –human, financial, raw materials	21	7	0	0	3,75	0.44	9
Client attitude towards payments –consultancy fees, interim certificates etc	22	4	1	1	3,68	0.72	4.967
Financial management	12	14	2	0	3,36	0.62	3.041
Risk management	6	18	4	0	3,07	0.60	0.625
Start-up difficulties	9	11	7	1	3,00	0.86	0
Bureaucracy	7	13	6	2	2,89	0.87	-0.648

Table 3a Procurement Types

No.	Procurement Type	Choice Rank	Weighting	Overall Ranking
1	Traditional competitive tendering	6(1)	6	1
2	Negotiated contract	5(2),(4)	11	2
3	Serial tendering	2(5),2(4),6	24	6
4	Design and Build	3(3),(2), 2(3)	17	3
5	Management contracts	3(3), 2(5),(6)	25	7
6	Indefinite quantity indefinite delivery (IQID)	(6), 4(17)	74	15
7	Build Own Operate Transfer (BOOT)	(4), 2(5), 3(6)	32	12
8	Build Own Operate (BOO)	(1),(2),(5),(6),2(7)	28	10
9	Design Build Operate (DBO)	(2),(4),(5),(8),(10)	29	11
10	Lease Own Operate (LOO)	3(15),(3),(6)	54	14
11	Build, Operate and Renewal of Concession BORC)	2(3),(5),(6),(16)	33	13
12	Build, Rent and Transfer (BRT)	3(2),(6),(8)	20	4
13	Build Transfer and Operate (BTO)	2(3),(7),(9)	21	5
14	Design, Build, Finance and Operate (DBFO)	(3),(6),3(14)	26	8
15	Design, Construct, Manage and Finance (DCMF)	2(4),(6),(13)	27	9
16	Modernise, Operate and Transfer (MOT)	(6),(7),(12),	25	7
17	Rehabilitate, Own and Transfer (ROT)	(3), 2(6),(11)	26	8

Table 3b Conditions Influencing Project Procurement

No.	Reasons	Level of Importance				μ	σ	t-values
		4	3	2	1			
1	When it is new to the environment	13	14	1	0	3,43	0.57	3.959
2	When it is too complex to run	15	12	0	1	3,46	0.69	3.545
3	When it does not fit in the existing construction industry structure	5	8	15	0	2,64	0.78	-2.423
4	When it does not fit in the socio-economic setting	7	9	11	1	2,78	0.87	-1.294
5	When it is misapplied	7	12	9	0	2,93	0.77	-0.493
6	When terms are not strictly adhered to	8	17	2	1	3,14	0.70	1.072

APPENDIX 10: Analyses of Responses for Practitioners' Questionnaire 3

Table A1. Project Performance, Assessment Criteria and their Indicators

Meas.	No.	Sub-Measure	Project Management Practitioners						Overall Weighting		
			Architects		Qty. Surveyor		Pjt. Manager				
			$\bar{A}_A$	σ_A	$\bar{A}_{QS}$	σ_{QS}	$\bar{A}_{PM}$	σ_{PM}	$\bar{A}_T$	σ_T	W_T
Performance	1	Cost	25.3	9.90	26.1	9.18	34.3	13.10	26.2	9.92	**26.2**
	2	Time	18.9	7.47	18.1	5.55	18.5	5.07	18.5	6.55	**18.5**
	3	Quality	18.8	6.23	22.5	8.86	16.5	4.73	20.1	7.59	**20.1**
	4	EI	11.5	7.73	8.9	4.66	8.5	5.80	10.2	6.51	**10.2**
	5	S.I	9.9	6.69	9.9	7.04	8.8	6.99	9.8	6.76	**9.8**
	6	MEE	15.6	7.56	14.4	8.47	13.5	2.38	14.9	7.65	**14.9**
Project Cost	1	Environmental/ Social Costs	12.2	6.31	12.7	9.29	18.8	8.54	12.8	7.82	**12.8**
	2	Managerial Costs	22.4	10.2	17.9	7.84	17.5	8.66	20.3	9.36	**20.3**
	3	Legal Costs	9.6	4.69	8.3	5.02	8.3	6.50	9.0	4.90	**9.0**
	4	Incidental Costs	11.5	5.13	9.3	5.07	9.5	5.26	10.5	5.15	**10.5**
	5	Fluctuation Costs	21.5	9.55	23.6	10.08	19.0	2.00	22.2	9.51	**22.2**
	6	Total Cost Overrun	22.8	11.96	28.5	11.81	24.5	13.2	25.2	12.1	**25.2**
Project Time											
	1	Valuation/ Certification Times	21.6	10.21	19.7	9.21	17.5	8.66	20.6	9.75	**20.6**
	2	Times for Payment of C. Works	31.6	16.06	28.6	11.58	26.5	2.38	30.1	14.25	**30.1**
	3	Incidental Times	16.1	8.38	11.5	6.73	11.5	6.76	13.9	7.87	**13.9**
	4	T. For Comp. of Major Works	30.7	14.29	40.2	18.03	44.5	13.70	35.4	16.44	**35.4**
Project Quality	1	Reworks (number/extent)	16.2	10.05	14.3	6.63	12.3	10.21	15.2	8.75	**15.2**
	2	Material test records	20.4	10.02	21.5	10.31	30.8	16.99	20.5	10.68	**20.5**
	3	Services test records	17.1	6.60	17.7	7.99	20.5	6.66	17.5	7.15	**17.5**
	4	Eng./ Arch's Approval/ Disapp.	30.6	11.29	25.9	11.87	22.3	5.19	28.2	11.49	**28.2**
	5	Variation, number/extent	15.7	8.25	20.6	14.75	14.3	9.18	17.7	11.55	**17.7**
Project MEE	1	Decision Making Process	18.3	8.58	13.5	5.39	16.5	5.07	16.2	7.54	**16.2**
	2	Communication and Reports	17.0	11.11	14.4	8.14	11.5	5.07	15.6	9.75	**15.6**
	3	Efficiency of project Team	19.3	8.61	23.8	10.77	23.8	11.1	21.4	9.79	**21.4**
	4	Supervision of contractor	18.2	7.24	19.8	8.71	24.3	6.75	19.2	7.88	**19.2**
	5	Insptn. and Approval of works	14.0	4.64	14.5	5.78	10.8	4.35	14.0	5.13	**14.0**
	6	Site Meeting Regularity	13.4	6.80	14.1	7.76	13.3	6.24	13.7	7.09	**13.7**
Project E.I											
	1	Investmt. On Env'tal Issues	28.6	12.70	25.3	6.33	35.8	17.30	27.6	10.99	**27.6**
	2	No. of employees with env. tasks	18.9	7.93	24.8	9.38	15.0	7.07	21.1	9.01	**21.1**
	3	No. of reported Incidents	21.8	13.90	18.3	7.02	12.8	8.96	19.9	11.42	**19.9**
	4	compliance with regtns (extent)	30.7	12.40	31.4	8.73	36.5	15.80	31.3	11.15	**31.3**
Project S.I.	1	No. of Population affected	32.9	10.10	34.5	10.31	26.8	7.89	33.2	10.09	**33.5**
	2	No. and type of community affected	37.0	11.60	33.9	8.54	47.0	17.00	36.3	11.05	**35.4**
	3	Comm./Soc. resources affected	30.2	13.50	31.6	8.39	26.3	11.10	30.5	11.43	**30.8**

Table A2. Factor Groups and Factors (or characteristics)

Meas.	No.	Sub-Measure	Project Management Practitioners						Overall Weighting		
			Architects		Qty. Surveyors		Project Managers				
			$\bar{A}_A$	σ_A	$\bar{A}_{QS}$	σ_{QS}	$\bar{A}_{PM}$	σ_{PM}	$\bar{A}_T$	σ_T	W_T
Project Team	1	Technical Background	27.0	10.70	27.3	11.50	31.0	10.50	27.4	10.90	**27.4**
	2	Relationship among team	13.3	4.76	14.8	5.91	11.8	5.38	13.8	5.29	**13.8**
	3	Commitment of team	18.3	7.34	17.8	5.73	14.5	3.32	17.9	6.54	**17.9**
	4	Ability to work as a team	18.7	6.36	17.9	6.15	17.3	4.86	18.3	6.14	**18.3**
	5	Competence of team	22.6	7.08	22.3	7.55	25.5	5.26	22.6	7.13	**22.6**
Projt. Mger Consultant	1	Ability to coordinate	22.5	8.51	18.7	5.20	16.8	4.72	20.6	7.34	**20.6**
	2	Ability to delegate authority	14.9	5.85	13.1	4.25	13.8	4.79	14.1	5.19	**14.1**
	3	Ability to lead	16.9	5.22	17.0	5.62	16.0	4.55	16.9	5.29	**16.9**
	4	Arbitration skills	10.3	4.50	10.1	3.68	8.5	4.36	10.1	4.13	**10.1**
	5	Ability to communicate	14.9	5.24	16.9	5.22	16.3	2.50	15.8	5.15	**15.8**
	6	Knowledge/Skills abt. Pjt.	20.4	8.11	24.4	8.68	28.8	8.54	22.6	8.61	**22.6**
Project	1	Project size	20.1	7.2	19.96	7.68	20.5	8.81	20.1	7.37	**20.1**
	2	Project value	22.4	10.91	21.321.5	9.17	17.5	8.66	21.8	10.04	**21.8**
	3	Urgency for completion	17.9	5.59	18.1	6.26	18.0	2.45	18.0	5.69	**18.0**
	4	Project Uniqueness	12.9	7.19	12.3	5.24	13.5	4.73	12.6	6.29	**12.6**
	5	Project complexity	16.0	7.95	17.5	7.47	19.5	8.23	16.8	7.17	**16.8**
	6	Life cycle	10.7	6.12	10.6	3.48	11.0	7.12	10.9	5.17	**10.9**
Client's Organisation	1	Top Mgt. support	17.4	6.7	17.8	6.80	16.3	4.79	17.5	6.58	**17.5**
	2	Client's Org. Structure	16.9	8.03	16.7	6.38	16.8	2.36	16.8	7.09	**16.8**
	3	Relationship with Project	18.8	6.74	19.0	5.97	21.5	5.97	19.0	6.33	**19.0**
	4	Ability to take decisions	22.4	5.33	21.3	7.73	22.0	6.78	21.9	6.42	**21.9**
	5	Relationship with contractor	12.9	7.32	14.7	6.12	11.3	4.79	13.5	6.72	**13.5**
	6	Sens'ty Env./Soc. issues	11.5	6.31	10.5	6.73	12.3	2.63	11.1	6.30	**11.1**
External Env	1	Political	18.9	8.58	20.5	8.09	24.3	10.9	19.9	8.49	**19.9**
	2	Economic	26.7	9.30	26.3	8.35	28.3	9.25	26.6	8.79	**26.6**
	3	Social environment	14.9	7.43	14.5	7.08	17.3	9.5	14.8	7.31	**14.8**
	4	Nature /Weather	17.3	7.79	12.7	5.62	9.5	6.14	14.9	7.27	**14.9**
	5	Availability of Labour, Material, Plants	22.2	8.55	26.3	11.17	20.8	8.3	23.8	9.80	**23.8**

Table A3. Influence of Factor Groups on Assessment Criteria

Meas.	No.	Sub-Measure	Project Management Practitioners						Overall Weighting		
			Architects		Qty. Surveyors		Project Managers				
			$\bar{A}_A$	σ_A	$\bar{A}_{QS}$	σ_{QS}	$\bar{A}_{PM}$	σ_{PM}	$\bar{A}_T$	σ_T	W_T
Effect on Cost	1	Project Manager	16.0	6.91	17.9	8.31	12.0	8.12	16.6	7.61	**16.6**
	2	Project Team	19.1	6.86	18.8	7.44	18.3	6.24	18.9	6.98	**18.9**
	3	Preoject	28.5	11.87	29.4	18.72	26.8	15.8	28.8	15.04	**28.7**
	4	Client's Organisation	18.1	9.75	18.3	10.39	23.3	11.8	18.4	10.05	**18.4**
	5	Project's Extl. Env.	18.7	8.94	15.6	9.90	19.8	8.18	17.5	9.32	**17.4**
Effect on Time	1	Project Manager	18.6	8.25	17.4	8.27	12.0	8.12	17.7	8.28	**17.7**
	2	Project Team	19.2	8.57	20.7	9.88	17.0	4.76	19.7	8.93	**19.7**
	3	Preoject	24.1	11.07	27.4	19.64	26.5	15.9	25.6	15.27	**25.6**
	4	Client's Organisation	20.1	8.71	19.5	11.25	23.3	11.8	20.0	9.88	**20.0**
	5	Project's Extl. Env.	17.9	10.17	15.0	8.91	21.3	8.54	16.9	9.61	**16.9**
Effect on Quality	1	Project Manager	26.3	9.58	24.8	9.58	25.5	10.5	25.6	9.51	**25.6**
	2	Project Team	25.7	10.55	31.3	10.44	35.8	17.7	28.6	10.25	**28.6**
	3	Preoject	15.9	9.26	14.2	5.98	13.8	6.29	15.1	7.86	**15.1**
	4	Client's Organisation	15.3	7.78	17.4	7.67	11.5	7.9	15.9	7.77	**15.9**
	5	Project's Extl. Env..	16.4	6.17	12.3	6.73	13.5	7.23	14.6	6.68	**14.6**
Effect on MEE	1	Project Manager	25.6	9.43	26.6	10.87	18.0	8.91	25.2	10.04	**25.2**
	2	Project Team	25.7	10.80	25.1	8.35	26.3	22.9	25.5	10.61	**25.5**
	3	Preoject	16.2	9.79	15.3	6.61	13.5	5.97	15.7	8.35	**15.7**
	4	Client's Organisation	16.6	8.35	19.5	8.24	22.8	14.4	18.2	8.74	**18.2**
	5	Project's Extl. Env.	15.9	8.80	14.5	6.98	19.5	10.8	15.5	8.18	**15.5**
Effect on S.I.	1	Project Manager	17.2	7.22	15.8	8.39	12.5	8.66	16.3	7.76	**16.3**
	2	Project Team	15.4	6.32	16.7	9.37	14.5	5.26	15.8	7.62	**15.8**
	3	Preoject	22.9	11.82	23.0	14.36	32.3	12.9	23.5	12.98	**23.5**
	4	Client's Organisation	20.1	8.95	20.5	12.08	18.0	3.56	20.1	10.08	**20.1**
	5	Project's Extl. Env.	24.5	12.10	24.0	10.25	22.8	12.5	24.2	11.23	**24.2**
Effect on E.I.	1	Project Manager	16.2	8.44	16.1	7.74	12.5	6.45	15.9	7.99	**15.9**
	2	Project Team	16.5	7.17	16.6	9.72	14.5	5.26	16.4	8.15	**16.4**
	3	Preoject	25.3	11.05	24.1	13.61	36.0	17.3	25.4	12.62	**25.4**
	4	Client's Organisation	15.9	8.93	19.8	10.84	14.3	6.99	17.6	9.77	**17.6**
	5	Project's Extl. Env.	26.1	13.36	23.4	9.33	22.8	14.4	24.8	11.85	**24.8**

KEY: A_A –Architects' Average; σ_A – Architects' Standard Deviation; A_{QS} –Quantity Surveyors' Average; σ_{QS} – Quantity Surveyors' Average; A_{PM} – Project Managers' Average; σ_{PM} -Project Managers' Standard Deviation A_T –Total (Overall) Average = W_T ; σ_T -Total (Overall) standard Deviation

APPENDIX 11: Analyses of Clients' Interviews

Table 1 Analysis of Respondents

No.	Government Agency	Organisation Type	Types of Building normally undertaken	Position of respondent	Years of Experience
1	Central Government	Regional Coordination Council	Housing, Office block, schools, Hospitals, Rehabilitation	Regional Economic Planner	15
2	Central Government	Regional Coordination Council	Housing, Office block, schools, Hospitals, Rehabilitation	Regional Economic Planner	10
3	Local Government	Metropolitan Assembly	Markets, Schools, Office block, Rehabilitation.	Planning Officer	12
4	Local Government	Municipal Assembly	Markets, Schools, Office block, Rehabilitation	Deputy Municipal Coordinator	13
5	Local Government	Municipal Assembly	Markets, Schools, Office block, Rehabilitation	Planning Officer	8
6	Government Institution	Tertiary Institution	Hostels, Classrooms, Bungalows, internal road networks, Office blocks	Principal	6
7	Government Institution	Tertiary Institution	Hostels, Classrooms, Bungalows, internal road networks, Office blocks	Estate Officer	7
8	Government Ministry	Ghana Health Services	Hostels, Nurses Training Schools, Bungalows, Office block	Ghana Health Services	6

APPENDIX 11.B
Main Interview Responses

Transcription of Answers to Main Questions

1. Yes. (All respondents answered in the affirmative)
2. Summary of answers:
   - Increase our involvement at the design stage *(involvement in project)*
   - Increase our involvement in supervision during execution stages *(involvement in supervision)*
   - Wish to be more consulted during design and execution stages by the consultant that is the case now *(involvement in design)*
   - A means by which we could ensure that all service providers are working as expected *(monitoring consultants/contractors)*
   - A means to properly track the progress of the throughout its execution period *(monitoring progress of work)*
   - Liaise more with the project team leader or project manager more effectively throughout execution *(involvement in supervision)*

3. Yes. (All respondents answered in the affirmative)
   - finish in time *(keeping to time schedule)*
   - no upward overall cost adjustment *(keeping to cost estimates)*
   - good quality *(quality work)*
   - good supervision from consultants *(good supervision)*
   - regular updates from consultants *(regular updates)*
   - good communication and relationship among all involved in the project *(communication/relationship among team)*
   - Updates, especially from consultants since I have entrusted my investments into their hands *(updates)*

4. Yes. (All responded in the affirmative)
   - poor performance by contractor *(contractor's performance)*
   - poor supervision by consultants *(consultants' supervision)*
   - poor quality of work *(poor quality)*
   - big cost overrun *(cost overrun)*
   - too much delay in completion *(delay)*
   - poor administration of the contract *(poor contract administration)*

5. Summary of answers:

- several means depending on what project we undertake and what aims *(several means of assessing satisfaction)*

- varies depending on the project, but commonly, we want to work within cost and finish on time. We also want good quality *(varying means, commonly by cost, time, quality)*

- when all consultants performed well and the contractors was efficient *(good performance of consultants, contractors)*

- when everything goes according to plan *(good progress of work)*

- when the contractor and consultants do not give us cause to worry during the construction phase *(satisfied with consultant, contractors)*

- when the project was not characterised with antagonism, leading to litigations etc.*(peaceful project environment)*

- when everything goes according to my expectation, especially when contractors and consultants performed to my expectation *(expectation from consultants, contractors met)*

6. Summary of answers:

- I want to accomplish my dream for the institution *(dream fulfilment)*

- we want to expand our institution *(pursuing an aim)*

- I want to continue with the good work of my predecessor *(continuing work started)*

- As a means of satisfying institutional objectives *(institutional objectives)*

- To let the public know that we are working to improve their lives *(satisfy public expectations)*

- To satisfy the requests and demands of the community *(satisfy community demand)*

- We undertake projects to meet the demands of the assembly *(meeting assembly demands)*

- With an overall aim of developing our assembly through the provision of infrastructure, e.g. schools, markets, roads etc. *(developing the assembly)*

- We want to provide needed facility for our workers *(provide facility for workers)*

- Improve on existing facilities *(improve facilities)*

7. Summary of answers:

- Continuous assessment , throughout the project, so that we will be kept updated *(continuous, for updates)*

- Continuous assessment so that we can ensure that things are done properly throughout the project life *(continuous, to ensure good work)*

- Continuous and at the end so that decisions can be taken about the progress based on good and timely information *(continuous and overall, for decisions on progress)*

- Continuous, from the begin to the end at regular intervals since it is the best way to follow the project and to monitor its progress *(continuous, regular intervals, for monitoring)*

- Continuously, to ensure good project monitoring *(continuous to ensure monitoring)*

8. Summary of answers:
   - yes, but not all the time *(not always visible)*
   - not quite, they are often more closer to the contractor than to me *(not quite, more closer to contractors)*
   - not all of them, sometimes it seems they are more interested only in their fees *(not all, some are interested in their fees)*
   - they do their best to be just responsible, not really to go the extra mile *(just responsible enough)*
   - Some of them are keen in our satisfaction, at best most work just to ensure completion just normal employees would do *(some are keen ,others are not)*
   - sometimes it appear consultants condone and connive with contractors on certain issues against the interest of the client *(sometimes condone and connive with contractors)*

9. Summary of answers:
   - We expect much from all, but more from consultants since they represent me and they have the oversight of the project including the contractor *(all must live to up expectation, but much is expected from consultants)*
   - I expect good supervision from consultants and good work from contractors *(much from all)*
   - Both are of equal importance and our expectation from them are equal, however, we get more disappointed when consultants allow the contractors to get away with poor quality work *(much is expected from all, but we count on consultants)*
   - Most contractors will perform poorly if consultants compromise their stand, therefore I expect more from the consultants *(much from consultants)*
   - Much is expected from both, but the overall success depends on the consultants *(much from all, but depends on consultants)*

10. Yes. (all answered in the affirmative) *(Consultant to be assessed)*
11. Summary of answers:
    - Continuous and overall assessment *(continuous and overall)*
    - Wish it is continuous but can't imagine how *(wish for continuous)*

APPENDIX 11.C Coding and themes

Que.	Idea in questionnaire	Coded phenomena	Categories	Themes
1	Active role	yes	Wants active role	Clients want to play active role in project implementation (A)
2	Changing role	Involvement in project execution	Wants Involving role in project implementation	
		Involvement in supervision		
		Involvement in design		
		monitoring		
3	Expectations, criteria for projects	Keeping to time schedules	Meeting set standards	Clients have set standard criteria to be met (B)
		Keeping to cost schedule		
		Good quality of work		
		Good supervision	Supervision	Clients have expectations from Consultants (C)
		Regular supervision		
		Communication	Communication and updates	Clients demand communication from consultants (C)
		transparency		
4	Causes of clients dissatisfaction	Contractors' performance	Contractors' performance	Unmet expectations from Service providers causes client dissatisfaction (C)
		Consultants' performance	Consultants' performance	
		Contract administration		
		Cost overrun	Meeting set standards	Unmet set standard criteria causes client dissatisfaction (B)
		Time overrun		
		quality		
5	Means of assessing satisfaction	Several	Several	Clients have several criteria for assessing their satisfaction on project (B+)
		Cost, time, quality	Meeting set standard	Clients have set standard criteria for assessing their satisfaction on project (B)
		Consultants performance	Service providers' performance	Performance of service providers is a means clients use to assess their satisfaction on project(C)
		Contractors performance		
		Progress of work	Project execution efficiency	
		Peaceful project environment		
6	Other reasons for undertaking projects	Dream fulfilments	Fulfilling institutional needs objectives	Clients have objectives to achieve (D)
		Pursuing an aim		
		For institutional objective		
		provide facility	Providing infrastructure	Clients wants to address infrastructural needs (D)
		Improve facility		
		Continuing work started		
		Developing the assembly		
		Satisfy community demands	Satisfy social and communal demands and expectation	Clients want to satisfy social and communal need (D)
		Meeting assembly demands		
		Satisfy public expectation		

APPENDIX 11.C (continue)

Que.	Idea in questionnaire	Coded phenomena	Categories	Themes
7	Assessing project performance	Continuous , for updates	Continuous for updates	Clients want project to be assessed continuously for communication and monitoring (E)
		Continuous to ensure good work	Continuous for monitoring of work	
		Continuous, overall for decisions on progress		
		Continuous, regular intervals for monitoring		
		Continuous to ensure monitoring		
8	Consultants and client's satisfaction	Not always visible	Not all take client's satisfaction seriously	Clients suspect that their ultimate satisfaction is not usually a priority for consultants (C-)
		Some are keen, others are not		
		Just responsible enough	Some work only for their fees	
		Not all, some are interested in their fees		
		Not quite, more closer to contractors	Lean more towards contractors	Some consultants are more interested in the contractor's satisfaction (C-)
		Condone and connive with contractors		
9	Level of expectation from consultants/contractors	All must live to expectation but much expected from consultants	Much is expected from consultants	Consultants are much influential in ensuring successful project performance (C+)
		Much expected from consultants		
		much is expected from all	Much is expected from all	
		much is expected from all, but we count on consultant	Much is expected from all but consultants are influential	
		much is expected from all, but it depends on contractors		
10/11	Consultants to be assessed	Yes, continuous and overall	Yes, continuous, overall	Consultants to be assessed continuously throughout the project (E+)
		Yes, continuous	Yes, continuous	

APPENDIX 11.D Themes for clients Responses

A: Clients want to play active roles in project implementation

Statement 1: Clients want to play active roles in project implementation

B: i. Clients have standard criteria to be met

ii. Unmet standard criteria causes client dissatisfaction

iii. Clients have several criteria for assessing their satisfaction on project

iv. Clients have Standard criteria for assessing their satisfaction on project

Statement 2: For every project, clients have set standards to be met and the extent to which these set standards are met determines their satisfaction level.

C: i. Clients have expectations from Consultants

ii. Clients demand communication from consultants

iii. Unmet expectations from Service providers causes client dissatisfaction

iv. Performance of service providers is a means clients use to assess their satisfaction on project

v. Consultants are much influential in ensuring successful project performance

vi. Clients suspect that their ultimate satisfaction is not usually a priority for consultants

vii. Some consultants are more interested in the contractor's satisfaction

Statement 3: Clients believe that the performance of service providers is a function of project performance and hence expect much from them, especially, from consultants.

Statement 4: clients are generally dissatisfied when their expectations from service providers are not met.

Statement 5: Clients believe that consultants do not always work towards achieving their ultimate satisfaction.

D: i. Clients have objectives to achieve

ii. Clients want to address infrastructural needs

iii. Clients want to satisfy social and communal need

Statement 6: Clients always have a well defined objective or need for which they undertake a project

E: Clients want project to be assessed continuously for communication and monitoring (E)

i. Consultants to be assessed continuously throughout the project (E+)

Statement 7: Clients want the performance of consultants to be assessed continuously, throughout the project phases.

APPENDIX 12: Analyses of Responses of Clients' Questionnaires 1

Table 1 Distribution of Projects Undertaken

Client	Distribution of Projects Undertaken											Total
	A	B	C	D	F	G	H	I	J	K	L	
33	1	0	6	0	2	0	0	4	0	0	0	**13**
34	***3***	***1***	***10***	***41***	***6***	***4***	***53***	***51***	***5***	***18***	***1***	***193***
35	0	1	1	2	3	0	1	3	0	0	0	**11**
36	0	0	0	1	0	0	0	5	0	0	0	**6**
Total	**4**	**3**	**17**	**43**	**11**	**4**	**54**	**63**	**5**	**18**	**1**	**223**
	Distribution in Percentage Terms											
33	7.7	0.0	46.1	0.0	15.4	0.0	0.0	30.8	0.0	0.0	0.0	**100**
34	***1.6***	***0.5***	***5.2***	***21.2***	***3.1***	***2.1***	***27.5***	***26.4***	***2.6***	***9.3***	***0.5***	***100***
35	0.0	9.1	9.1	18.2	27.2	0.0	9.1	27.3	0.0	0.0	0.0	**100**
36	0.0	0.0	0.0	16.7	0.0	0.0	0.0	83.3	0.0	0.0	0.0	**100**
Total	**1.6**	**0.8**	**10.4**	**22.4**	**6.4**	**1.6**	**19.2**	**28**	**2.4**	**6.4**	**1**	**100**

Table 2 Profession of Respondents

Client	Profession of Respondents														Total	
	50		60		70		80		90		100		110			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
33	1	1.1	1	1.1	5	55.6	1	1.1	0	0.0	1	1.1	0	0.0	**9**	**100**
34	***2***	***0.0***	***14***	***33.3***	***5***	***14.8***	***6***	***11.1***	***3***	***7.4***	***11***	***29.6***	***3***	***3.7***	***44***	***100***
35	1	25	0	0.0	1	25	0	0.0	0	0.0	0	0.0	2	50.0	**4**	**100**
36	0	0.0	0	0.0	1	16.7	0	0.0	0	0.0	0	0.0	5	83.3	**6**	**100**
Total	4	6.3	15	23.8	12	19.0	7	11.1	3	4.7	12	19.0	10	15.9	**63**	**100**

Key for Codes in Table 1 and 2:

1. Clients: 3 : Real Estate Developers; 34: Government Agency; 35: Investors; 36: Owner Occupiers

2. Background of Respondents: 50: Architects;60: Quantity Surveyors; 70: Project Managers; 80:Construction Managers; 90: Structural Engineers; 100: Service Engineers; 110: Others (Technical Officer, Estate Officers etc.

3. Projects Undertaken: A: Large scale Residential houses (not including storey type);
B: Large scale residential houses (only storey type); C: Large scale residential houses (all types)
D: Office accommodation; E: Office accommodation: F: Industrial buildings; G: Institutional buildings e.g. School, hospitals etc.; H: Self-occupying housing; L: Others (Please state)……..

Table 3. Need/Motivation of Clients

No.	Measures	Level Important				μ	σ	Rank	t-values
		4	3	2	1				
33	**Real Estate Developers**								
33.1	For profit	**7**	**1**	**1**	0	*3,67*	*0,71*	*1*	*2,828*
33.2	For speculative purposes	1	2	1	5	*1,89*	*1,17*	*4*	*-2,857*
33.3	To maintain/improve market share	3	6	0	0	*3,33*	*0,5*	*3*	*2,000*
33.4	To achieve sales target	**6**	**2**	**1**	0	*3,55*	*0,73*	*2*	*2,294*
34	**Government Agencies**								
34.1	To satisfy Social Needs	**41**	**3**	**0**	0	*3,93*	*0,25*	*1*	*24,241*
34.2	To regulate the economy e.g. create jobs etc	19	11	8	6	*2,98*	*1,09*	*2*	*-0,138*
34.3	To generate income	11	9	18	**6**	*2,57*	*1,02*	*3*	*-2,806*
34.4	For prestige/ National pride	7	15	5	17	*2,27*	*1,15*	*4*	*-4,200*
34.5	To satisfy international objective	6	9	6	23	*1,95*	*1,140*	*5*	*-6,082*
35	**Investors**								
35.1	For business expansion, market share improvement, competition	**4**	**0**	**0**	0	*4*	*0*	*1*	-
35.2	For diversification purposes	**2**	**2**	**0**	0	*3,5*	*0,58*	*3*	*1,732*
35.3	To match fund liability with property asset base	**3**	**1**	**0**	0	*3,75*	*0,5*	*2*	*3,000*
35.4	To minimise investment risks believing that property is a comparatively low risk and stable investment vehicle	**3**	**0**	**1**	0	*3,5*	*1*	*3*	*1,000*
35.5	To achieve capital growth/long-term retention of funds against inflation	**2**	**1**	**1**	0	*3,25*	*0,96*	*4*	*0,522*
35.6	To achieve desired returns from investment/profitability levels	**3**	**1**	**0**	0	*3,75*	*0,5*	*2*	*3,000*
35.7	Speculative, to meet anticipated demand	**3**	**0**	**1**	0	*3,5*	*1*	*3*	*1,000*
36	**Owner Occupiers**								
36.1	For business expansion, market share, market share improvement, competition	1	0	1	4	*1,67*	*1,21*	*4*	*-2,697*
36.2	To minimise rental cost, resulting from leasehold decision	**6**	**0**	**0**	0	*4*	*0*	*1*	
36.3	To improve on the capital asset of the firm	**4**	**0**	**2**	0	*3,33*	*1,03*	*2*	*0,790*
36.4	To enhance corporate image	3	0	3	**0**	*3*	*1,09*	*3*	*0,000*
36.5	To acquire or extend infrastructure facility with a view to enhancing business process	**2**	**2**	**2**	**0**	*3*	*0,89*	*3*	*0,000*

Table 4 Govt agencies (Public Clients) Expectations from Service Providers

No.	Measures	Level Important				μ	σ	Rank	t-values
		4	3	2	1				
37	**Quantity Surveyor**								
37.1	Accurate and reliable budget estimate	33	8	2	1	*3.66*	*0.68*	*3*	*6.429*
37.2	Efficiency (timely job execution)	35	3	3	3	*3.59*	*0.90*	*4*	*4.367*
37.3	Competency (expertise and experience)	39	3	2	0	*3.84*	*0.48*	*1*	*11.633*
37.4	Ability to foresee and budget for potential inflation	31	7	3	3	*3.50*	*0.90*	*5*	*3.676*
37.5	Efficient performance of duties as per the terms and condition of conditions of employment	36	4	4	0	*3.73*	*0.62*	*2*	*7.735*
38	**Architects**								
38.1	Flexibility in design (to accommodate future changes)	39	1	1	3	*3.73*	*0.82*	*2*	*5.902*
38.2	Buildability of design	38	3	2	1	*3.77*	*0.64*	*1*	*7.983*
38.3	Efficiency (supervision, instruction etc)	28	10	4	2	*3.45*	*0.85*	*5*	*3.556*
38.4	Aesthetic appeal	28	6	6	4	*3.32*	*1.03*	*6*	*2.051*
38.5	Delivery within time	33	6	4	1	*3.62*	*0.75*	*4*	*5.4*
38.6	Efficient performance of duties as per the terms and condition of conditions of employment	35	4	3	2	*3.63*	*0.81*	*3*	*5.214*
39	**Project Managers**								
39.1	Technical and managerial competencies/ experience	10	1	1	1	*3.54*	*0.97*	*4*	*2.007*
39.2	Team work and efficient coordination	10	2	1	0	*3.69*	*0.63*	*3*	*3.959*
39.3	Delivery within time, cost and cost target	10	0	3	0	*3.54*	*0.88*	*4*	*2.213*
39.4	Manage client's changes efficiently	11	1	1	0	*3.77*	*0.60*	*2*	*4.629*
39.5	Efficient performance of duties as per the terms and condition of conditions of employment	12	1	0	0	*3.92*	*0.28*	*1*	*12*
40	**Consulting Engineers**								
40.1	Safe and economic design	36	4	3	1	*3.70*	*0.70*	*3*	*6.662*
40.2	Sustainability/flexibility in design and construction	38	3	3	0	*3.79*	*0.55*	*1*	*9.538*
40.3	Timely delivery	36	4	3	1	*3.70*	*0.70*	*3*	*6.662*
40.4	Workable	35	5	3	1	*3.68*	*0.71*	*4*	*6.389*
40.5	Efficient performance of duties as per the terms and condition of conditions of employment	36	5	3	0	*3.75*	*0.57*	*2*	*8.642*
41	**Contractors**								
41.1	Delivery within time quality and cost targets	38	4	2	0	*3.82*	*0.49*	*1*	*10.959*
41.2	Minimise cost (avoiding on site and material wastes	37	4	3	0	*3.78*	*0.56*	*2*	*9.072*
41.3	Technical and managerial competence	37	4	2	1	*3.75*	*0.65*	*4*	*7.636*
41.4	Accommodating client's changes in good faith	37	4	2	1	*3.75*	*0.65*	*4*	*7.636*
41.5	Efficient coordinating of the specialists and subcontracting works	35	6	3	0	*3.73*	*0.58*	*5*	*8.243*
41.6	Financial capacity and adequate guarantee against own and subcontractors default	37	5	1	1	*3.77*	*0.60*	*3*	*8.475*
41.7	Efficient coordinating of the specialists and subcontracting works	35	4	4	1	*3.66*	*0.74*	*6*	*5.866*
42	**Clients' Responsibilities**								
42.1	Reasonable expectation	35	5	3	1	*3.68*	*0.71*	*3*	*6.389*
42.2	Seeking professional advice in investment decisions	34	5	3	2	*3.61*	*0.81*	*7*	*5.006*
42.3	Disclosing all motives of investment, at the outset, to the project team	34	7	3	0	*3.70*	*0.59*	*4*	*7.871*
42.6	Budgeting Sufficient time and funds for detailed feasibility studies/market research at the outset	35	7	1	1	*3.73*	*0.62*	*2*	*7.735*
42.7	Striving to cultivate synergy amongst project team members, through strong emphases on teamwork, equality and fairness	27	14	3	0	*3.54*	*0.63*	*8*	*5.770*
42.8	Assessing levels of similar development springing up, or having been slated for near future development with a given node, before investing	14	6	20	4	*2.68*	*1.03*	*5*	*-2.051*
42.4	Fulfilment of contractual obligation	36	6	2	0	*3.77*	*0.52*	*1*	*9.815*
42.5	Employment of specialists in the management and executions of all critical aspects of the work	35	4	3	2	*3.64*	*0.81*	*6*	*5.214*

Table 5 Assessment by Government Agencies on the Performance of Service Providers

No.	Measures	Level of Importance				μ	σ
		4	3	2	1		
37	**Quantity Surveyor**						
37.1	Accurate and reliable budget estimate	3	34	7	0	*2.91*	*0.47*
37.2	Efficiency (timely job execution)	5	10	25	4	*2.36*	*0.81*
37.3	Competency (expertise and experience)	2	35	5	2	*2.84*	*0.57*
37.4	Ability to foresee and budget for potential inflation	3	22	15	4	*2.54*	*0.76*
37.5	Efficient performance of duties as per the terms and condition of conditions of employment	4	28	10	2	*2.77*	*0.68*
38	**Architects**						
38.1	Flexibility in design (to accommodate future changes)	2	27	9	6	*2.57*	*0.79*
38.2	Buildability of design	3	31	6	4	*2.75*	*0.72*
38.3	Efficiency (supervision, instruction etc)	2	26	12	4	*2.59*	*0.72*
38.4	Aesthetic appeal	1	29	10	4	*2.61*	*0.69*
38.5	Delivery within time	2	30	7	5	*2.66*	*0.74*
38.6	Efficient performance of duties as per the terms and condition of conditions of employment	4	31	5	4	*2.79*	*0.734*
39	**Project Managers**						
39.1	Technical and managerial competencies/ experience	1	7	4	1	*2.61*	*0.77*
39.2	Team work and efficient coordination	2	6	5	0	*2.77*	*0.72*
39.3	Delivery within time, cost and cost target	1	8	3	1	*2.69*	*0.75*
39.4	Manage client's changes efficiently	1	3	6	3	*2.15*	*0.90*
39.5	Efficient performance of duties as per the terms and condition of conditions of employment	0	5	7	1	*2.31*	*0.63*
40	**Consulting Engineers**						
40.1	Safe and economic design	4	29	7	4	*2.75*	*0.75*
40.2	Sustainability/flexibility in design and construction	4	27	8	5	*2.68*	*0.80*
40.3	Timely delivery	1	31	11	1	*2.73*	*0.54*
40.4	Workable	4	27	8	5	*2.68*	*0.80*
40.5	Efficient performance of duties as per the terms and condition of conditions of employment	5	33	1	5	*2.86*	*0.76*
41	**Contractors**						
41.1	Delivery within time quality and cost targets	1	19	22	2	*2.43*	*0.62*
41.2	Minimise cost (avoiding on site and material wastes	1	19	22	2	*2.43*	*0.62*
41.3	Technical and managerial competence	3	27	13	1	*2.73*	*0.62*
41.4	Accommodating client's changes in good faith	1	26	15	2	*2.59*	*0.62*
41.5	Efficient coordinating of the specialists and subcontracting works	1	18	23	2	*2.41*	*0.62*
41.6	Financial capacity and adequate guarantee against own and subcontractors default	2	26	13	3	*2.61*	*0.69*
41.7	Efficient coordinating of the specialists and subcontracting works	3	27	11	3	*2.68*	*0.71*
42	**Clients' Responsibilities**						
42.1	Reasonable expectation	5	26	10	3	*2.75*	*0.76*
42.2	Seeking professional advice in investment decisions	1	31	10	2	*2.71*	*0.59*
42.3	Disclosing all motives of investment, at the outset, to the project team	2	26	13	3	*2.61*	*0.69*
42.6	Budgeting Sufficient time and funds for detailed feasibility studies/market research at the outset	2	28	11	3	*2.66*	*0.68*
42.7	Striving to cultivate synergy amongst project team members, through strong emphases on teamwork, equality and fairness	1	18	22	3	*2.39*	*0.65*
42.8	Assessing levels of similar development springing up, or having been slated for near future development with a given node, before investing	1	15	20	8	*2.20*	*0.76*
42.4	Fulfilment of contractual obligation	3	33	4	3	*2.84*	*0.64*
42.5	Employment of specialists in the management and executions of all critical aspects of the work	1	30	9	4	*2.64*	*0.68*

Table 6 comparison for Assessment Gap, Government Agencies

No.	Measures	Expectation		Assessment		Gap	%Satn.	t-values
37	**Quantity Surveyor**	**μ**	**σ**	**μ**	**σ**			
37.1	Accurate and reliable budget estimate	*3.66*	*0.68*	*2.91*	*0.47*	*0.75*	*79.50*	*6.004*
37.2	Efficiency (timely job execution)	*3.59*	*0.90*	*2.36*	*0.81*	*1.23*	*65.82*	*6.735*
37.3	Competency (expertise and experience)	*3.84*	*0.48*	*2.84*	*0.57*	*1*	*73.96*	*8.921*
37.4	Ability to foresee and budget for potential inflation	*3.50*	*0.90*	*2.54*	*0.76*	*0.95*	*72.73*	*5.364*
37.5	Efficient performance of duties as per the terms and condition of conditions of employment	*3.73*	*0.62*	*2.77*	*0.68*	*0.95*	*74.39*	*6.877*
38	**Architects**							
38.1	Flexibility in design (to accommodate future changes)	*3.73*	*0.82*	*2.57*	*0.79*	*1.16*	*68.90*	*6.766*
38.2	Buildability of design	*3.77*	*0.64*	*2.75*	*0.72*	*1.02*	*72.89*	*7.036*
38.3	Efficiency (supervision, instruction etc)	*3.45*	*0.85*	*2.59*	*0.72*	*0.86*	*75*	*5.134*
38.4	Aesthetic appeal	*3.32*	*1.03*	*2.61*	*0.69*	*0.70*	*78.77*	*3.773*
38.5	Delivery within time	*3.62*	*0.75*	*2.66*	*0.74*	*0.95*	*73.58*	*5.973*
38.6	Efficient performance of duties as per the terms and condition of conditions of employment	*3.63*	*0.81*	*2.79*	*0.734*	*0.84*	*76.87*	*5.105*
39	**Project Managers**							
39.1	Technical and managerial competencies/ experience	*3.54*	*0.97*	*2.61*	*0.77*	*0.92*	*73.91*	*2.694 9*
39.2	Team work and efficient coordination	*3.69*	*0.63*	*2.77*	*0.72*	*0.92*	*75*	*3.464 5*
39.3	Delivery within time and cost target	*3.54*	*0.88*	*2.69*	*0.75*	*0.85*	*76.09*	*2.642*
39.4	Manage client's changes efficiently	*3.77*	*0.60*	*2.15*	*0.90*	*1.61*	*57.14*	*5.392*
39.5	Efficient performance of duties as per the terms and condition of conditions of employment	*3.92*	*0.28*	*2.31*	*0.63*	*1.61*	*58.82*	*8.456*
40	**Consulting Engineers**							
40.1	Safe and economic design	*3.70*	*0.70*	*2.75*	*0.75*	*0.95*	*74.23*	*6.161*
40.2	Sustainability/flexibility in design and construction	*3.79*	*0.55*	*2.68*	*0.80*	*1.11*	*70.66*	*7.592*
40.3	Timely delivery	*3.70*	*0.70*	*2.73*	*0.54*	*0.98*	*73.62*	*7.302*
40.4	Workable	*3.68*	*0.71*	*2.68*	*0.80*	*1*	*72.84*	*6.208*
40.5	Efficient performance of duties as per the terms and condition of conditions of employment	*3.75*	*0.57*	*2.86*	*0.76*	*0.89*	*76.36*	*6.140*
41	**Contractors**							
41.1	Delivery within time quality and cost targets	*3.82*	*0.49*	*2.43*	*0.62*	*1.39*	*63.69*	*11.533*
41.2	Minimise cost (avoiding on site and material wastes	*3.78*	*0.56*	*2.43*	*0.62*	*1.34*	*64.46*	*10.557*
41.3	Technical and managerial competence	*3.75*	*0.65*	*2.73*	*0.62*	*1.02*	*72.73*	*7.522*
41.4	Accommodating client's changes in good faith	*3.75*	*0.65*	*2.59*	*0.62*	*1.16*	*69.09*	*8.536*
41.5	Efficient coordinating of the specialists and subcontracting works	*3.73*	*0.58*	*2.41*	*0.62*	*1.32*	*64.63*	*10.238*
41.6	Financial capacity and adequate guarantee against own and subcontractors default	*3.77*	*0.60*	*2.61*	*0.69*	*1.16*	*69.28*	*8.384*
41.7	Efficient coordinating of the specialists and subcontracting works	*3.66*	*0.74*	*2.68*	*0.71*	*0.98*	*73.29*	*6.307*
42	**Clients' Responsibilities**							
42.1	Reasonable expectation	*3.70*	*0.71*	*2.75*	*0.76*	*0.95*	*74.37*	*5.989*
42.2	Seeking professional advice in investment decisions	*3.61*	*0.81*	*2.71*	*0.59*	*0.91*	*74.84*	*5.989*
42.3	Disclosing all motives of investment, at the outset, to the project team	*3.70*	*0.59*	*2.61*	*0.69*	*1.09*	*70.55*	*7.954*
42.6	Budgeting Sufficient time and funds for detailed feasibility studies/market research at the outset	*3.73*	*0.62*	*2.66*	*0.68*	*1.07*	*71.34*	*7.679*
42.7	Striving to cultivate synergy amongst project team members, through strong emphases on teamwork, equality and fairness	*3.54*	*0.63*	*2.39*	*0.65*	*1.16*	*67.31*	*8.480*
42.8	Assessing levels of similar development springing up, or having been slated for near future development with a given node, before investing	*2.68*	*1.03*	*2.20*	*0.76*	*0.48*	*82.20*	*2.469*
42.4	Fulfilment of contractual obligation	*3.77*	*0.52*	*2.84*	*0.64*	*0.94*	*75.20*	*7.447*
42.5	Employment of specialists in the management and executions of all critical aspects of the work	*3.64*	*0.81*	*2.64*	*0.68*	*1*	*72.50*	*6.255*

Table 7 Private clients (Combined) Expectations from Service Providers

No.	Measures	Level Importance				μ	σ	R	t-values
		4	3	2	1				
37	**Quantity Surveyor**								
37.1	Accurate and reliable budget estimate	17	1	1	0	*3.84*	*0.50*	*3*	*7.320*
37.2	Efficiency (timely job execution)	15	3	0	1	*3.68*	*0.75*	*5*	*3.980*
37.3	Competency (expertise and experience)	17	2	0	0	*3.89*	*0.31*	*2*	*12.370*
37.4	Ability to foresee and budget for potential inflation	16	2	0	1	*3.74*	*0.73*	*4*	*4.380*
37.5	Efficient performance of duties as per the terms and condition of conditions of employment	18	1	0	0	*3.95*	*0.23*	*1*	*18.000*
38	**Architects**								
38.1	Flexibility in design (to accommodate future changes)	15	4	0	0	*3.79*	*0.42*	*3*	*8.216*
38.2	Buildability of design	18	0	1	0	*3.89*	*0.46*	*1*	*8.500*
38.3	Efficiency (supervision, instruction etc)	17	1	1	0	*3.84*	*0.50*	*2*	*7.320*
38.4	Aesthetic appeal	16	3	0	0	*3.84*	*0.37*	*2*	*9.798*
38.5	Delivery within time	16	3	0	0	*3.84*	*0.37*	*2*	*9.798*
38.6	Efficient performance of duties as per the terms and condition of conditions of employment	15	4	0	0	*3.79*	*0.42*	*3*	*8.216*
39	**Project Managers**								
39.1	Technical and managerial competencies/ experience	12	2	0	0	*3.86*	*0.36*	*1*	*8.832*
39.2	Team work and efficient coordination	7	4	3	0	*3.28*	*0.82*	*4*	*1.295*
39.3	Delivery within time and cost target	9	2	3	0	*3.42*	*3.59*	*5*	*1.88*
39.4	Manage client's changes efficiently	9	4	1	0	*3.57*	*0.65*	*3*	*3.309*
39.5	Efficient performance of duties as per the terms and condition of conditions of employment	10	3	1	0	*3.64*	*0.63*	*2*	*3.798*
40	**Consulting Engineers**								
40.1	Safe and economic design	17	1	1	0	*3.84*	*0.50*	*2*	*7.320*
40.2	Sustainability/flexibility in design and construction	13	5	1	0	*3.63*	*0.60*	*3*	*4.609*
40.3	Timely delivery	18	1	0	0	*3.95*	*0.23*	*1*	*18.000*
40.4	Workable	15	1	1	2	*3.53*	*1.02*	*4*	*2.248*
40.5	Efficient performance of duties as per the terms and condition of conditions of employment	18	1	0	0	*3.95*	*0.23*	*1*	*18.000*
41	**Contractors**								
41.1	Delivery within time quality and cost targets	18	0	1	0	*3.89*	*0.46*	*1*	*8.500*
41.2	Minimise cost (avoiding on site and material wastes	14	2	1	2	*3.47*	*1.02*	*4*	*2.024*
41.3	Technical and managerial competence	15	3	1	0	*3.74*	*0.56*	*2*	*5.715*
41.4	Accommodating client's changes in good faith	13	6	0	0	*3.68*	*0.48*	*3*	*6.245*
41.5	Efficient coordinating of the specialists and subcontracting works	14	4	1	0	*3.68*	*0.58*	*3*	*5.121*
41.6	Financial capacity and adequate guarantee against own and subcontractors default	10	6	2	1	*3.31*	*0.88*	*5*	*1.555*
41.7	Efficient coordinating of the specialists and subcontracting works	17	2	0	0	*3.89*	*0.31*	*1*	*12.369*
42	**Clients' Responsibilities**								
42.1	Reasonable expectation	17	2	0	0	*3.89*	*0.31*	*1*	*12.369*
42.2	Seeking professional advice in investment decisions	16	3	0	0	*3.84*	*0.37*	*2*	*9.798*
42.3	Disclosing all motives of investment, at the outset, to the project team	15	2	2	0	*3.68*	*0.67*	*3*	*4.444*
42.6	Budgeting Sufficient time and funds for detailed feasibility studies/market research at the outset	13	5	1	0	*3.63*	*0.60*	*4*	*4.609*
42.7	Striving to cultivate synergy amongst project team members, through strong emphases on teamwork, equality and fairness	13	5	0	1	*3.58*	*0.77*	*5*	*3.284*
42.8	Assessing levels of similar development springing up, or having been slated for near future development with a given node, before investing	12	5	2	0	*3.52*	*0.70*	*6*	*3.293*
42.4	Fulfilment of contractual obligation	16	3	0	0	*3.84*	*0.37*	*2*	*9.798*
42.5	Employment of specialists in the management and executions of all critical aspects of the work	15	1	3	0	*3.63*	*0.76*	*4*	*3.618*

Table 8 Private Clients' assessment on Expectations from service providers

No.	Measures	Level Importance				μ	σ
		4	3	2	1		
37	**Quantity Surveyor**						
37.1	Accurate and reliable budget estimate	3	14	2	0	*3.05*	*0.52*
37.2	Efficiency (timely job execution)	3	11	4	1	*2.84*	*0.76*
37.3	Competency (expertise and experience)	3	15	1	0	*3.10*	*0.46*
37.4	Ability to foresee and budget for potential inflation	3	10	6	0	*2.84*	*0.69*
37.5	Efficient performance of duties as per the terms and condition of conditions of employment	2	13	4	0	*2.89*	*0.57*
38	**Architects**						
38.1	Flexibility in design (to accommodate future changes)	4	9	6	0	*2.89*	*0.74*
38.2	Buildability of design	6	8	2	3	*2.89*	*1.05*
38.3	Efficiency (supervision, instruction etc)	5	10	4	0	*3.05*	*0.71*
38.4	Aesthetic appeal	4	11	4	0	*3.00*	*0.67*
38.5	Delivery within time	4	11	3	1	*2.94*	*0.78*
38.6	Efficient performance of duties as per the terms and condition of conditions of employment	8	8	3	0	*3.26*	*0.73*
39	**Project Managers**						
39.1	Technical and managerial competencies/ experience	2	10	2	0	*3.00*	*0.55*
39.2	Team work and efficient coordination	4	8	2	0	*3.14*	*0.66*
39.3	Delivery within time, cost and cost target	2	9	1	2	*2.78*	*0.89*
39.4	Manage client's changes efficiently	4	7	2	1	*3.00*	*0.88*
39.5	Efficient performance of duties as per the terms and condition of conditions of employment	3	7	4	0	*2.93*	*0.73*
40	**Consulting Engineers**						
40.1	Safe and economic design	8	9	1	1	*3.26*	*0.80*
40.2	Sustainability/flexibility in design and construction	6	11	0	2	*3.10*	*0.87*
40.3	Timely delivery	8	9	2	0	*3.32*	*0.67*
40.4	Workable	6	7	6	0	*3.00*	*0.82*
40.5	Efficient performance of duties as per the terms and condition of conditions of employment	9	8	2	0	*3.37*	*0.68*
41	**Contractors**						
41.1	Delivery within time quality and cost targets	3	12	3	1	*2.89*	*0.74*
41.2	Minimise cost (avoiding on site and material wastes	3	11	5	0	*2.89*	*0.66*
41.3	Technical and managerial competence	3	14	0	2	*2.95*	*0.78*
41.4	Accommodating client's changes in good faith	2	10	7	0	*2.74*	*0.65*
41.5	Efficient coordinating of the specialists and subcontracting works	3	8	7	1	*2.68*	*0.82*
41.6	Financial capacity and adequate guarantee against own and subcontractors default	2	11	6	0	*2.79*	*0.63*
41.7	Efficient coordinating of the specialists and subcontracting works	3	15	1	0	*3.10*	*0.46*
42	**Clients' Responsibilities**						
42.1	Reasonable expectation	4	14	1	0	*3.16*	*0.50*
42.2	Seeking professional advice in investment decisions	3	13	2	1	*2.95*	*0.70*
42.3	Disclosing all motives of investment, at the outset, to the project team	3	13	2	1	*2.95*	*0.70*
42.6	Budgeting Sufficient time and funds for detailed feasibility studies/market research at the outset	2	9	7	1	*2.64*	*0.76*
42.7	Striving to cultivate synergy amongst project team members, through strong emphases on teamwork, equality and fairness	4	11	3	1	*2.95*	*0.78*
42.8	Assessing levels of similar development springing up, or having been slated for near future development with a given node, before investing	3	13	2	1	*2.95*	*0.70*
42.4	Fulfilment of contractual obligation	3	13	2	1	*2.95*	*0.70*
42.5	Employment of specialists in the management and executions of all critical aspects of the work	3	14	2	0	*3.05*	*0.52*

Table 9 Comparison for Assessment Gap for private clients

No.	Measures	Expectation		Assessment		Gap	%Satn.	t-values
37	**Quantity Surveyor**	**μ**	**σ**	**μ**	**σ**			
37.1	Accurate and reliable budget estimate	*3.84*	*0.50*	*3.05*	*0.52*	*0.79*	*79.45*	*4.743*
37.2	Efficiency (timely job execution)	*3.68*	*0.75*	*2.84*	*0.76*	*0.84*	*77.14*	*3.4286*
37.3	Competency (expertise and experience)	*3.89*	*0.31*	*3.10*	*0.46*	*0.79*	*79.73*	*6.181*
37.4	Ability to foresee and budget for potential inflation	*3.74*	*0.73*	*2.84*	*0.69*	*0.89*	*76.06*	*3.877*
37.5	Efficient performance of duties as per the terms and condition of conditions of employment	*3.95*	*0.23*	*2.89*	*0.57*	*1.05*	*73.33*	*7.5*
38	**Architects**							
38.1	Flexibility in design (to accommodate future changes)	*3.79*	*0.42*	*2.89*	*0.74*	*0.89*	*76.39*	*4.598*
38.2	Buildability of design	*3.89*	*0.46*	*2.89*	*1.05*	*1*	*74.32*	*3.808*
38.3	Efficiency (supervision, instruction etc)	*3.84*	*0.50*	*3.05*	*0.71*	*0.79*	*79.45*	*3.977*
38.4	Aesthetic appeal	*3.84*	*0.37*	*3.00*	*0.67*	*0.84*	*78.08*	*4.8*
38.5	Delivery within time	*3.84*	*0.37*	*2.94*	*0.78*	*0.89*	*76.71*	*4.508*
38.6	Efficient performance of duties as per the terms and condition of conditions of employment	*3.79*	*0.42*	*3.26*	*0.73*	*0.53*	*86.11*	*2.716*
39	**Project Managers**							
39.1	Technical and managerial competencies/ experience	*3.86*	*0.36*	*3.00*	*0.55*	*0.86*	*77.78*	*4.837*
39.2	Team work and efficient coordination	*3.28*	*0.82*	*3.14*	*0.66*	*0.14*	*95.65*	*0.505*
39.3	Delivery within time and cost target	*3.42*	*3.59*	*2.78*	*0.89*	*0.64*	*81.25*	*1.950*
39.4	Manage client's changes efficiently	*3.57*	*0.65*	*3.00*	*0.88*	*0.57*	*84.00*	*1.963*
39.5	Efficient performance of duties as per the terms and condition of conditions of employment	*3.64*	*0.63*	*2.93*	*0.73*	*0.71*	*80.39*	*2.765*
40	**Consulting Engineers**							
40.1	Safe and economic design	*3.84*	*0.50*	*3.26*	*0.80*	*0.58*	*84.93*	*2.659*
40.2	Sustainability/flexibility in design and construction	*3.63*	*0.60*	*3.10*	*0.87*	*0.53*	*85.51*	*2.165*
40.3	Timely delivery	*3.95*	*0.23*	*3.32*	*0.67*	*0.63*	*84*	*3.882*
40.4	Workable	*3.53*	*1.02*	*3.00*	*0.82*	*0.53*	*85.07*	*1.756*
40.5	Efficient performance of duties as per the terms and condition of conditions of employment	*3.95*	*0.23*	*3.37*	*0.68*	*0.58*	*85.33*	*3.498*
41	**Contractors**							
41.1	Delivery within time quality and cost targets	*3.89*	*0.46*	*2.89*	*0.74*	*1*	*74.32*	*5.018*
41.2	Minimise cost (avoiding on site and material wastes	*3.47*	*1.02*	*2.89*	*0.66*	*0.58*	*83.33*	*2.079*
41.3	Technical and managerial competence	*3.74*	*0.56*	*2.95*	*0.78*	*0.79*	*78.87*	*3.580*
41.4	Accommodating client's changes in good faith	*3.68*	*0.48*	*2.74*	*0.65*	*0.95*	*74.28*	*5.102*
41.5	Efficient coordinating of the specialists and subcontracting works	*3.68*	*0.58*	*2.68*	*0.82*	*1*	*72.86*	*4.334*
41.6	Financial capacity and adequate guarantee against own and subcontractors default	*3.31*	*0.88*	*2.79*	*0.63*	*0.53*	*84.13*	*2.112*
41.7	Efficient coordinating of the specialists and subcontracting works	*3.89*	*0.31*	*3.10*	*0.46*	*0.79*	*79.73*	*6.1818*
42	**Clients' Responsibilities**							
42.1	Reasonable expectation	*3.89*	*0.31*	*3.16*	*0.50*	*0.74*	*81.08*	*5.422*
42.2	Seeking professional advice in investment decisions	*3.84*	*0.37*	*2.95*	*0.70*	*0.89*	*76.71*	*4.885*
42.3	Disclosing all motives of investment, at the outset, to the project team	*3.68*	*0.67*	*2.95*	*0.70*	*0.74*	*80.00*	*3.300*
42.6	Budgeting Sufficient time and funds for detailed feasibility studies/market research at the outset	*3.63*	*0.60*	*2.64*	*0.76*	*1*	*72.46*	*4.506*
42.7	Striving to cultivate synergy amongst project team members, through strong emphases on teamwork, equality and fairness	*3.58*	*0.77*	*2.95*	*0.78*	*0.63*	*82.35*	*2.514*
42.8	Assessing levels of similar development springing up, or having been slated for near future development with a given node, before investing	*3.52*	*0.70*	*2.95*	*0.70*	*0.58*	*83.58*	*2.546*
42.4	Fulfilment of contractual obligation	*3.84*	*0.37*	*2.95*	*0.70*	*0.89*	*76.71*	*4.885*
42.5	Employment of specialists in the management and executions of all critical aspects of the work	*3.63*	*0.76*	*3.05*	*0.52*	*0.58*	*84.06*	*2.7312*

Table 10 Public and Private Clients Compared

No.	Measures	GVT		Private		Gap	t-values
		μ	σ	μ	σ		
37	**Quantity Surveyor**						
37.1	Accurate and reliable budget estimate	*3.66*	*0.68*	*3.84*	*0.50*	*-0.18*	*-1.116*
37.2	Efficiency (timely job execution)	*3.59*	*0.90*	*3.68*	*0.75*	*-0.09*	*-0.426*
37.3	Competency (expertise and experience)	*3.84*	*0.48*	*3.89*	*0.31*	*-0.05*	*-0.469*
37.4	Ability to foresee and budget for potential inflation	*3.50*	*0.90*	*3.74*	*0.73*	*-0.24*	*-1.078*
37.5	Efficient performance of duties as per the terms and condition of conditions of employment	*3.73*	*0.62*	*3.95*	*0.23*	*-0.22*	*-1.513*
38	**Architects**						
38.1	Flexibility in design (to accommodate future changes)	*3.73*	*0.82*	*3.79*	*0.42*	*-0.06*	*-0.323*
38.2	Buildability of design	*3.77*	*0.64*	*3.89*	*0.46*	*-0.12*	*-0.790*
38.3	Efficiency (supervision, instruction etc)	*3.45*	*0.85*	*3.84*	*0.50*	*-0.39*	*-1.925*
38.4	Aesthetic appeal	*3.32*	*1.03*	*3.84*	*0.37*	*-0.52*	*-2.183*
38.5	Delivery within time	*3.62*	*0.75*	*3.84*	*0.37*	*-0.23*	*-1.287*
38.6	Efficient performance of duties as per the terms and condition of conditions of employment	*3.63*	*0.81*	*3.79*	*0.42*	*-0.15*	*-0.802*
39	**Project Managers**						
39.1	Technical and managerial competencies/ experience	*3.54*	*0.97*	*3.86*	*0.36*	*-0.32*	*-1.143*
39.2	Team work and efficient coordination	*3.69*	*0.63*	*3.28*	*0.82*	*0.41*	*1.393*
39.3	Delivery within time, cost and cost target	*3.54*	*0.88*	*0.07*	*3.59*	*0.11*	*0.323*
39.4	Manage client's changes efficiently	*3.77*	*0.60*	*3.57*	*0.65*	*0.20*	*0.804*
39.5	Efficient performance of duties as per the terms and condition of conditions of employment	*3.92*	*0.28*	*3.64*	*0.63*	*0.28*	*1.419*
40	**Consulting Engineers**						
40.1	Safe and economic design	*3.70*	*0.70*	*3.84*	*0.50*	*-0.14*	*-0.815*
40.2	Sustainability/flexibility in design and construction	*3.79*	*0.55*	*3.63*	*0.60*	*0.16*	*1.171*
40.3	Timely delivery	*3.70*	*0.70*	*3.95*	*0.23*	*-0.24*	*-1.488*
40.4	Workable	*3.68*	*0.71*	*3.53*	*1.02*	*0.15*	*0.816*
40.5	Efficient performance of duties as per the terms and condition of conditions of employment	*3.75*	*0.57*	*3.95*	*0.23*	*-0.20*	*-1.4673*
41	**Contractors**						
41.1	Delivery within time quality and cost targets	*3.82*	*0.49*	*3.89*	*0.46*	*-0.08*	*-0.625*
41.2	Minimise cost (avoiding on site and material wastes	*3.78*	*0.56*	*3.47*	*1.02*	*0.30*	*1.832*
41.3	Technical and managerial competence	*3.75*	*0.65*	*3.74*	*0.56*	*0.01*	*0.082*
41.4	Accommodating client's changes in good faith	*3.75*	*0.65*	*3.68*	*0.48*	*0.06*	*0.419*
41.5	Efficient coordinating of the specialists and subcontracting works	*3.73*	*0.58*	*3.68*	*0.58*	*0.04*	*0.295*
41.6	Financial capacity and adequate guarantee against own and subcontractors default	*3.77*	*0.60*	*3.31*	*0.88*	*0.46*	*2.795*
41.7	Efficient coordinating of the specialists and subcontracting works	*3.66*	*0.74*	*3.89*	*0.31*	*-0.23*	*-1.351*
42	**Clients' Responsibilities**						
42.1	Reasonable expectation	*3.68*	*0.71*	*3.89*	*0.31*	*-0.21*	*-1.283*
42.2	Seeking professional advice in investment decisions	*3.61*	*0.81*	*3.84*	*0.37*	*-0.23*	*-1.197*
42.3	Disclosing all motives of investment, at the outset, to the project team	*3.70*	*0.59*	*3.68*	*0.67*	*0.020335*	*0.134*
42.6	Budgeting Sufficient time and funds for detailed feasibility studies/market research at the outset	*3.73*	*0.62*	*3.63*	*0.60*	*0.095694*	*0.619*
42.7	Striving to cultivate synergy amongst project team members, through strong emphases on teamwork, equality and fairness	*3.54*	*0.63*	*3.58*	*0.77*	*-0.03349*	*-0.206*
42.8	Assessing levels of similar development springing up, or having been slated for near future development with a given node, before investing	*2.68*	*1.03*	*3.52*	*0.70*	*-0.8445*	*-3.425*
42.4	Fulfilment of contractual obligation	*3.77*	*0.52*	*3.84*	*0.37*	*-0.07*	*-0.552*
42.5	Employment of specialists in the management and executions of all critical aspects of the work	*3.64*	*0.81*	*3.63*	*0.76*	*0.00*	*0.024*

NB: % Satisfaction. : “percentage satisfaction”, measured by:

$$\frac{\text{Mean of ranked assessment of an item x 100}}{\text{Mean of ranked expectation of the item}}$$

APPENDIX 13: Analyses of Clients' Questionnaires 2

Meas.	No.	Sub- Measure	Client		Project Management Practitioners				Overall Weightings			
					Architects		Q. Surveyor					
			$\bar{A}_{CL}$	σ_{CL}	$\bar{A}_{A}$	σ_{A}	$\bar{A}_{QS}$	σ_{QS}	$\bar{A}_{P}$	σ_{P}	A_{CP}	σ_{CP}
Needs/ Mot.ivation	1	Contributing to good governance	**32.1**	12.50	25.9	9.72	28.6	9.66	27.4	9.66	29.31	11.04
	2	Contributing to National Infrastructure	**37.9**	11.42	45.0	8.48	37.1	9.34	40.5	9.72	39.46	10.43
	3	Addressing future infrastructural expectations	**30.0**	8.48	28.8	6.74	35.0	10.20	32.3	9.31	31.39	8.99
Good Gov'nance	1	Building a positive image of the government	**17.4**	9.46	20.3	8.56	22.7	9.35	21.7	8.98	19.95	9.34
	2	Creating job employment	**22.5**	9.51	17.4	5.89	25.0	7.87	21.7	7.97	22.00	8.56
	3	Regulating the economy	**20.4**	11.22	17.6	7.72	16.6	5.43	17.1	6.46	18.39	8.75
	4	Improvement in country's GDP	**19.4**	9.20	17.1	7.51	13.9	6.16	15.3	6.88	16.92	8.09
	5	To satisfy social need	**20.3**	9.98	25.9	9.72	21.6	9.04	23.5	9.47	22.20	9.73
National. Infras'ture	1	Adding to national physical infrastructural stocks	**25.8**	10.65	25.3	9.09	30.7	11.88	28.3	10.96	27.31	10.83
	2	Developing a new technical capability	**17.7**	6.20	14.71	5.99	15.0	7.24	14.9	6.64	16.00	6.57
	3	Contributing to other projects	**18.5**	7.25	15.3	6.24	15.7	5.83	15.5	5.94	16.71	6.61
	4	Contributing to critical fields of national interest	**25.1**	9.02	27.7	7.73	22.1	11.41	24.5	10.25	24.72	9.71
	5	Investing excess liquidity in infrastructure	**12.9**	8.02	16.5	10.27	17.1	7.82	16.8	8.85	15.26	8.67
Infrastructural Needs	1	Providing housing and infrastructure for increasing population	**30.8**	14.95	34.7	20.37	39.3	12.47	37.3	16.26	34.69	15.96
	2	Providing housing and infrastructure for future expectations	**21.0**	9.84	19.1	7.34	21.6	7.14	20.5	7.24	20.73	8.31
	3	Creating incentive for accelerated national growth	**25.0**	10.77	26.2	12.19	19.3	8.77	22.3	10.81	23.39	10.79
	4	Providing facilities for expanding government activities	**23.2**	9.28	19.4	8.08	20.9	9.72	20.3	8.96	21.43	9.13

Table 1. Client's Needs and Motivation Criteria

Meas.	No.	Sub- Measure	Clients		Project Management Practitioners				Overall Weighting			
					Architects		Q. Surveyor					
			$\bar{A}_{CL}$	σ_{CL}	$\bar{A}_{A}$	σ_{A}	$\bar{A}_{QS}$	σ_{QS}	$\bar{A}_{P}$	σ_{P}	A_{CP}	σ_{CP}
Quantity Surveyors	1	Providing good and reliable financial advice	**30.9**	13.19	27.7	12.76	38.2	11.39	33.6	12.98	32.54	13.02
	2	Efficient execution of the procurement process (especially, tendering)	**26.6**	9.46	27.1	8.85	22.9	8.40	24.7	8.73	25.49	9.00
	3	Accurate, fair and timely preparation of the valuation certificate	**21.7**	8.64	25.9	7.75	20.7	4.95	22.9	6.76	22.43	7.53
	4	Efficient performance of duties as per terms and conditions of appointment	**20.8**	8.91	19.4	11.44	17.7	5.50	18.5	8.52	19.39	8.69
Architects	1	Providing acceptable design on time	**28.5**	12.10	23.5	8.05	35.0	10.35	30.0	10.94	29.39	11.41
	2	Providing team leadership	**16.3**	6.25	16.8	6.11	15.9	4.79	16.3	5.34	16.31	5.69
	3	Providing timely and comprehensive site instructions	**18.3**	7.99	19.7	6.72	18.5	4.62	19.1	5.58	18.74	6.60
	4	Effective site supervision and inspection	**19.6**	6.62	19.4	8.64	17.1	7.18	18.1	7.83	18.69	7.36
	5	Efficient performance of duties as per terms and conditions of appointment	**17.3**	8.74	20.6	9.33	13.5	5.93	16.6	8.24	16.89	8.56
Project Managers/ Consultants	1	Coordination and Teamwork	**19.6**	7.06	30.6	17.13	16.6	5.65	22.7	13.81	21.46	11.62
	2	Technical and managerial competence	**24.2**	11.97	18.1	5.12	21.1	7.06	19.8	6.39	21.58	9.22
	3	Delivery within the project estimated goals: ***time, cost, quality and scope***	**27.1**	10.79	23.8	9.06	37.3	17.37	31.5	15.68	29.73	14.00
	4	Ensuring compliance of all social and environmental regulations	**13.0**	5.73	13.8	4.16	10.5	5.54	11.9	5.21	12.37	5.41
	5	Efficient performance of duties as per terms and conditions of appointment	**16.0**	8.67	16.2	8.93	14.55	8.00	15.3	8.35	15.55	8.42

Table 2 Expectation from Service Providers

Meas.	No.	Sub- Measure	Clients		Project Management Practitioners				Overall Weighting			
					Architects		Q. Surveyor					
			$\bar{A}_{CL}$	σ_{CL}	$\bar{A}_{A}$	σ_{A}	$\bar{A}_{QS}$	σ_{QS}	$\bar{A}_{P}$	σ_{P}	A_{CP}	σ_{CP}
Consulting Engineers	1	Providing timely, Complete, Comprehensive design	**28.9**	11.73	29.1	5.93	39.8	13.23	35.1	11.84	32.66	12.09
	2	Providing Effective supervision and inspection	**29.0**	8.49	21.8	3.93	23.2	5.01	22.6	4.57	25.15	7.12
	3	Provision of timely and comprehensive instruction	**21.2**	6.34	24.4	6.34	20.9	5.90	22.4	6.27	21.95	6.29
	4	Efficient performance of duties as per terms and conditions of appointment	**20.4**	8.94	24.7	5.72	16.4	7.74	20.0	8.03	20.15	8.34
Contractor	1	Delivery within agreed project time	**29.6**	10.19	24.4	7.88	34.6	15.42	30.1	13.55	29.92	12.23
	2	Diligence to work	**20.0**	9.27	19.3	6.35	16.4	5.39	17.6	5.93	18.59	7.47
	3	Coordination of the specialists and sub-contractors' works	**11.7**	5.14	13.2	4.66	16.4	6.58	15.0	5.96	13.68	5.84
	4	Financial capacity	**20.6**	9.20	22.1	5.07	15.0	8.17	18.1	7.76	19.08	8.39
	5	Efficient performance of duties as per terms and conditions of appointment	**18.1**	9.55	20.7	9.83	17.9	9.08	19.2	9.39	18.74	9.39

Table 2 Continued.

Meas.	No.	Sub- Measure	Clients		Project Management Practitioners				Overall Weighting			
					Architects		Q. Surveyor					
			$\bar{A}_{CL}$	σ_{CL}	$\bar{A}_{A}$	σ_{A}	$\bar{A}_{QS}$	σ_{QS}	$\bar{A}_{P}$	σ_{P}	A_{CP}	σ_{CP}
Overall Project Performance	1	Quantity Surveyor	**13.8**	7.71	14.4	7.05	14.7	6.09	14.6	6.44	14.29	6.92
	2	Architect	**15.3**	4.84	18.5	9.15	14.1	5.83	16.1	7.67	15.76	6.65
	3	Project Manager	**14.0**	6.65	11.8	3.03	13.4	4.68	12.7	4.07	13.21	5.25
	4	Consulting Engineer	**13.1**	3.83	10.0	3.06	13.8	5.21	12.2	4.76	12.55	4.40
	5	Contractor	**16.0**	7.57	8.8	4.85	13.3	4.65	11.4	5.19	13.25	6.61
	6	Project Team	**11.7**	5.27	10.8	6.32	9.8	3.84	10.2	5.02	10.82	5.13
	7	Client's Organisation	**9.7**	4.84	16.7	9.04	9.4	3.91	12.6	7.49	11.42	6.68
	8	External Environment	**6.4**	3.73	10.2	8.40	10.5	9.28	10.4	8.79	8.78	7.42
Good Governance	1	Quantity Surveyor	**13.0**	7.63	17.1	9.85	14.7	6.09	15.7	7.93	14.65	7.85
	2	Architect	**13.8**	5.85	15.1	8.60	11.5	5.81	13.1	7.29	13.36	6.71
	3	Project Manager	**13.6**	5.16	16.5	10.42	10.8	4.93	13.2	8.21	13.38	7.10
	4	Consulting Engineer	**11.8**	4.58	9.6	3.32	10.9	5.26	10.3	4.51	10.91	4.60
	5	Contractor	**16.6**	9.53	9.1	5.37	19.2	7.29	14.8	8.20	15.53	8.72
	6	Project Team	**10.7**	5.60	9.7	5.98	9.4	4.24	9.5	5.00	9.97	5.24
	7	Client's Organisation	**12.5**	6.94	14.0	10.90	10.7	4.95	12.1	8.15	12.28	7.58
	8	External Environment	**8.0**	5.66	8.7	4.01	12.9	7.66	11.1	6.63	9.85	6.39
National Infrastructure	1	Quantity Surveyor	**12.1**	7.79	15.4	8.67	15.3	6.18	15.3	7.27	14.03	7.59
	2	Architect	**13.9**	6.19	13.0	6.31	13.4	6.43	13.2	6.29	13.49	6.22
	3	Project Manager	**11.7**	5.98	10.0	3.53	9.3	5.79	9.6	4.89	10.42	5.41
	4	Consulting Engineer	**11.9**	3.36	10.4	3.66	12.6	7.33	11.6	6.04	11.75	5.11
	5	Contractor	**15.2**	6.55	12	4.24	24.9	12.73	18.6	12.32	17.21	10.47
	6	Project Team	**12.6**	6.52	13.2	7.69	8.3	4.52	10.4	6.52	11.29	6.55
	7	Client's Organisation	**14.8**	10.33	16.8	9.34	8.9	5.55	12.3	8.34	13.32	9.20
	8	External Environment	**7.8**	4.99	11.4	6.84	7.1	2.92	8.9	5.37	8.50	5.22
Infrastructural Needs	1	Quantity Surveyor	**11.2**	7.11	10.3	5.44	12.5	5.06	11.5	5.28	11.40	6.02
	2	Architect	**16.4**	7.14	18.2	8.83	14.8	8.09	16.3	8.49	16.34	7.92
	3	Project Manager	**11.9**	5.86	10.6	3.48	10.1	5.37	10.3	4.59	10.98	5.16
	4	Consulting Engineer	**11.7**	4.24	7.8	4.80	10.3	3.64	9.2	4.33	10.22	4.43
	5	Contractor	**12.3**	7.36	7.3	7.30	16.7	6.52	15.1	7.03	13.98	7.24
	6	Project Team	**11.7**	5.53	12.9	5.16	11.4	4.41	10.2	4.89	10.78	5.15
	7	Client's Organisation	**14.4**	9.09	20.0	10.31	10.8	5.53	14.8	9.11	14.62	9.04
	8	External Environment	**10.4**	6.90	11.8	9.67	14.1	17.64	13.1	14.58	11.98	12.11

Table 3. Influence of Service Providers and Other Factors on Project Performance

Meas.	No.	Sub- Measure	Client		Project Management Practitioners				Overall Weighting			
					Architects		Q. Surveyor					
			$\bar{A}_{CL}$	σ_{CL}	$\bar{A}_{A}$	σ_{A}	$\bar{A}_{QS}$	σ_{QS}	$\bar{A}_{P}$	σ_{P}	A_{CP}	σ_{CP}
Across PLC	1	Inception stage	**21.9**	8.49	20.9	5.07	20.9	9.21	20.9	7.59	21.31	7.92
	2	Execution Stage	**24.8**	8.42	24.1	6.18	25.9	14.28	25.1	11.38	25.00	10.23
	3	Commissioning Stage	**23.7**	14.32	25.6	11.02	24.6	13.23	25.0	12.19	24.46	12.99
	4	Use stage	**29.6**	12.72	28.2	10.74	28.6	16.70	28.5	14.24	28.92	13.56
Project Performance Criteria	1	Cost	**17.6**	6.56	13.6	3.77	21.6	9.65	18.1	8.57	17.92	7.77
	2	Time	**11.4**	4.18	14.0	4.42	14.6	5.49	14.3	4.99	13.18	4.86
	3	Quality	**18.3**	7.66	14.1	6.43	18.2	9.79	16.4	8.64	17.15	8.25
	4	Environmental Impact	**7.6**	3.61	9.0	3.64	7.9	5.04	8.4	4.46	8.08	4.13
	5	Social Impact	**10.3**	5.95	9.2	4.53	7.9	3.67	8.5	4.06	9.19	4.93
	6	Management & Execution Efficiency	**11.7**	6.71	11.8	6.78	11.1	4.80	11.4	5.67	11.53	6.06
	7	Service providers*	**11.6**	5.92	10.6	3.91	8.9	5.10	9.6	4.64	10.41	5.24
	8	Client's Needs	**11.5**	6.02	17.4	5.89	9.6	4.61	12.9	6.46	12.39	6.28

Table 4. Clients' Satisfaction

Key : $\mathbf{A_{CL}}$ -Clients' Average; σ_{CL} -Clients' Standard Deviation**;** Architects' Average; σ_{A} – Architects' Standard Deviation; A_{QS} –Quantity Surveyors' Average; σ_{QS} –Quantity Surveyors' Average; A_{P} -Overall Practitioners' Average = $\boldsymbol{\sigma_{P}}$ - Overall Practitioners' Standard Deviation; $A_{CP:}$ Overall average for clients and practitioners; $\boldsymbol{\sigma_{cp}}$ **:** Overall standard deviation for clients and practitioners.

APPENDIX 14: Clustering Criteria, Indicators and Factors for Practitioners Questionnaires 3

1. Criteria for Assessment

Provisional Criteria: The main criteria for practitioners' questionnaire so far are:
Cost (C), Time (T), Quality (Q), Managerial (M), Project and Execution Efficiency (PEE), Environmental Impact Assessment (EIA), Financial and Commercial (F/C), Contribution to National to Business (CB), Benefit to National Infrastructure (BNI), Future Perspective (FP), Customer Perspective (CP)

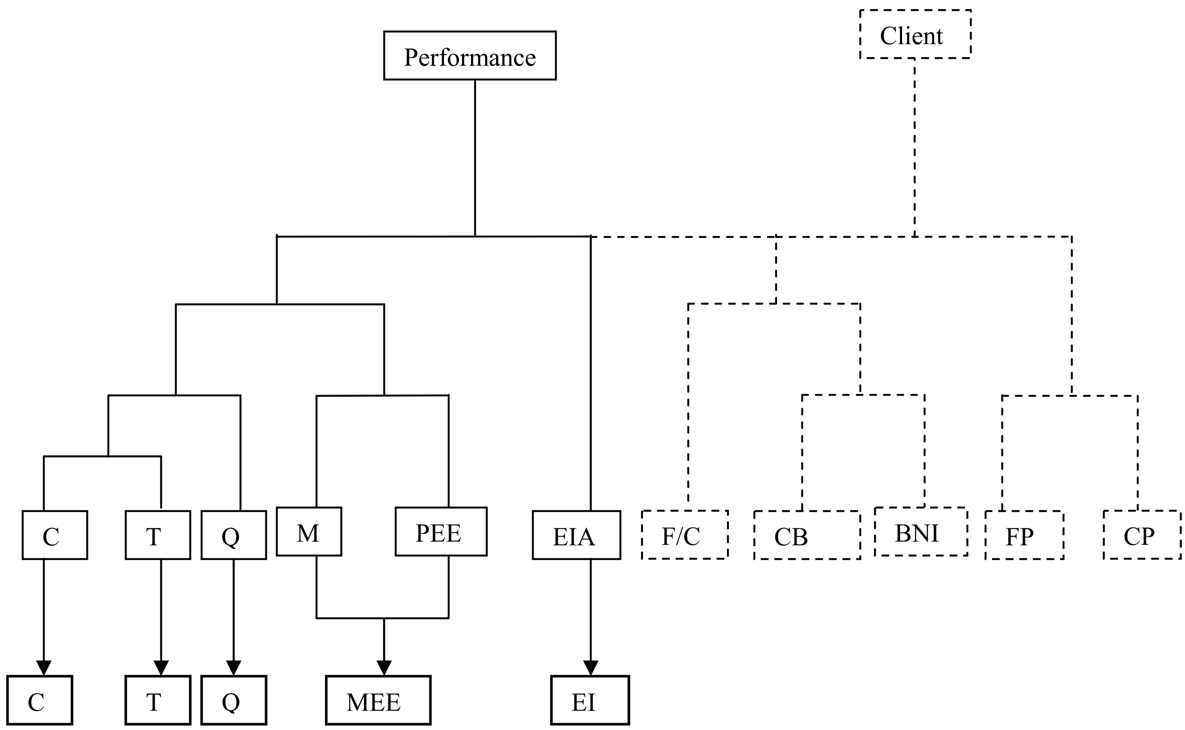

Fig P1

NB: i. The dotted areas represent those criteria which are for the client's perspective but has been initially considered with practitioners.

Resultant set of criteria: Five criteria have been determined for the next practitioners' survey. Two criteria ("Managerial" and "Project Execution Efficiency") have been grouped into one –Management and Execution Efficiency (MEE). "Environmental Impact Assessment (EIA)", now reads "Environmental Impacts (EI)". Based on the outcome of the expects' workshop, a sixth criteria, "Social Impacts" (SI) was added. Consequently, the six main criteria for assessing performance purely in Practitioners' perspective are: *Cost, Time, Quality, MEE, EI and SI.*

2. Indicators

i. Indicators of Cost: Variation between contract sum and final account (VCF), Variation cost (VC), Managerial costs (MC), Cost in relation to environmental issues (CEI), Fluctuation costs (FC), Legal costs (LC), Dispute costs (DC), Accidental costs (AC), Cost of incompletion (CI), Cost of capital (CC) and cost of Land/site (CLS)

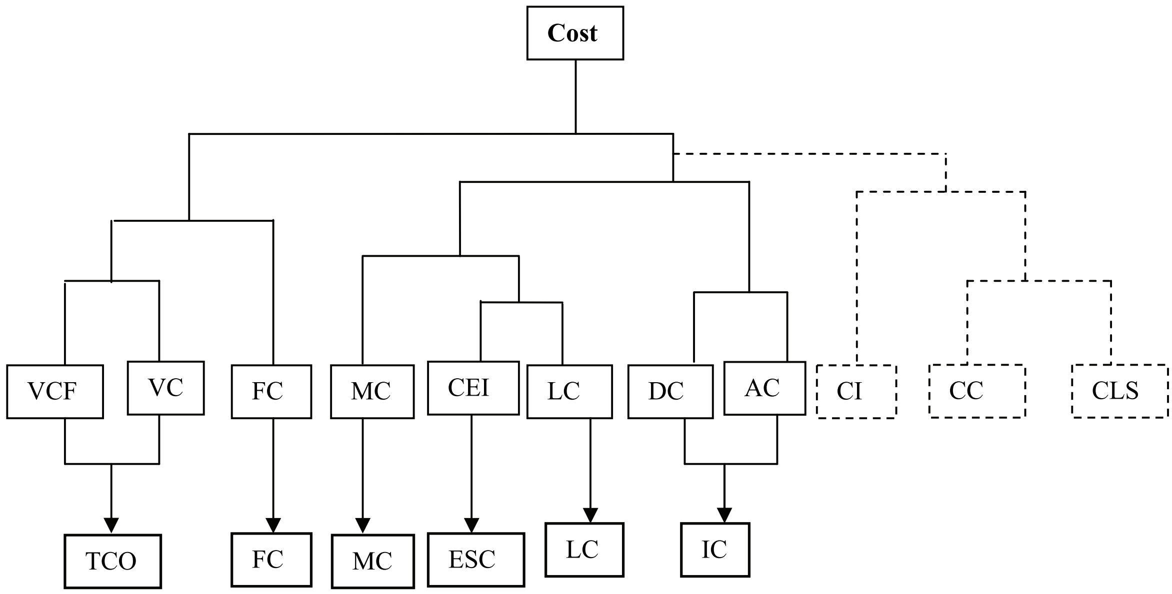

Fig. P2

Resultant set of indicators: *Total Cost Overrun (TCO), Fluctuation Costs (FC), Managerial Costs (MC), Environmental and Social Cost (ESC), Legal Costs (LC), Incidental Costs(IC).*

ii. Indicators of Time: Variation between estimated and actual completion time (VEAT), Actual time for completion of planned activities as against schedules (ACS), Time for executing variation (VT), Time for issuing and implementing site proceedings (TIS), Actual time of site meeting as against estimated (TSM), Actual commencement time (ACT), Time for resource mobilisation (TRM), Time for arrival of resources (TAR), Time for industrial action (TIA), Time for inclement weather (TIW), Dispute resolution Time (DRT), Time for Honouring certificate (THC), Time for evaluation and certification (TEC).

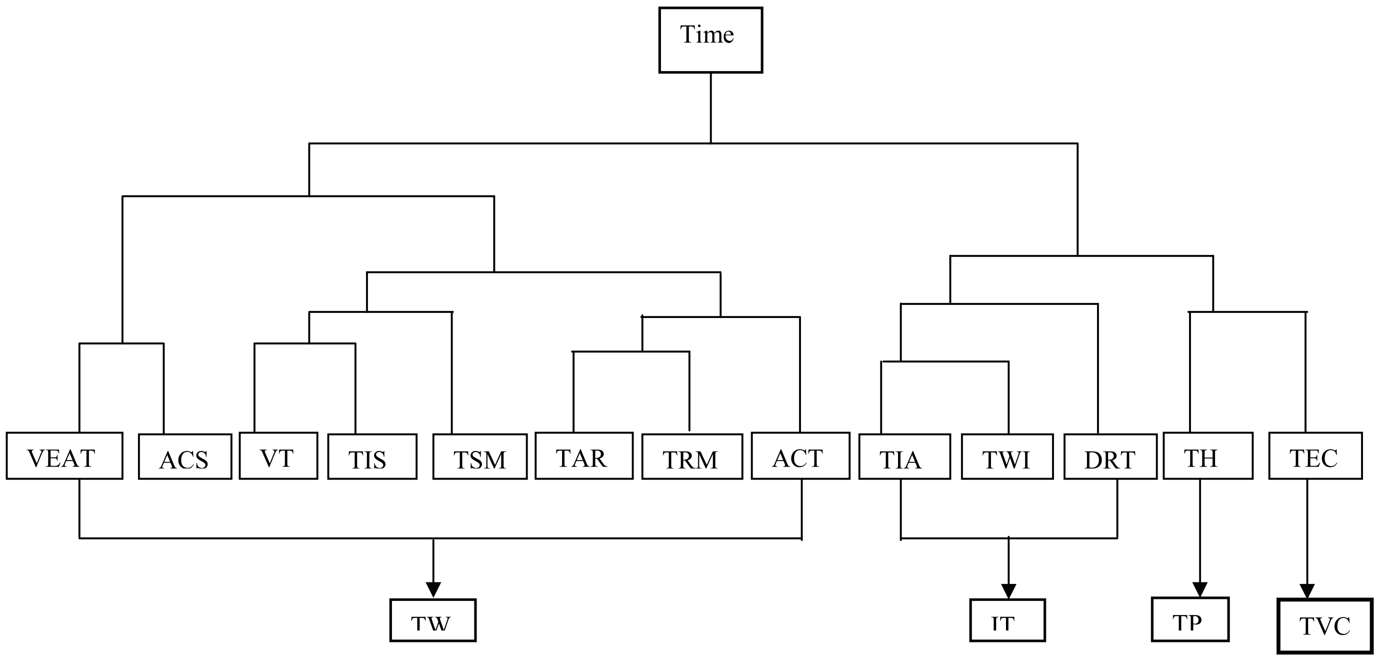

Fig. P 3

Resultant set of indicators: *Time for completion of major works (TW), Incidental times (IT), Time for payment of certified works (TP), Time for valuation and certification (TVC).*

iii. Indicators of Quality

Number of reworks (NR), Extent of reworks (ER), Records of material tests (RMT), Records of service tests (RST), Records of Engineer's/Architect's Approvals (RA), Records of Engineers/ Architect's disapprovals (RD), Technical specification (TS), Records of variation orders (RV).

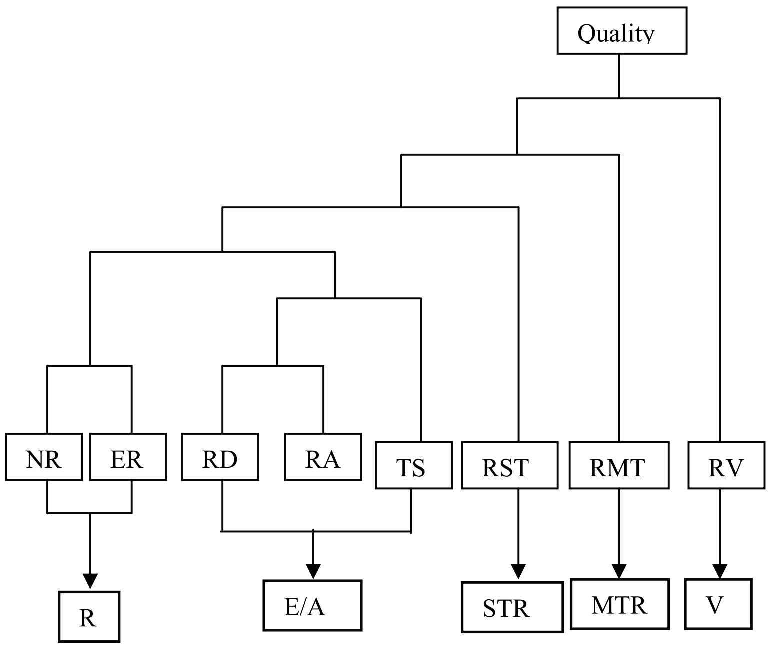

Fig. P 4

Resultant set of indicators: *Reworks –number and extent (R), Engineer's/Architect's records of approval/disapproval (E/AR), Service test records (STR), Material test records (MTR), Variation –number and extent (V).*

iv. Indicators of MEE
STEP 1:

Managerial aspect: Decision Making Process (DMP), Communication and reporting (CR), Test management (TM), Configuration control (CC), Budge management (BM), QS services (QSS), Architectural services (AS), Communication with Team workers (CTW), Resource scheduling and control (RSC), Personnel management (PM), Risk management (RM), Engineering services (ES).

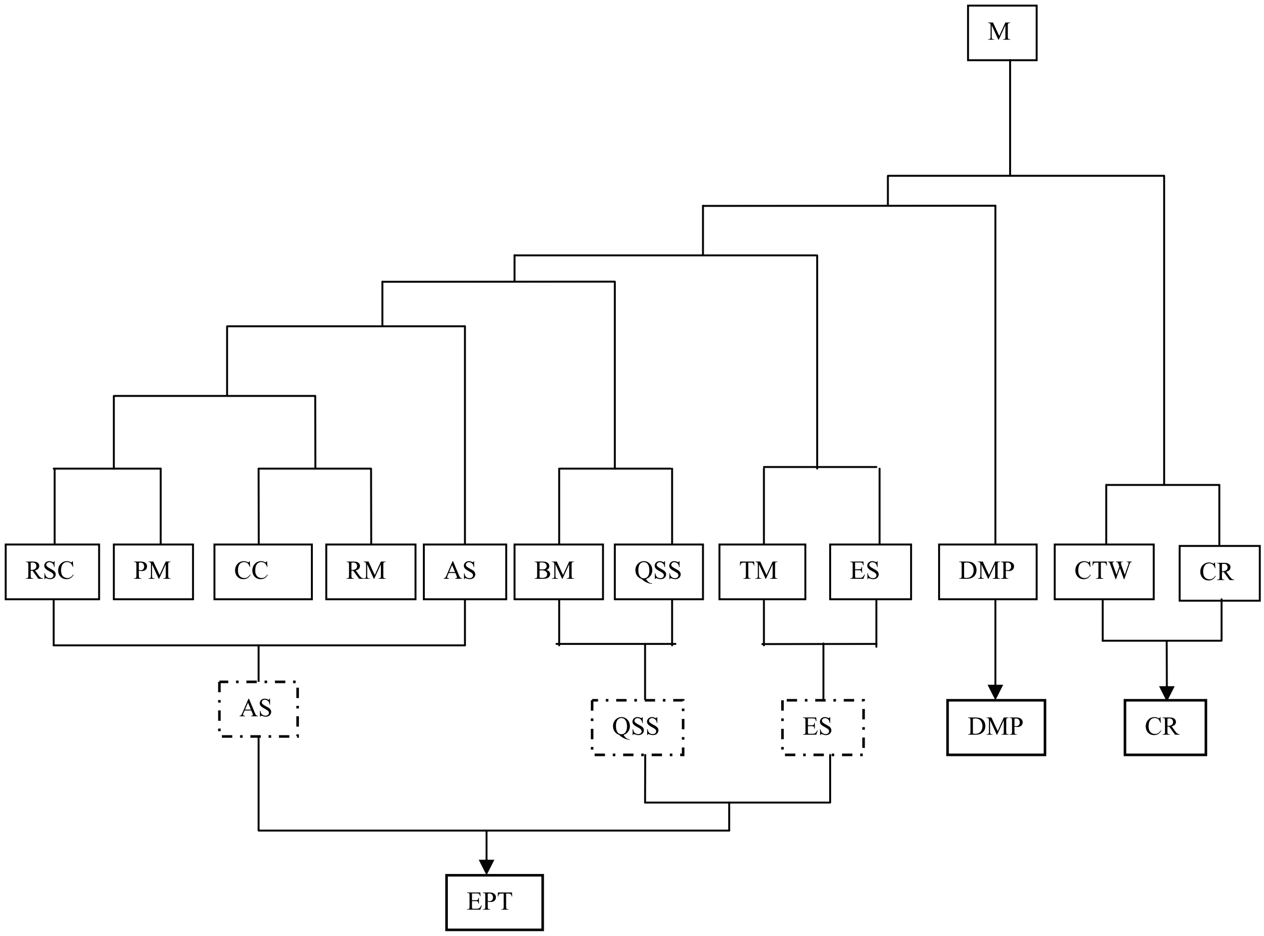

Fig. P 5

Resultant set of indicators: *Efficiency of project team (EPT), Decision Making processes (DMP), Communication and reporting (CR)*

Step 2:

Project Execution Efficiency aspect: Proper budgeting preceding project (PBP), Project going on budget (PGB), Project going on schedule (PGS), Frequency of variation order (FVO), Consistency of variation order (CVO), Complete design before proceeding (CDP), Number of reworks (NR), Extent of rework (ER), Site organisation (SO), Regularity of site meeting (RSM), Effective health and safety measures (EHS), Contractor's diligence to work (CD), Contractor's response to Architect's /Engineer's instruction (CRI), Relationship between expected and actual outputs (REA), Time for honouring payment certificate (TPC).

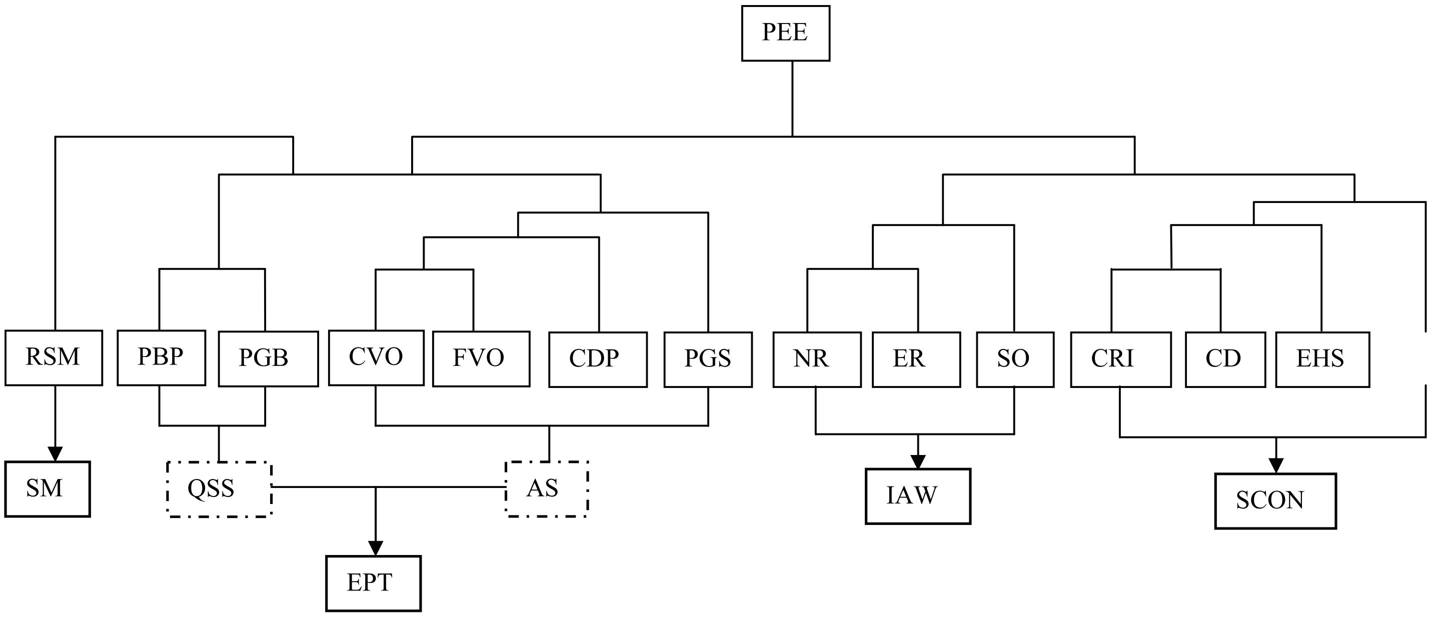

Fig. P 6

Resultant set of indicators: Site meeting regularity (SM), Efficiency of project Team (EPT), Inspection and approval of works (IAW), Supervision of contractors (SCON).

Decided Indicators: Combining the two into one perspective (**M + PEE),** the following indicators were settled on **MEE**: *Decision making procedure (DMP), Communicating and reporting (CR), Efficiency of project team (EPT), Site meeting regularity (SM), Inspection and approval of works (IAW), Supervision of contractor (SCON)*

v. Indicators of EI: Construction waste handling (CWH), Records of communal/social complains (RCS), Records from EIA department (RED).

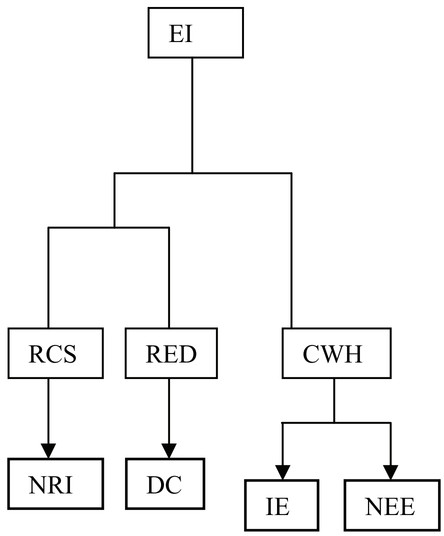

Fig. P 7

Resultant set of indicators: *Number of reported incidents (NRI), Degree of compliance with regulation (DC), Investment on environmental Issues (IE), Number of employees with environmental tasks (NEE).*

vi. Indicators of Social Impact. Displacement of residents (DR), impacts on residents (IR), Population characteristics (PC), Community and Institutional structures (CIS), Political and Social resources (PSR), Individual and family changes (IFC), Community resources(CR), displacement of business (DB), impacts on businesses and community services(IBCS) , Impacts on community (IC), social justice (SJ).

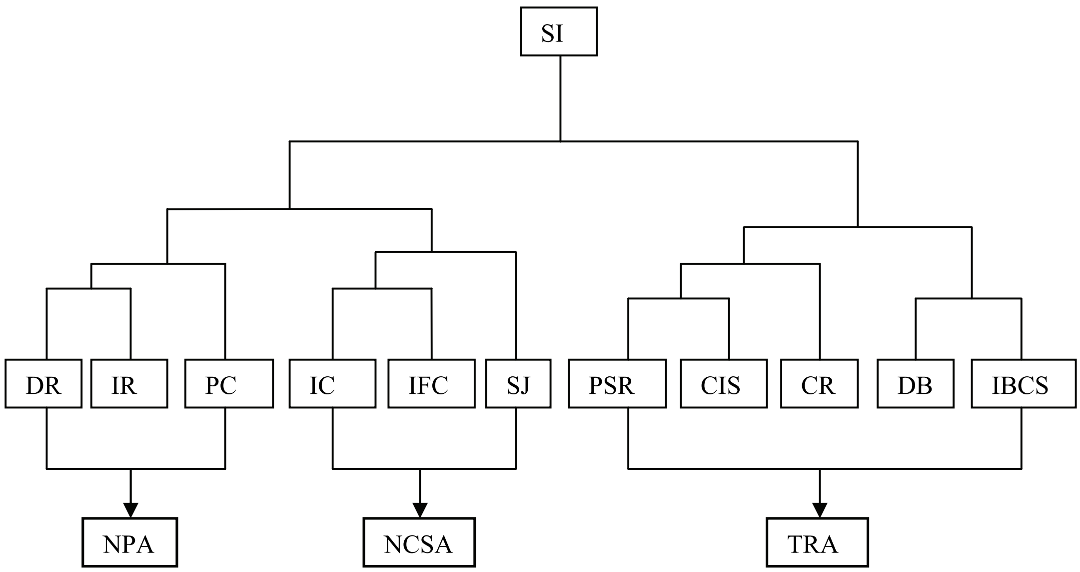

Fig. P 8

Resultant set of indicators: Number of population affected (NPA), Number and type of community and institutional structures affected (NCSA), Type of Community/Social resources affected (TRA).

3. Factors Groups and Factors.

a. Factor Groups: Factor Group: Factors related to the Project (Pj), Factors related to the project Manager/Consultant (PM/C), Factors related to the Project Team (PT), Factors Related to Client's Organisation (CLO), and Factors relate to the Project's External Environments (PEE).

b. Factors:

i. Factors Related to the Project: Project Type (Pt), Project size (PS), Project value (PV), Uniqueness of project activities (UP), Project duration (PD), Urgency (U), Project location (PL), Contractor's experience (Ce), Buildability (B), Project density (Pd).

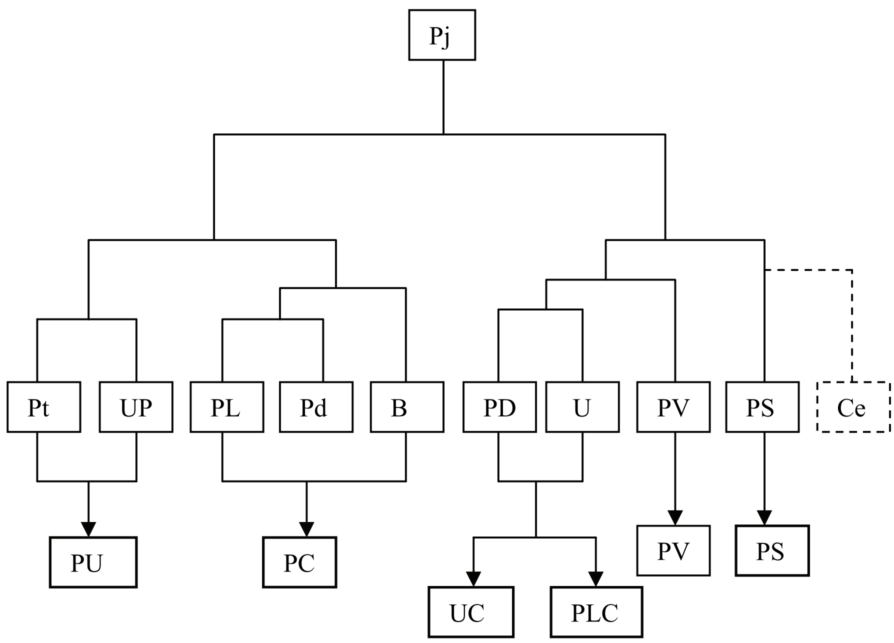

Fig. P 9

Resultant set of factors: *Project uniqueness (PU), Project complexity (PC), Urgency for completion (UC), Project life cycle (PLC), Project value (PV), Project size (PS).*

ii. Project Manager/Consultant: Ability to coordinate (AC), Ability to delegate authority (AD), Ability to take decisions when necessary (ATD), Ability to trade-off among competing requirements (ATCR), Competence (C), Commitment (Ct), Knowledge in /about local condition (KL), Ability to lead (AL), Strong sense of accountability (SSA), Arbitration skills (AS), Communicate effectively (CE).

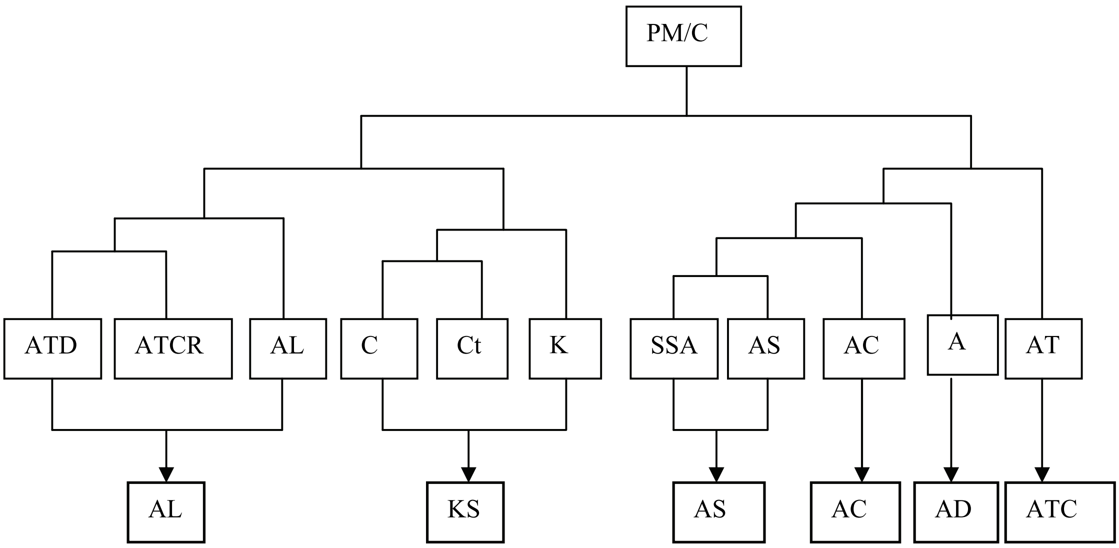

Fig. P 10

Resultant set of factors: *Ability to lead (AL), Knowledge/Skills abt. Project (KS), Arbitration skills (AS), Ability to coordinate (AC) Ability to delegate authority (AD), Ability to communicate (ATC).*

iii. Factors Related to the Project Team: Technical background (TB), Communication (Cn), Relationship among them (R), Commitment of team (Ct), Competence (Ce), Ability to work as a team (ATW).

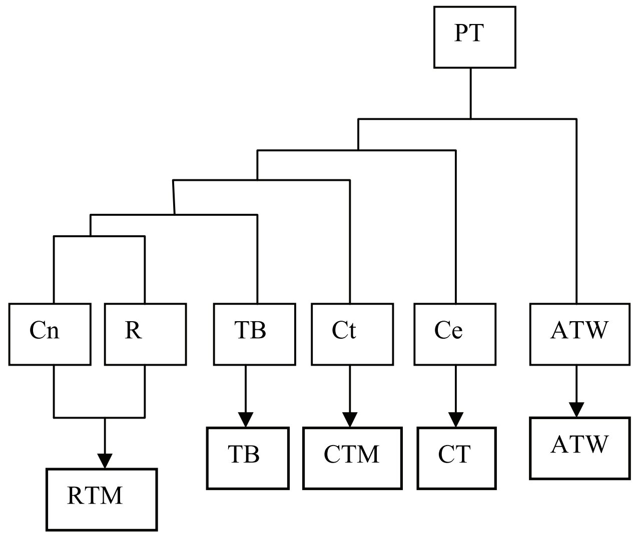

Fig. P 11

Resultant set of factors: *Relationship among team members (RTM), Technical background (TB), Commitment of team members (CTM), Competence of team (CT), Ability to work as a team (ATW).*

iv. Factors Related to Client's Organisation: Top management support (TMS), Project organisation structure (POS), Functional manager's support (FMS), Relationship to project team members (RPTM), Ability to take decisions (ATD), Technical ability (TA), Understanding project cycle and procedures (UPP), Relationship with contractor (RC)

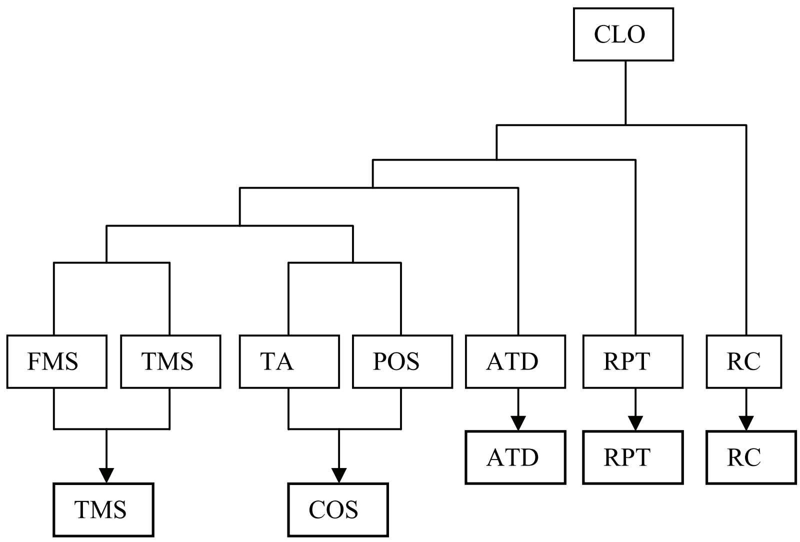

Fig. P 12

Resultant set of factors: *Top management support (TMS), Client's organisational structure (COS), Ability to take decisions (ATD), Relationship with project Team (RPT), Relationship with contractor (RC).*

V. Factors related to the external environment: Political (PE), Economic environment (EE), Social environment (SE), Technological Environment (TE), Nature/Weather (NW), Client (CL), Competitors (Cp), Sub-contractors (SC), Suppliers of building materials (SBM), Availability of skilled labour (ASL).

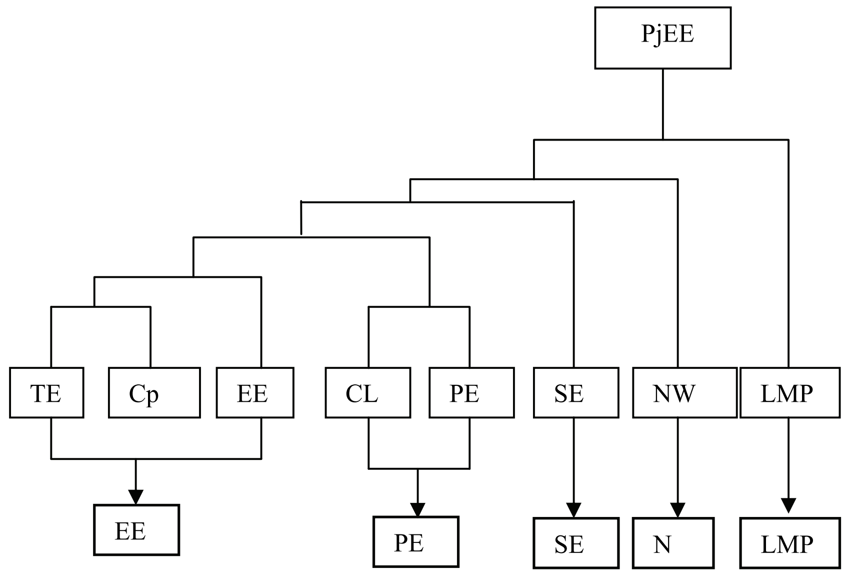

Fig. P 13

Resultant set of factors: *Economic environment (EE), Political environment (PE), Social environment (SE), Nature/Weather (NW), Availability of labour, Material, Plants (LMP).*

Table P 1 Summary of Clustering for Practitioners' Criteria and Indicators Groupings for Main Survey

Measures		**Practitioners' Criteria**							**Clients' Criteria**							**No.**
Criteria		C	T	Q	M	PEE	EIA	SIA	F/C	CB	BNI	FP	CP			
		C	**T**	**Q**	**MEE**		**EI**	**SI**	-	-	-	-	-			**6**
		Indicators														
Cost		VCF	VC	FC	MC		LC	DC	AC	CI	CC	CLS				
		TCO		**FC**	**MC**	**ESC**	**LC**	**IC**		-	-	-				**6**
Time		VEAT	ACS	VT	TIS		TAR	TRM	ACT	TIA	TWI	DRT	THC	TEC		
		TW								**IT**			**TP**	**TVC**		**4**
Quality		NR	ER	RD	RA		RST	RMT	RV							
		R		**E/AR**			**STR**	**MTR**								**5**
MEE	**M**	RSC	PM	CC	RM		BM	QSS	TM	ES	DMP	CTW	CR			
		AS					*QSS*		*ES*		*DMP*					
		(EPT)									**(DMP)**	**(CR)**				**3**
	PEE	RSM	PBP	PGB	CVO	FVO	CDP	PGS	NR	ER	SO	CRI	CD	EHS	REA	
		SM	*QSS*		*AS*				*IAW*			*SCON*				
		(SM)	**(EPT)**						**(IAW)**			**(SCON)**				
	M + PEE	**SM**	**EPT**	**DMP**	**CR**	**IAW**	**SCON**									**6**
EI		RCS	RED	CWH												
		NRI	**DC**	**IE**	**NEE**											**4**
SI		DR	IR	PC	IC	IFC	SJ	PSR	CIS	CR	DB	IBCS				
		NPA			**NCSA**			**TRA**								**3**

Table P 2. Summary of Clustering for Practitioners' Factor Groups and Factors

Factor Groups	**Factors**											No.
Project	Pt	UP	PL	Pd	B	PD	U	PV	PS	Ce		
	PU		**PC**			**PLC**	**UC**	**PV**	**PS**	**-**		**6**
Project Manager/Consultant	ATD	ATCR	AL	C	Ct	KL	SSA	AS	AC	AD	AT	
	AL			**KL**			**AS**		**AC**	**AD**	**AT**	**6**
Project Team												
Factors Related to Client's Organisation	FMS	TMS	TA	POS	ATD	RPT	RC					
	TMS		**COS**		**ATD**	**RPT**	**RC**					**5**
Factors related to the external environment	TE	Cp	EE	CL	PE	SE	NW	LMP				
	EE			**PE**		**SE**	**NW**	**LMP**				**5**

4. Clients' Needs and Motivation Criteria:

These were essentially, built from the five main criteria tested within practitioners' surveys 1 and 2. These are: Customer's perspective (CP), Financial/Commercial (F/C), Contribution to Business (CB), Benefit to National Infrastructure (BNI), Future perspective (FP).

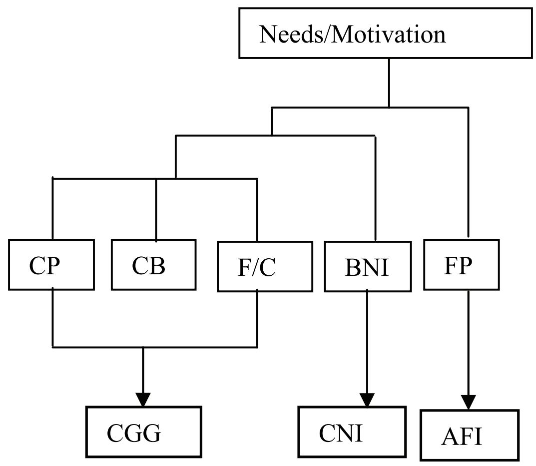

Fig. C 1

Resultant set of Criteria: *Indicator to good governance (CGG), Contribution to National Infrastructure (BNI) Addressing future Infrastructural Needs (AFIN)*

a1. Indicators of Contribution to good governance. This comprises the indicators of the three components: Customer perspective, Finance/Commerce and Contribution to business.

i. Customer Perspectives: Initial cost to end user (ICE), Cost- in-use to end user (CIU), Functionality to end user (FE), Solving customer problems (SCP), Adequacy of service installation (ASI), Adequacy of internal function (AIF),Adequacy of security facility(ASF), Adequacy of external function (AEF), Reflection on desired corporate image (RCI), Aesthetic appeal (AA)

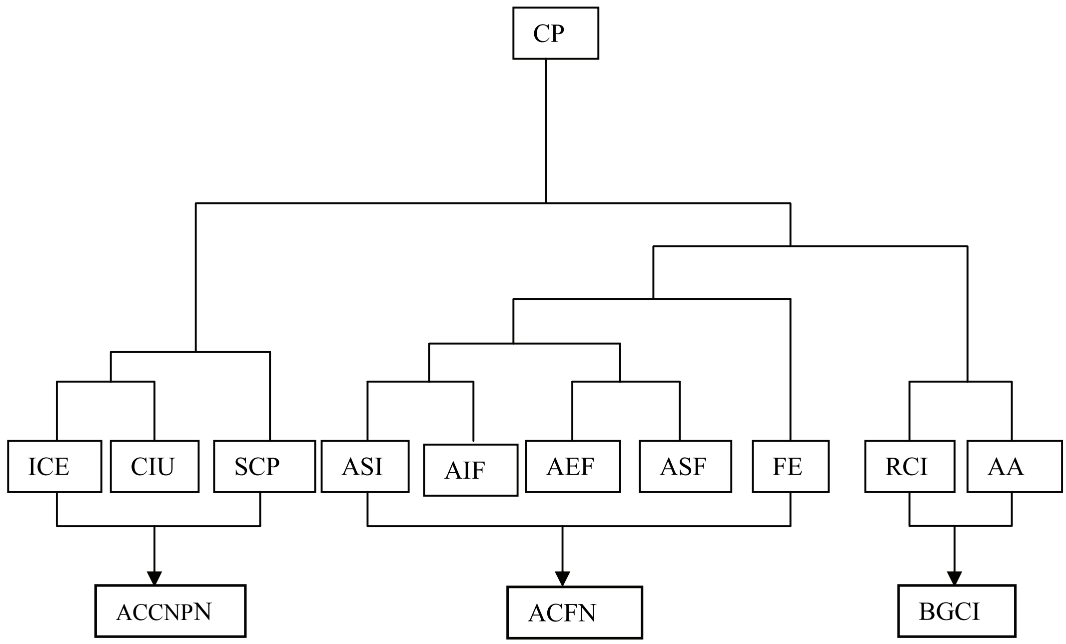

Fig. C 2/1

Resultant set of Indicators: *Addressing customers' Cost needs and related problems (ACCNP), Addressing customers' functionality needs (ACFN), Building a good corporate image (BGCI).*

aii. Finance/Commerce indicators: Commercial results (CR), Cash flow generation (CFG), Profit generation (PG).

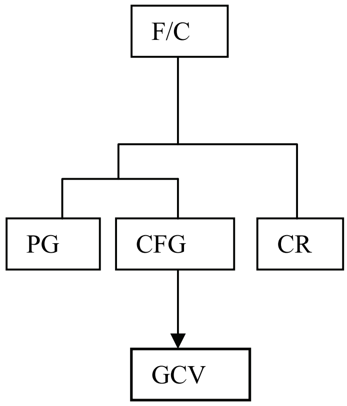

Fig. C 2/2

Resultant set of Indicators: *Growth in corporate value (GCV)*

aiii. Contribution to Business indicators: Building a positive image of client's company (BPI), Contribution to the innovation profile of the company (CIP), Competitive advantage (CA), Having a large impact on the company's future (ICF), Causing firm's growth (FG), Improvement in organisation's profile (IOP), Developing a new technology (DNT), Acquiring greater market share (AGMS), Creating a large market (CLM), Creating a new market(CNM), Creating a new product line (CNPL).

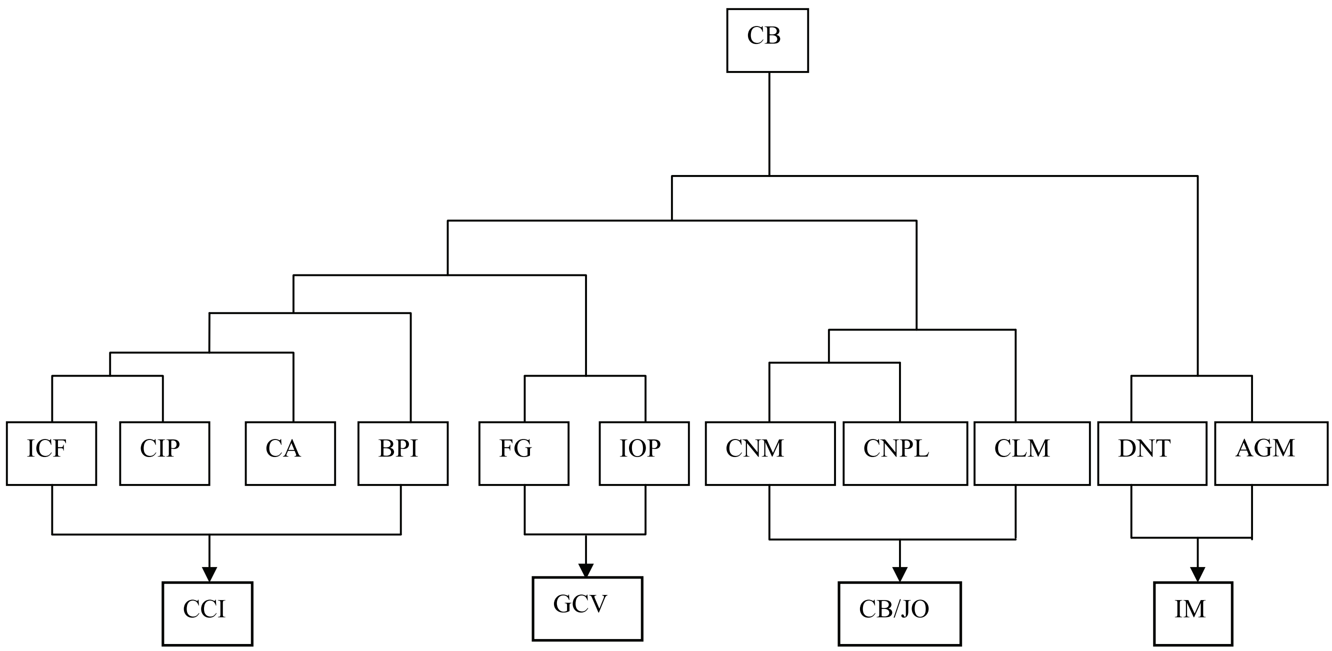

Fig. C 2/3

Resultant set of Indicators: *Contributing to corporate image (CCI), Growth in corporate value (GCV), Contributing to business/job opportunities (CB/JO), Influencing the Market (IM).*

aiv. Combing the indicators for Contribution to Good Governance: *Addressing customers' Cost needs and related problems (ACCNP), Addressing customers' functionality needs (ACFN), Building a good corporate image (BGCI), Growth in corporate value (GCV), Contributing to corporate image (CCI)Contributing to business/job opportunities (CB/JO), Influencing the Market (IM).*

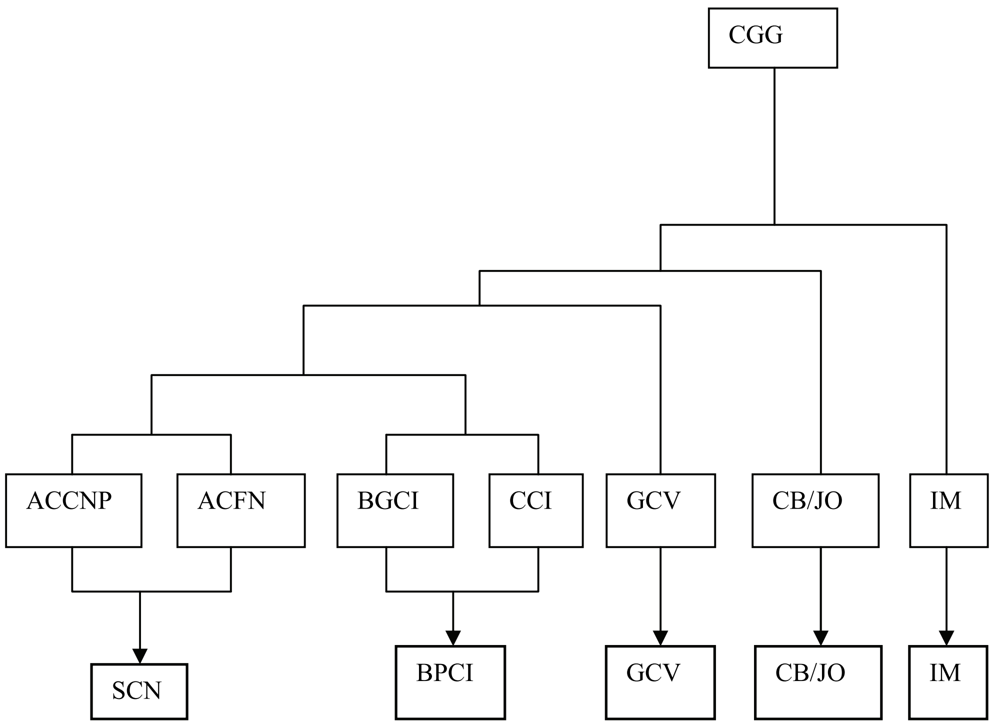

Fig. C 2/4

Resultant set of Indicators: *Satisfy customer needs (SCN), Building a positive corporate image (BPCI), Growth in corporate value (GCV), Creating business and job opportunities (CB/JO), Influencing the Market (IM).*

These indicators were later translated to government specific (as the public client) together with the appropriate terms as shown in Table C 1.

Table C 1

Corporate Entity	**Public client as a corporate entity**
Satisfy customer needs (SCN)	Satisfy social needs **(SSN)**
Building a positive corporate image (BPCI),	Building a positive image about the government**(PI)**
Growth in corporate value (GCV),	Improvement in GDP **(IGDP)**
Creating business and job opportunities (CB/JO),	Creating (jobs) employment (**CE)**
Influencing the Market (IM).	Regulating the economy **(RE)**

b. Indicators of Contribution to National Infrastructure: Developed a new technical capacity (DTC), Contributing to other projects (COP)contributing to critical fields of national interest (FNI), Decrease dependence on outside sources for help (DDO), Adding to infrastructural stock (AIS), Indicator of good governance (IGG), Investing excess liquidity in infrastructure (IEL).

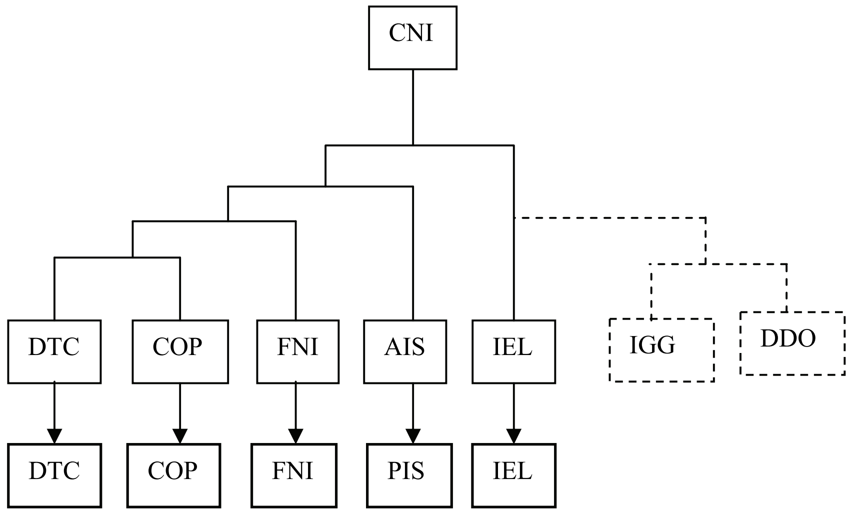

Fig. C 3

Resultant set of Indicators: *Developing a new technical capacity (DTC), Contributing to other projects (COP), Contributing to critical fields of national interest (FNI), Adding to national physical infrastructural stock (PIS), Investing excess liquidity in infrastructure (IEL).*

c. Indicators of Addressing Future Infrastructural Needs: Long term benefit (LB), Preparing organisation for future (POF), Preparing technological infrastructure for the future (TIFF), Creating incentives for accelerated national development (IAD).

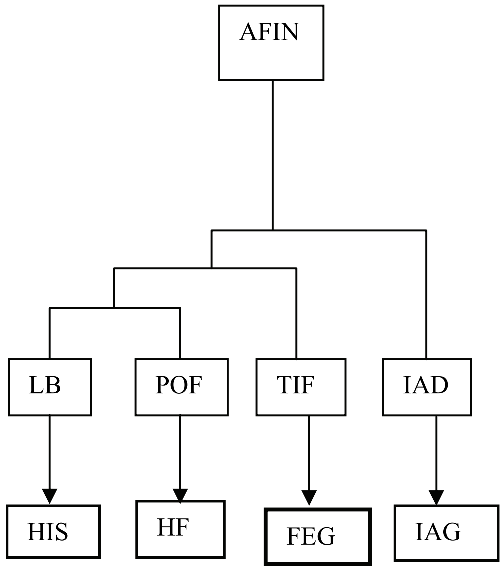

Fig. C 4

Resultant set of Indicators*: Providing housing for and infrastructure for increasing population (HIS), Providing housing and infrastructure for future expectations (HFE), Providing facilities for expanding government activities (FEG), Creating incentive for accelerated growth (IAG).*

2. Client's Expectations from Service providers

a. Indicators of Expectations from Quantity Surveyors: Accurate and reliable budget estimate (ARB), Ability to foresee and budget for potential inflation (AFI), Efficiency (timely job execution) (E), Competency (expertise and experience) (C), Efficient performance of duties as the conditions of contract (EPD_{QS}).

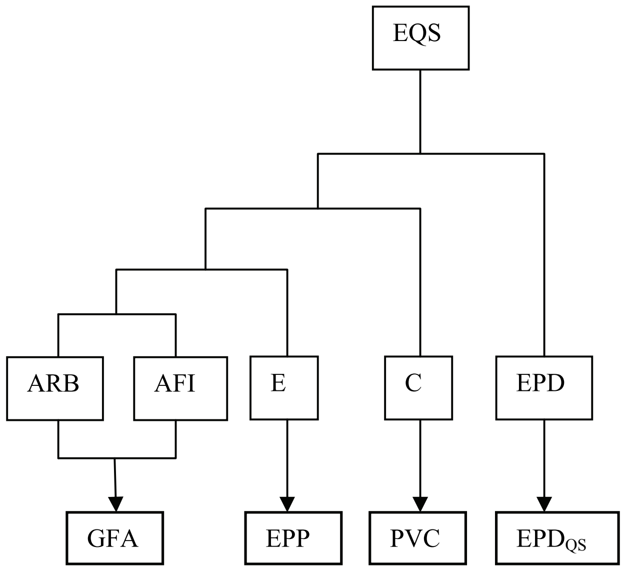

Fig. C 5

Resultant set of Indicators: *Providing good financial advice (GFA), Efficient execution of procurement process (EPP), Accurate, fair and timely preparation of variations (PVC), Efficient performance of duty as per terms and conditions of employment* (EPD_{QS}).

b. Indicators of Expectations from Architects: Flexibility in design (to accommodate future changes (DFC), Buildability (B), Aesthetic appeal (AA), Efficiency (supervision and instruction etc.) (E), Delivery within time (DT), Efficient performance of duty as per terms and conditions of employment (EPD_A), Providing team leadership (PTL).

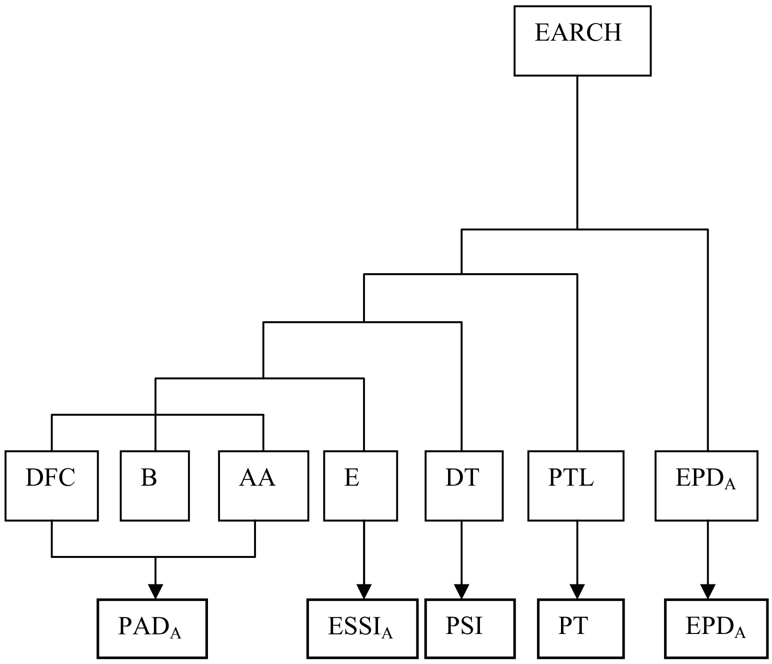

Fig. C 6

Resultant set of Indicators: *Providing acceptable design on time (PAD_A), Efficient site supervision and Inspection ($ESSI_A$), Providing timely and comprehensive site instruction (PSI_A), Providing Team Leadership (PTL), Efficient performance of duty as per terms and conditions of employment (EPD_{QS}).*

c. Indicators of Expectations from the Project Manager/Consultant: Technical and Managerial competencies/experience (TMCE), Manage client's changes efficiently (MCCE), Delivery within time and cost targets (DTC), Teamwork and efficient coordination (TWC), Ensuring compliance of all social and environmental regulations (SER), Efficient performance of duty as per terms and conditions of employment ($EPD_{PM/C}$).

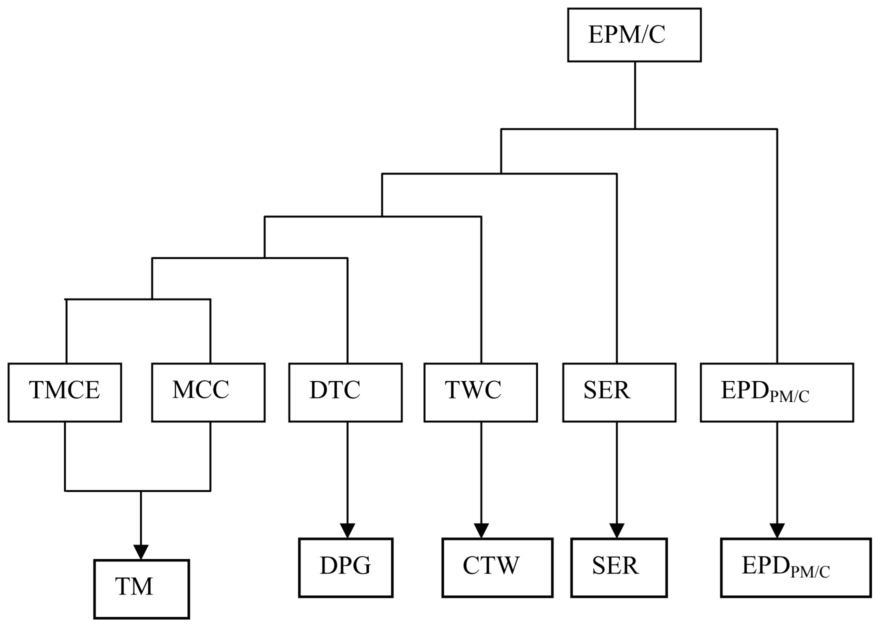

Fig. C 7

Resultant set of Indicators: Technical and managerial competence (TMC), Delivery within project estimated goals (DPG), Coordination and Teamwork (CTW), Ensuing compliance of all social and environmental regulations (SER), Efficient performance of duty as per terms and conditions of employment ($EPD_{PM/C}$).

d. Indicators of Expectations from Consulting Engineers: Safe and economic design (SED), Sustainability/flexibility in design and construction (SFDC), Workable design (W), Timely delivery (TD), Providing timely site instruction(PSI), regular site inspection(RI), good site supervision(GSS), Efficient performance of duty as per terms and conditions of employment (EPD_{CE}).

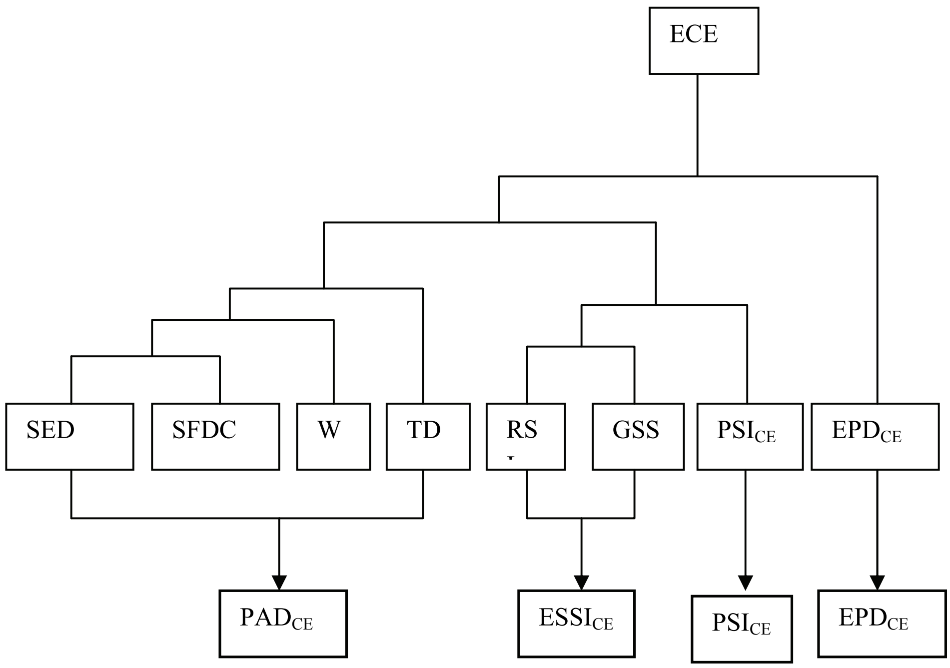

Fig. C 8

Resultant set of Indicators: *Providing timely complete, comprehensive design (PAD_{CE}), Effective site supervision and inspection ($ESSI_{CE}$), Providing timely and comprehensive site instruction (PSI_{CE}), Efficient performance of duty as per terms and conditions of employment (EPD_{CE}).*

d. Indicators of Expectation from Contractors: Delivery with agreed time, quality and cost targets (DTC), Technical and managerial competence (TMC), Accommodating client's changes in good faith (ACC), Financial capacity and adequate guarantee against own and sub-contractors defaults (FCOS), Efficient coordinating of the specialists and sub-contractors' works (ECSS), Minimise cost (avoiding on-site and material waste (MC), Efficient performance of duty as per terms and conditions of employment (EPD_{CON}).

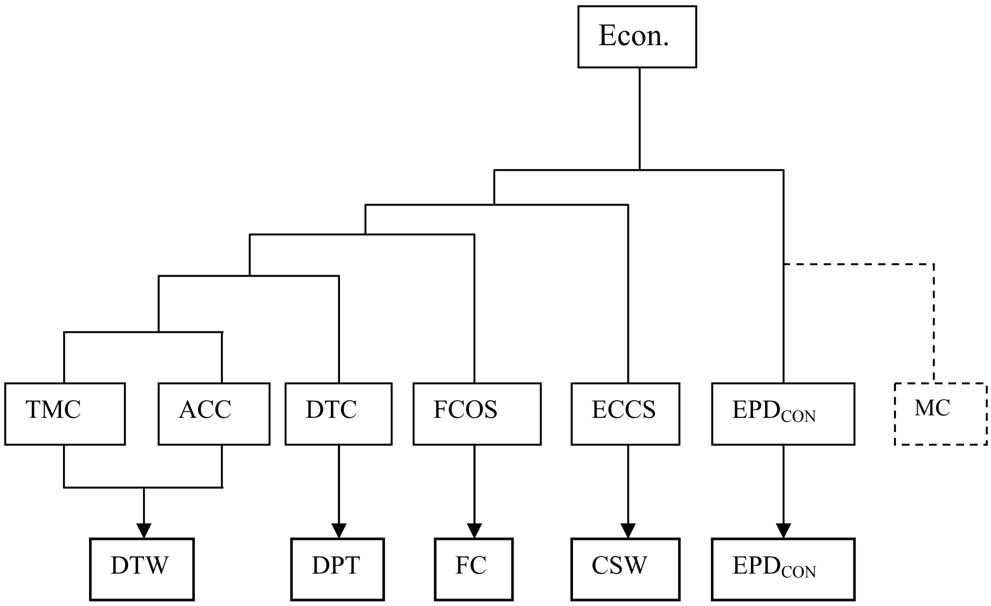

Fig. C 9

Resultant set of Indicators: *Diligence to work (DTW), Delivery within agreed time (DPT), Financial capacity (FC), Coordination of specialists and sub-contractors' works (CSW), Efficient performance of duty as per terms and conditions of employment (EPD_{CON}).*

Table C 2 Summary of Clustering Procedure for Clients' Measures

Criteria		**Indicators**											**No.**
Needs/Motivation		CP	F/C	CB	BNI	FP							
		CGG			**CNI**	**AFIN**							
CGG	**CP**	ICU	CIU	SCP	ASI	AIF	AEF	AST	RCI	AA			
		ACCNP			**ACFN**				**BGCI**				**3**
	F/C	PG	CFG	CR									
		GCV											
	CB	ICF	CIP	CA	BPI	FG	IOP	CNM	CNPL	CLM	DNT	AGMS	
		CCI				**GCV**		**CB/JO**			**IM**		**4**
	CP;F/C;CB	ACCNP	ACFN	BGCI	CCI	GCV	CB/JO	IM					
	1	**SCN**		**BPCI**		**GCV**	**CB/JO**	**IM**					
	2	**SSN**		**PI**		**IGDP**	**CJE**	**RE**					**5**
CNI		DTC	COP	FNI	AIS	IEL	IGG	DDO					
		DTC	**COP**	**FNI**	**PIS**	**IEL**	**-**	**-**					**5**
AFIN		LB	POF	TIFF	IAD								
		HIS	**HFE**	**FEG**	**IAG**								**4**
Expectations													
EQS		ARB	AFI	E	C	EPD$_{QS}$							
		GFA		**EPP**	**PVC**	**EPD$_{QS}$**							**4**
EARCH		DFC	BAA	E	DT	PTC	EPD$_{A}$						
		PAD$_{A}$		**ESSI$_{A}$**	**PSI$_{A}$**	**PTL**	**EPD$_{A}$**						**5**
EPM/C		TMCE	MCCE	DTC	TWC	SER	EPD$_{PM/C}$						
		TMC		**DPG**	**CTW**	**SER**	**EPD$_{PM/C}$**						**5**
ECE		SED	SFDC	W	TD	RSI	GSS	PSI$_{CE}$	EPD$_{CE}$				
		PAD$_{CE}$				**ESSI$_{CE}$**		**PSI$_{CE}$**	**EPD$_{CE}$**				**4**
E Con		TMC	ACC	DTC	FCOS	ECCS	EPD$_{CON}$						
		DTW		**DPT**	**FC**	**CSW**	**EPD$_{CON}$**						**5**

Appendix 16: Research Methodology –The philosophical Basis of the Research

A4.1. Introduction.

This section is devoted to discussing the research methodology adopted for the study. It discusses the ontology, epistemology, the scientific paradigm forming the philosophical basis of the research. This is followed by the methodology adopted for the research practice. Further, the chapter elucidates how the mixed-methodological approach was employed in addressing the research problem and the reasoning behind the formulation of theories chosen as well the philosophy of science influencing it. The summarised results of the preliminary surveys which were used to build measures of project performance as well as the factors that influence them are presented. The chapter concludes by showing the contextual factors that affected the research and how ethics was considered.

A4.2. Research Paradigms: Ontology and Epistemology and Praxiology.

A4.2.1. Research Paradigm.

A research paradigm "is a very general set of philosophical assumptions that define the nature of possible research and intervention" (Mingers and Brocklesby, 1997). Generally, research paradigms are distinguished in terms of three philosophical dimensions: *ontology, epistemology, and praxiology* (which are of particular interest to management science).

1. Ontology

Ontology is concerned with our own conceptions of being and reality. It is also defined as the study of categories; and the goal of science is to categorise nature (Koepell, 1999). Wand and Weber (1993:220) refer to ontology as "a branch of philosophy concerned with articulating the nature and structure of the world."

This subtle distinction between ontology and typical metaphysics is that the former studies "beings" whiles the later questions the existence of beings. As an example, Koepell (1999) has this to say:"a successful ontology may include such objects as "angels", "apples" and "Bosnia" without addressing the typical metaphysical questions of whether angels exist or how many can fit on the head of a pin". According to Koepell, the success of categorisation can be measured by the degrees of prediction and controls which the categories produced afford other scientists. These provide bases for good theories. Hence the goal towards applied ontology is to clarify ontologies of the social world by carefully studying the existing categories.

The goal of ontology in a research is to study the assumptions about existence and which of these acts as a suitable and justifiable underpinning for research (Olsen, 2008).

The larger discipline of ontology can thus be seen as having four interrelated parts (Hofweber, 2004):

- the study of ontological commitment, i.e. what we or others are committed to,
- the study of what there is,
- the study of the most general features of what there is, and how the things there are relate to each other in the metaphysically most general ways,
- the study of meta-ontology, i.e. saying what task it is that the discipline of ontology should aim to accomplish, if any, how the question it aims to answer should be understood, and with what methodology they can be answered.

This research therefore aims at addressing the ontological problems through the following questions:

- What is the nature or state of project performance measurement in the construction industry?
- What features/categories of construction project performance exist?
- What relationships exist among the features and categories?

The basic assumption is that project performance measurement concepts are emergent and a shifting reality, multifaceted and are categorised by contingency and contextual factors.

2. Epistemology

Epistemology is generally defined as the way of knowledge or the philosophy of knowledge or of how knowledge is acquired (Trochim, 2001; Bernard, 2002). It is concerned with the nature, sources and limits of knowledge. Epistemology is to do with characteristics of the knower but is more than just a collection of individual or collective beliefs; it is concerned with what must be added to beliefs to convert them into knowledge. Our own epistemological commitments underpin how we make sense of the world and our epistemological commitments influence the approach we take to research.

The key epistemological problems addressed are:

- How to identify the nature of existing knowledge about construction project performance
- And how this knowledge relate to reality or in practice

The basic assumption is that by addressing the main ontological problems the knowledge may be acquired of both the nature and its relationship with reality.

The two main epistemological views broadly considered are: (1) positivism (2) post-positivism (interpretism and naturalism or critical realism).

i. Positivism

This is an outright rejection of metaphysics (Trochim, 2001). Positivists believe that the goal of knowledge is to describe phenomena that are experienced, and that the purpose of science it to stick to that which is observable and measurable.
In particular, it is based on the philosophy that the preconceptions of the researcher be set aside in order to identify objective facts based on empirical observations .The goals being to identify generalisable laws based on the identification statistical relationships between dependent and independent variables (McEvoy and Richards, 2006).

Positivism is a philosophical paradigm which confines genuine knowledge within the bounds of science based on formal logic or mathematics. It is based on the belief that there is an objective reality and that knowledge exists as something that can be observed and measured. A positivist approach generally involves quantitative research methods.

ii. Post-Positivism

a. Interpretism

Post-positivism is a rejection of the central tenets of positivism. They posit that scientific reasoning and common sense reasoning are the same process, and that they may exist only in a degree.
Interpretivism supports the view that people and their institutions are fundamentally different from the natural sciences. The study of the social world therefore requires a different approach and seeks an understanding of human behaviour, an empathic understanding of human action (Bernard, 2002).
The interpretivist paradigm places much emphasis on the way in which the world is socially construed and understood (Giere, 1987; Blaike, 2000; McEvoy and Richards, 2006), and that research is guided by the researcher's set of beliefs and feelings about the world and how it should be understood and studied. Interpretive research methods are prone to criticism because they embrace variations of ontology, of multiple, individually constructed but socially and culturally constrained realities. If reality is constructed it implies we are active and implicated in that process. This is in contrast to positivist approaches within which the researcher is independent of reality. In an interpretivist paradigm, the researcher is always part of the reality they are attempting to understand.

iii. Positivism and Post-Positivism (Interpretivism) and Alternative Paradigms.

"Whereas the positivist believe that the goal of science was to uncover the truth, the post-positivist critical realist believe that the goal of science is to hold steadfastly to the goal of getting it right about reality, even though this goal can never be perfectly achieved (Trochim, 2001)".

Whiles positivists speak of rationality, post-positivist or naturalist speak of hypothetical or instrumental rationality, emphasizing on “effective goal-directed action” (Giere, 1987).

The main thrust of recent philosophy of science is that the positivists approach to science is inadequate (Annis, 1978; Grene, 1987). Science as practiced yields justified beliefs about the world. Thus the study of the actual practices, which have changed through time, cannot be neglected. The present tenor in the philosophy of science is thus toward a historical or methodological realism, natural realism or critical realism.

Shapere (1987) proposes the following:

- the abandonment of mechanistic and deterministic constraint on what could count as a genuine explanation;
- the replacement of the perfectionists by the compositionalists approach to explanation of material substance
- the relaxation of the idea that explanation must consist in rigorous deduction.

Post-positivist recognizes the fallibility of measurement and emphasize the importance of multi measure and observations, each of which may possess different types of errors, and the need to use triangulation across these multiple error sources for good results (Trochim, 2001). This latest proposition is very much in tune with the view of an alternative epistemological view to the two main types discussed: Critical Realism, which is the main epistemology adopted for this research. In their view, critical realists believe that causal mechanisms have the potential to make an impact, but the actualisation of the mechanism is dependent upon the variable conditions in which the mechanism operates which makes it more appropriate to think in terms of the tendencies that are produced by underlying causal mechanisms, than in terms of empirical generalisations as shown in figure 4.1. (Lawson, 2003, McEvoy and Richards, 2006).

Post-positivism thinking since the 1950’s caused social science researchers to start looking for alternative philosophies and methodologies to the orthodox “logical empiricists” view of inquiry (Outhwaite, 1987). The following became predominant: i. Analytical philosophy (*this sought to re-define key concepts with the aim of clarity of inquiry*), ii. Hermeneutics (this sought to approach reality from a textual model of successive approximations and thresholds or horizons of understanding, Maxcy, 2003 p76), iii. Critical theory and critical social science (this attempted to raise consciousness of social conditions and emancipate individuals from their situations via critical methods of inquiry, Fay, 1987.) Many of the orientations currently subsumed under critical theory are captured under the umbrella of “transformative-emancipatory perspective,” and iii. Pragmatism (this does not look at the origins of the idea but instead to its direction. “What counted was not where you had been with an idea but where it took you”, Maxcy, 2003 p75).

Subsequently, Tashakorri and Teddlie (2003) identify three main paradigms as alternative foundations for mixed methods.

a. The Dialectical Paradigm Thesis: This stance assumes that all paradigms have something to offer and that the use of multiple paradigms contributes to greater understanding of the phenomenon under study (e.g. Greene and Caracelli, 1997; 2003 pp 91-110; Maxwell and Loomis, 2003 pp241-271). Greene and Caracelli (1997; 2003) reject the continued search for a single best paradigm. Their main position is that multiple diverse perspectives are important because they are required to explain the complexity of an increasingly pluralistic society.

b. Multiple Paradigm Thesis: Some believe that multiple paradigms may serve as the foundation for mixed methods research. Creswell et al (2003) present six advanced mixed methods and then argue that no single paradigm applies too all of the designs. They then conclude that multiple paradigms may be applied to diverse mixed methods design for a particular study.

c. Single Paradigm Thesis: The single paradigm/methodology link was initiated by Lincoln and Guba (1985). The underlying reason is that both positivist-quantitative and constructivist-qualitative have their own epistemologies, and that mixed methods, scholars opined, will need its own epistemology, their own paradigm to support their methodology. Two main types considered in this are "pragmatism" (Data, 1977; Howe, 1988; Patton, 1990; Rossman and Wilson, 1985; Tashakkori and Teddlie, 1998) and the "transformative-emancipative paradigms (TE)" or critical realism (Mertens, 1998, 1999, 2003).

According Tashakkori and Teddlie (2003) the most basic difference between the two points of view is axiology among others. Pragmatists believe that the values of the researcher play a large role in the selection of research topics and in the interpretation of results. Those who advocates of transformative-emancipatory viewpoint posit social justice and democracy, especially for oppressed groups, as a goal of research. Table 4.1 show the characteristics of the two viewpoints and the dialectic paradigms. Yet they see no conflict between these two axiological positions; rather, "they describe research programmes that may be quite different from one another. TE researchers may choose a topic that may directly help an oppressed member of the society. Pragmatists select topics are that are of interest to him or her but that quite often involve social relevance.

Table A4.1 Characteristics of Pragmatism, Transformative-Emancipatory (TE) and Dialectic Paradigms based on Tashakkori and Teddlie (2003)

Pragmaism	Transformative-emancipatory	Dialectic
Pragmatism supports the use of both qualitative and quantitative research methods in the same research study and within multistage research programme. It rejects the incompatibility thesis.	TE places central importance on the experiences of individuals who suffer from discrimination or oppression	The ability to think dialectically is important in this viewpoint. This involves consideration of opposing viewpoints an interaction with the "tensions" caused by their juxtapositions
Pragmatist researchers consider the research question to be more important than either the method they use or the paradigm that underlies the method –"dictatorship of the research question"	Researchers working within the TE paradigm are aware of power differentials in the context of their research and use their research to promote greater social equity and justice.	The conversations and dialogues in dialectic are not about philosophical issues but rather about the phenomena that are the subject of the research.
Pragmatism also rejects the forced choice between positivism and constructivism with regard to logic, epistemology, and so on. In each case, it rejects the either/or of the incompatibility thesis and embraces both points of view (or a position between the two opposing viewpoints)	With regard to ontology, the TE viewpoint is considered as one aiming at describing reality within its multiple contexts (e.g. cultural, political, economic, historical) (Mertens, 2003).	Historical dualisms such as those featured in paradigms wars) are not of particular importance in dialectical inquiry. The are no endless discussions of induction versus deduction, subjectivity versus objectivity, and so on.
Specific decision regarding the use of mixed method or qualitative or quantitative methods depend on the research question as it is currently posed and the stage of the research cycle that is ongoing.	With regard to epistemology, it is considered that interaction between the researcher and the participants is essential and that this interaction requires understanding and trust.(Mertens, 2003).	Some important dichotomies exist, however, in dialectic inquiry: value-neutrality and value-commitment, emic and etic, particularity and generality, social comstructions and physical traces, and so on.
Pragmatism avoids the use of metaphysical concepts (e.g., "truth," "reality") that have caused much endless discussion and debate.	From methodological point of view, mixed methods offer especially promising ways to address the concerns of diverse groups in an appropriate manner (Mertens, 2003).	
Pragmatism presents a very practical and applied philosophy		

A4.3. The System Logic: Deductive, Inductive and Retroductive Reasoning.

The two broad approaches to reasoning as a basis for scientific knowledge development are often used in carrying out research, namely *deduction* and *induction* approaches (Fellows and Liu, 2005 p12-13; Saether, 1994; Trochim, 2001 p17). These form the bedrock of theory formulation. Finally, there is a third one, *Retroduction,* which emerges as a result of the alternative epistemology.

i. **Deductive Reasoning**.

Deductive reasoning (also referred to as the "hypothetico-deduction") works from the more general to the more specific. Such reasoning might begin with thinking up a *theory* about a topic of interest. It is then narrowed down into more specific *hypotheses* that we can test. It is narrowed down even further when *observations* are collected to address the hypotheses. This ultimately leads us to be able to test the hypotheses with specific data for a *confirmation* (or not) of our original theories. According to the hypothetico-deductivism issue scientific theory must be testable empirically. Deductive reasoning is, thus, narrower in nature, concerned with testing or confirming hypotheses. Fellows and Liu (2005, p16) illustrates with this example "If a theory is correct and one fact is known, another can often be deduced. If a theory states that 'all clay is brown' and a sample provided in known to be clay, the deduction is that the sample will be brown. Deductive reasoning, to go from the general to the specific statement, is valid. However, a discovery of clay which has a colour other that brown will falsify the general theory and so require it to be modified, if not abandoned". Deductive reasoning is, thus, limited by anomalies. Hence, they conclude that deduction is 'safe', given corroboration of theory/hypothesis, but it does not allow knowledge to be advanced. It is the logic underpinning Positivism. A research is said to be driven by deductive theory when it is aimed at testing a theory or a hypothesis. Such a research tries to answer the questions of "how much or how many, to determine relationships, and so forth"

ii. **Inductive Reasoning**. On the other hand inductive reasoning moves from specific observations to broader generalizations and theories. Here, we begin with specific *observations* and *measures*, begin to *detect patterns* and regularities, formulate some *tentative hypotheses* that we can explore, and finally end up developing some general *conclusions* or *theories*. Inductive reasoning thus, by its very nature, is more open-ended and exploratory, especially at the beginning. Induction is useful in yielding hypothesis, such as that by inspecting a variety of samples it may be hypothesised that all clay is brown. From these deductions can be made from as above so long as it remains corroborated. Inductive reasoning has been generally declared as a non valid approach to reasoning (Fellows and Liu, 2005 p16). A research is said to be driven by inductive theory when it aims at discovery, trying to find answers to problems such as the following: "what is going on? What is happening? What are the characteristics of? What is the meaning of? (Morse, 2003)" However, advances are made by the use of induction. As knowledge advances hypothesis may require qualification statements: "all clay of a certain type and found in a given location, is brown –such auxiliary statements lend precision by raising the information content of the hypothesis or theory….. Inductive reasoning should be used carefully, scientifically (Fellows and Liu, 2005, p16)". Inductive reasoning on its own is limited by fallacy of affirmation. It is the logic underpinning Intepretism.

Table A4.2 compares the two system logics as provided by Trochim (2001) and Alvesson and Skoldberg (1994).

Table 4.2 Comparison of Flowchart of deduction and Induction Approaches to research.

Trochim (2007)		**Alvesson and Skoldberg (1994)**	
Deductive Approach	**Inductive Approach**	**Deductive Approach**	**Inductive Approach**
Theory	Observation	Theory	Empirical
Hypothesis	Pattern	Empirical	Generalisation
Observation	Tentative Hypothesis	Generalisation	
Confirmation	Theory	empirical	

iii. Retroduction.

Retroduction has been defined as 'a mode of analysis in which events are studied with respect to what may have, must have, or could have caused them. According to Haig (1987) retroduction is explanatory inference from puzzling data to conception of one or more causal mechanisms which because of their prima fascie plausibility, deserve to be further investigated. In short, it means asking why events have happened in the way they did' (Olsen and Morgan, 2004: 25). It is the logic that underpins critical realism. This involves moving from the level of observations and lived experience to postulate about the underlying structures and mechanisms that account for the phenomena involved (Mingers, 2003). The root of retroductive reasoning has been traced back to the needs of hunters. In order to track down their prey, hunters needed to develop the ability to look for clues such as broken branches, hoof marks, tufts of hair and odours, and ask themselves, 'What does it indicate?' When they encountered unusual clues such as new scents they were then able to speculate what the cause of the scent might be (Ginzburg ,1990 ; McEvoy and Richards, 2006). In the context of scientific research, retroduction takes place in similar manner, as mechanisms are postulated to account for observed phenomena via analogy, metaphor and model building (Lawson, 1989). From a critical realist perspective, the best explanations are those that are identified as
having the greatest *explanatory power*. Explanations are always potentially open to revision. Accepted theories may be rejected in favour of more convincing alternatives, if the alternative is better able to explain a phenomena and generate theoretical implications that are actually realised (Sayer, 2002).

A4.4. Methodology.

Regarding the choice between the age-long dichotomy of qualitative and quantitative methods many authors (Lee, 1999; Robson, 2003; Silverman, 2000; Strauss and Corbin, 1998) have taken an intermediary position, referred to as 'comparative study" (Saether, 1998), and advocate the possibility of blending the two where appropriate and necessary. The choice of pragmatism as the main epistemology of this research supports this intermediate position of research; paving the way for multimethodology, mixed models and mixed methods within the comparative study of this research.

The Mixed methods comprise several possible forms of mixing methods of varying degrees ranging from those which are significantly dominantly quantitative which are only spiced up by qualitative methods at the relevant stage, close to the pure quantitative end; to those which are significantly dominantly qualitative methods which are only spiced up by quantitative methods at the relevant stage close to the qualitative end. In addition, Morse (2003) also explains "methodological triangulated design" which describes a project that is composed of two or more sub-projects, each of which exhibits methodological integrity. Morse in 1991 developed the notation system that has gained wide usage by mixed method researchers, (Creswell et al, 2003). On this basis Morse (2003) developed four types each of mixed methods: simultaneous (QUAL + qual, QUAN + quan, QUAL + quan, QUAN + qual, the plus sign signifies simultaneous of concurrent mixing, capitalization signifies the dominating method), and sequential
One key requirement of her model is that each of these should be driven by the appropriate logic (induction or deduction based o whether the main methodology being used is qualitative or quantitative respectively). Steckler et al. (1992) provide four models of mixed methods: Model 1 describes the use of qualitative method to develop quantitative measures, Model 2 is about using qualitative method to explain quantitative findings, Model 3 describes the use of quantitative methods to embellish a primarily

(QUAL → qual, QUAN → quan, QUAL → quan, QUAN → qual, the arrow sign signifies sequential mixing)

qualitative findings, and model four dealing with the situation where both quantitative and qualitative methods are used equally. Creswell et al. (2003, see figure 3) elaborated further on Morse's (2003) models with additional models. Creswell et al's (2003) identifies six mixing models, three main types of sequential mixed method designs: explanation, (with priority given to quantitative approach), exploratory (with priority given to qualitative approach) and transformation, which could be influenced either by qualitative or quantitative approach. The next three are concurrent mixed methods: concurrent triangulation, used when quantitative and qualitative approaches are used simultaneously to confirm, cross-validate, or corroborate findings within a single study (Greene et al., 1989; Morgan, 1998; Steckler et al., 1992), Concurrent nested, in which one data collection phase is used to collect both quantitative and qualitative data, and concurrent transformation design, which is guided by the researcher's use of a specific theoretical perspective, taken the form of either triangulation or nested design (Figure A 4.1).

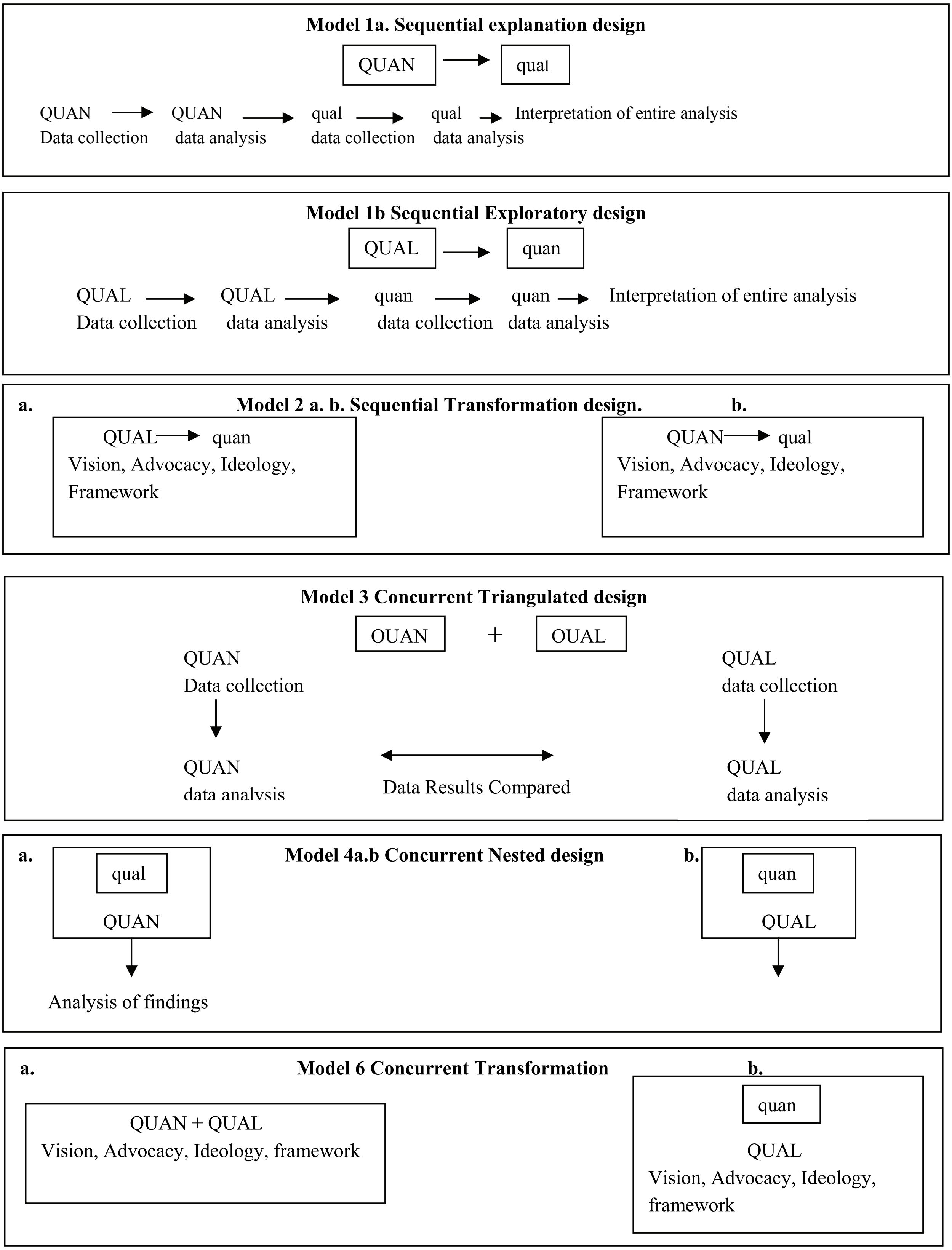

Fig. A4.1 Advanced Mixed Method Models by Creswell et al. (2003)

Curriculum Vitae

William Gyadu-Asiedu

9-5-1966	Born at Asamankese
1981-1989	Secondary Education
1990-1994	University of Science and Technology (UST), Kumasi, for Bachelor of Science Degree
1995-1996	Assistant Quantity Surveyor, Development Office, UST, Kumasi, (National Service)
1996-1999	Assistant Quantity Surveyor, Architectural and Engineering Services Limited (AESL), Ghana.
1999-2002	Study at the Kwame Nkrumah University of Science and Technology (KNUST), Kumasi, Ghana
2002-2005	Lecturer, Sunyani Polytechnic, Sunyani
2005-2009	Study at the Technology University of Eindhoven (TU/e), Netherlands.