EVALUATION OF INCENTIVE MECHANISMS ON PERFORMANCE-BASED CONTRACTING SYSTEMS IN SOUTH AFRICA AND NIGERIA

BY

OGWUELEKA, AMAKA CHINWEUDE

STUDENT NO: 13297547

STUDY LEADER: PROFESSOR MARTHINUS JOHANNES MARITZ

PhD IN QUANTITY SURVEYING

DEPARTMENT OF CONSTRUCTION ECONOMICS

FACULTY OF ENGINEERING, BUILT ENVIRONMENT AND INFORMATION TECHNOLOGY

UINVERSITY OF PRETORIA

MAY 6th 2015

ABSTRACT

This thesis focuses on evaluating the use of incentive mechanisms for improving project performance in construction projects in South Africa and Nigeria. The literature review reveals that there is no existing framework or model for adopting incentive mechanisms in construction projects in both countries. Most incentive schemes adopted in construction projects are usually focused on achieving a single performance metric. This has led to over-investment of one's effort in one area at the expense of other performance metrics. This study advocated the need to incorporate the key performance metrics, such as cost, time, quality and safety/health in incentive mechanisms and develop a framework for incentive mechanisms targeted towards improved performance. The study further investigated on the sociological and operational constructs for evaluating performance in relation to incentive mechanisms.

The literature review established that human social interactions play a significant role in achieving project success; these interactions are governed by workforce behaviour and are measured using sociological constructs. Likewise, the operational activities can significantly influence the attainment of performance goals. To achieve the research aim and also address the research problem, the study adopts these specific objectives: to assess the impact of incentives on employee motivation and identify positive motivational drivers that bridge the gap; to evaluate the sociological and operational constructs of performance in relation to incentive mechanisms; to appraise the economic impact of incentive mechanisms; and to adopt the research outcomes to model for incentive payoffs and develop a framework for incentive mechanisms.

An explanatory sequential approach of mixed methods research approach was adopted for data collection which is based on ontology and epistemology philosophies. First, a quantitative survey was conducted using a stratified probability (random) sampling technique. The findings from the questionnaire survey were then transformed into semi-structured questions for case study interviews. Second, a qualitative survey was conducted using non-probability (purposive) sampling technique.

The outcomes from the questionnaire survey and case study were adopted to develop a framework for incentive mechanism consisting of three components. Results of the validation process revealed that the top ranked economic challenges associated with the use of incentives can be resolved through the implementation of the developed framework for incentive mechanisms. This thesis recommends the need to develop a software programme incorporating the three components of incentive mechanism framework for effective usage.

Keywords: incentive mechanisms, performance-based contracting, motivation, project performance and construction industry.

ACKNOWLEDGEMENT

I express my heartfelt gratitude to my supervisor, Professor Tinus Maritz for his invaluable support and guidance throughout my research work. He taught me how to smile at tough times for which I am deeply grateful. My thanks to Professor Chris Cloete, Professor Chrisna Du Plessis, Mrs. Tersia Toerien, Mrs. Alta Lotz, Mrs. Andri Viljoen, Ms. Marveline Molema and many others in the Department of Construction Economics for the support given to me throughout my studies. I am grateful to the University of Pretoria for providing me with the opportunity to undertake my PhD studies and also for all the various forms of assistance rendered to me during my programme. I am grateful to Dr. Judy Kleyn and Mrs. Joyce Jordaan of the Statistics Unit for their support throughout my data analysis. Thanks also to Dr. Anthony Jackson and Mrs. Lana Patterson who kindly agreed to proofread my thesis.

I acknowledge with thanks the University of Uyo for laying the foundation for my career and studies, and employing me on the academic staff of the University. I appreciate the support of my colleagues in the faculty especially Dr. Dubem Ikediashi and many others.

My special thanks to my parents, Professor and Mrs. O.S. Ogwueleka for their unending love and encouragement towards my endeavours. My appreciation goes to all my siblings, Pharm. Ogo, Professor Toochukwu, Professor Nnoyelum, Engr. Chinedu, Obinna, and also my nieces and nephews for their unending calls, guidance and prayers throughout my studies. May God bless and keep you all for me, I love you all.

I am forever grateful to my GOD Almighty for proving Himself mighty in my life. I call HIM, “Yahweh-Tsidkenu” and “Yahweh-M’Kaddesh”. My generation shall praise YOU forever, thanks.

LIST OF PUBLICATIONS

Ogwueleka, A.C. & Maritz, M.J. 2014. Incentive issues in the South African construction industry: preliminary findings from project stakeholders, *Acta Structilia*, vol. 21, no. 1, pp. 1-23.

Maritz, M.J. & Ogwueleka, A.C. 2013. Construction employees' perspectives on workforce motivational drivers in Akwa Ibom State of Nigeria, *Journal of Construction*, vol. 5, no. 2, pp. 2-7.

Ogwueleka, A.C. & Maritz, M.J. 2015. Modeling for incentive payoffs in the Nigerian construction industry, *Journal of Engineering Design and Technology* – accepted for publication.

Ogwueleka, A.C. & Maritz, M.J. 2013. A review of Incentive issues in the South African construction industry: prospect and challenges, In: *Third proceedings of ICCREM conference published by American Society of Civil Engineers (ASCE)*, 10-11th October, Karlsruhe, Germany, pp. 83-98.

Ogwueleka, A.C. & Maritz, M.J. 2013. A pragmatic review of workforce motivation, de-motivation and job performance in the South African construction industry, In: *Seventh International Conference on Construction in the 21st Century (CITV-VII)*, 19-21th December 2013, Bangkok, Thailand, pp. 6, ID 90.

Ogwueleka, A.C. & Maritz, M.J. 2014. Interweaving the risk elements with incentive compensation plans in project performance, In: *7th Annual Quantity Surveying Research Conference (SACQSP)*, 22-23th September 2014, Pretoria, South Africa, pp. 238-252.

Ogwueleka, A.C. & Maritz, M.J. 2014. Effect of organisational justice in motivating construction workforce towards improved work productivity, In: *5th International Conference on Engineering, Project and Production Management (EPPM)*, 26-28th November 2014, Port Elisabeth, South Africa, pp. 215-224.

Award received:

Best paper award for EPPM 2014, In: *5th International Conference on Engineering, Project and Production Management*, 26-28th November 2014, held at Port Elisabeth, South Africa.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACRONYMS AND ABBREVATIONS

ATPC	Actual time of project completion
BSC	Balance scorecard
CIDB	Construction Industry Development Board
CIIs	Construction Industry Indicators
CPFC	Cost-plus-fixed contract
CPIC	Cost-plus-incentive contract
CPPC	Cost-plus-percentage contract
DPW	Department of Public Works
EOT	Extension of time
EPC	Estimated project cost
ETPC	Estimated time of project completion
FPC	Final project cost
OSHA	Occupational Safety and Health Administration
PBCs	Performance-based contracts
PCA	Principal Component Analysis
SAS	Statistical Analysis System
SPSS	Statistical Package for Social Sciences
SANRAL	South African National Roads Agency Limited

CHAPTER ONE

INTRODUCTION

This chapter involves the general introduction of this thesis by discussing the research settings, the statement of the research problem, sub-problems and hypotheses. It further outlines the research aim, objectives as well as the research questions derived from the formulated problems. Afterward, the justification for this study and a brief introduction of research methodology are presented, this chapter concludes with the delimitation of this study, key assumptions and the structure of the thesis.

1.1 Background

In the 21st century, contracting has become an important avenue for service delivery. The demand to outsource goods and services has been overwhelming which makes the use of performance-based contracting (PBC) systems increasingly important (Martin, 2007: 132). Styles (2001: 11) emphasises that there are different misconceptions of what constitutes a PBC system. A PBC involves stipulating the project objectives and emphasising the results as related to output, quality and outcomes and tie payments to the deliverables, performance measures and/or outcomes (DES, 2015). This incorporates the use of rewards and/or penalties in order to propel construction employees' behaviours towards accomplishing the stipulated project objectives.

All PBCs are incentive contracts, but not all incentive contracts are performance-based contracts (Martin, 2008: 5). For instance, the behaviours of construction workforce can be influenced to achieve the desired change through either performance-related incentive contracting or non-performance-related incentive contracting. Naoum (2003) further emphasises that it is more appropriate to adopt incentive schemes to stimulate better performance in an asset contract, this may be achieved through a PBC. Smith and Grinker (2003: 9) also define a PBC system as the use of performance techniques and incentives to reward organisations for good performance and sometimes penalise them for failing to achieve the project outcomes.

In most cases, clients are concerned with the best performance from contractors with reasonable prices, stating the objectives and specifying the scope and metrics for achieving project goals with less emphasis on the strategies used to achieve them. Partnering was introduced in the late 1980's to facilitate an environment of trust in which the contracting parties will share a lot of objectives (Tang *et al.*, 2008: 457). Partnering is a 'concept which provides a framework for the establishment of mutual objectives among the building team, with an attempt to reach an agreed dispute resolution procedure as well as encouraging the principle of continuous improvement' (Naoum, 2001:1). The priorities of contracting parties are different; therefore the use of partnering alone cannot promote good performance but might create a platform that is prone to misalignment of objectives (Hosie, 2001: 45).

The concept of alliance contracting was further introduced into partnering to overcome the weaknesses of partnering. Alliance contracting is reinforced by incentive design, whereby the sharing of resources, risks and profits/ losses are properly defined among parties in a moral/ contract agreement measured against the performance indicators (Tang *et al.*, 2008: 460). Henneveld (2006: online) defines alliances as " incentive based contracts in which the parties agree to work together as an integrated team in a relationship that is based on the principles of equity, trust, respect, openness, no dispute and blame". The recent use of alliance has also faced challenges relating to the design of appropriate risks and reward systems which can motivate project participants (Rose, 2008: 45). The general principles of incentive systems are to ensure that risks and rewards are commensurably and fairly distributed among the parties concerned and that they are tailored to achieving specific project objectives (Bresnen and Marshall, 2000: 588). This is underpinned by the incentive design where contracting parties are encouraged to work together and achieve good results, make rational returns and bear appropriate risks (Scott, 2001: 112; Tang *et al.*, 2007: 947).

Eriksson and Westerberg (2011) further establish that project success can be measured by all, or a few, of the attributes of time, cost, quality, environmental impact, work environment and innovation. In the recent study conducted by Kerzner (2013), he stipulates that the success of a project is measured by the completion of all work items such as: project duration, project budget, meeting the performance level (quality/specification), good acceptance by users, within the scope and minimum acceptable level, project efficiency and corporate culture. This has broadened the expectations of most project stakeholders in project delivery. Koelmans (2004:231) further identifies the constituents of project success pyramid as schedule, quality, budget, client satisfaction, health, safety/ environment, utility, tools /techniques and project team (people and organisation).

In large and complex projects, these project objectives may be difficult to achieve during project implementation (Harris *et al.*, 2006). O'Toole (1996: xi) stipulates that the increased complexity of contract service delivery has created coordination problems in project implementation. It is important to understand that the characteristics of projects are unique and dynamic therefore there is a need to adopt a strategy which is efficient and effective to achieve project success. In order to improve project performance, many researchers have argued for different performance techniques. For example, project risk management (Kwak and Smith, 2009), total cost management (Fernandes and Valdiviezo, 1997), quality and safety management (Pheng and Teo, 2004) and benchmarking (Luu *et al.*, 2008).

Notwithstanding, most construction projects still suffer from time delays, cost overruns and quality defects (Sun and Meng, 2009: 568). According to Love *et al.* (2011: 129), best performance is facilitated through proper alignment of project participants' behaviours to improve performance objectives. Similarly, Rahman and Kumaraswamy (2004: 155) identify the challenges associated with best performance as: misalignment of objectives, fragmented association between the contracting parties and risk-averse behaviours. The behavioural pattern of project participants has a role to play in the alignment of performance objectives. Mullins (1999) describes performance as a product of motivation, ability and environment while motivation is the intermediate variable between principal project activities and project performance (Rose and Manley, 2011: 766).

Many researchers have recommended incentives as motivational tools used to achieve project outcomes and higher returns (Martin, 2003; Kohlmeyer and Drake, 2008). Incentives can be incorporated in contracts to achieve project objectives such as: time, cost, quality, and safety/health either separately or a combination of two or more project objectives (Bubshait, 2003: 67; Meng and Gallagher, 2012: 354). The basic principle of contracting through incentives is to provide the contractor with the opportunity to be rewarded with greater profits if he performs the contract efficiently (Bower *et al.*, 2002: 38) while the penalty for defaulting is regarded as disincentive (Bubshait, 2003: 67). The combination of both incentive and disincentive is encouraged because it leads to more saving and less overspending (Meng and Gallagher, 2012: 354). It is recommended that, to prevent a confrontational relationship between the contracting parties, incentive designs should focus on rewards rather than penalties (Lahdenpera and Koppinen, 2003: 483).

The use of incentives enhances project performance by promoting unified motivation across project teams through improved working relationships (Bower *et al.*, 2002: 38; Tang *et al.*, 2008: 220). Bonner and Sprinkle (2002) argue that although a positive correlation exists between incentives and performance, the use of incentives does not influence performance directly. For example, extrinsic rewards may drive away intrinsic motivation. Davila (2000 citing Higginbotham, 1997) reports that not all employees are always excited about bonuses; some might prefer peer recognition to bonuses. Incentives may either be financial or non-financial, tangible or intangible, offered in exchange for increased performance (Olugbenga, 2011: 39).

In the construction industry, the relationship among the contracting parties is often adversarial, resulting in claims and litigation and in most cases, may result in increased costs and time (Bower *et al.,* 2002: 1). Incentives are generally used to motivate contractors to exceed the stipulated project goals or expectations. The recognition of the significant role that motivation plays in achieving project success has led to an increase in the use of incentive contracting. Incentive schemes consist of two attributes: a) aligning the objectives of the contracting parties through the use of performance measures and b) link them to payment (Richmond-Coggan, 2001). The design of incentive schemes varies depending on the acquisition and performance goal requirements and involved risks (Costello, 1997). In the construction sector, incentives for performance may be related to the completion date of contracts where bonuses might be paid for early completion or penalties deducted for late completion (Datta and Roy, 2012: 363).

Different types of contracting methods have different implications in terms of incentive designs, responsibilities and risk allocation for both parties. For example, a fixed-price contract may allocate all the risks involved to the contractor by offering few performance incentives. A cost-plus contract spreads the risks among the contracting parties and may provide few or no incentives for contractors to reduce costs (Kim *et al.,* 2007). In performance-based contracts, the risk allocations and responsibilities between the contracting parties differ in projects. The best practice of the fee strategy is to set performance fees up to a percentage of the contractor's costs where the fees are directly connected to the key performance indicators (KPIs). If the contractor is willing to accept some of his costs to perform the services at his own risk, then its upside or fee potential should reflect the added risk by at least the risk percentage. For example, the fees could range anywhere from 10 to 20 percent of the contractor's costs. If the contractor is willing to put part or all of his actual costs at risk, then higher performance fees are usually warranted (Cunic, 2003: 45).

Today's highly competitive and rapidly evolving work environment requires a reformulation of contracting strategies and associated performance outcomes in order to respond to changes in market conditions, legislation, technology or public expectations (Curtis, 2004; Datta and Roy, 2011: 364). This involves a shift from the traditional basic-services provider to advanced-services provider where the firm changes from a service supporting the customer's product to a service supporting his actions (Mathieu, 2001; Ogwueleka, 2010: 208). Gronroos (2000:196) further explains the change process as the shift from: a) product-based value to total-value in the customer relationship; b) short-term transactions to long-term relationships; c) core product quality to total customer relationships; and d) the production of technical solutions as the key process to developing total perceived quality and value. Barnes (1981:

102) identifies the three key functions to consider for successful implementation of construction contracts as:

i. Work transfer: to define the work which one party will do for the other;
ii. Risk transfer: to define how the risks inherent in doing the work, will be allocated between the two parties; and
iii. Motive transfer: to implant motives in the 'contractor party' that ideally matches with those of the 'client party'.

The major concern in project contracting is to successfully align the separate motives of project participants with stakeholders' expectations (Bower *et al.*, 2002:1). This requires their expectations to be clear and consistent, and contractors' objectives to be predicted in order to effectively align them (Barnes, 1981: 103). The contracting strategies vary in the construction industry where some might attempt to transfer risks from clients to contractors, and others might try to reward contractors for superior performance and the value they give to their clients. Likewise, PBCs differ substantially from other forms of contracting strategies since the PBC participants share specific goals and objectives by setting up rewards for superior performance which increases profitability (Cunic, 2003: 43). In traditional contracts, the project participants understand how their actions result in increased benefits for themselves and their clients while the effective PBCs motivate contractors to achieve clients' expectations through incentives flowing through contractors' organisations to employees (Cunic, 2003: 43).

Incentive compensation payoffs are adopted in the construction industry at two different levels, namely: the organisation and the employee (Hughes et al., 2007). In an organisation, incentives are targeted to achieve one or more of these project objectives which are time, cost, quality and safety/health. In this scheme, a performance compensation plan is tied to each project objective using the most critical parameter to measure the payoff. At the employee level, incentives are used to enhance workers' performance towards improved productivity. It is important to note that organisations are social systems where human elements (workforce) are basically the driving force for effectiveness and efficiency. It takes a highly motivated workforce to make a difference between success and failure therefore improving performance in linked to attracting, retaining and developing motivated and committed employees (Farrell, 2011: 200). In today's construction environment, the shortage of skilled craft workers has prompted contractors to have the ability to retain their employees. Most contractors have opted for different types of incentives and programs to keep their employees satisfied in their current job (Hancock, 2014: 3&4).

1.2 Problem formulation

Although the previous studies on incentives reveal a wide recognition of the importance of incentives to project success, there is little empirical research on the impact of incentives on motivation and performance in the context of construction projects (Ling *et al.*, 2006: 58; Chapman and Ward, 2008: 660; Rose and Manley, 2011: 766). The study conducted by Bubshait (2003: 64 - 69) compares the perceptions of clients and contractors regarding the use of incentives. The study lacks empirical data for assessing the performance outcomes in incentive projects. In Nigeria, there are two existing studies conducted by Olugbenga (2011) and Abdulsalam *et al.* (2012) on incentive schemes in the construction industry. Both studies investigated the types of incentive schemes used in the construction industry to compensate construction employees but failed to provide empirical data for assessing their impact on project improvement and also to develop incentive frameworks/models to achieve best practice. In the context of the South African construction industry, the literature review revealed that there is no existing study on the impact of incentives on project improvement.

Bower *et al.* (2002: 40 - 43) analyse the use of quality incentives in project alliancing and other types of incentives but the relationship that exists between quality incentive and quality outcomes was not analysed. A further study by Jansson and Ryddoke (2010: 11 - 18) assesses only the relationship existing between quality incentive and quality outcome.

A literature review on incentives shows that the majority of previous researchers focus on a single incentive plan (Jaraiedi *et al.*, 1995; Berends, 2000; Brenen and Marshall, 2000; Rose and Manley, 2010). Beer *et al.* (2004: 42) argue that a single incentive can cause employees to over-invest efforts in one area at the expense of other areas. The use of a single incentive plan is regarded as problematic since any one performance objective is incomplete. It is important to consider the weight of each performance measure in calculating incentive payoffs (Ittnera *et al.*, 2003: 728). Cauley *et al.* (1999: 196) emphasise that incentive designs can only be considered as correct incentives to project participants when they are based on performance criteria.

The use of multiple incentives can improve overall performance while a single incentive as previously noted tends to stimulate performance of a particular aspect (Volker and Rose, 2012: 4-5). Despite the numerous studies on incentives and project outsourcing, the determinants of successful outsourcing with particular reference to risks, contract design and incentives are largely unknown (Datta and Roy, 2012: 371). In order to evaluate the relationship between incentives and performance improvement, there is a need to assess the four aspects of incentives which are: a) economic, b) relational, c) legal and d) psychological (Hughes *et al.*, 2007: 2274). The economic perspective reviews the impact of incentives on productivity and efficiency; the relational perspective assesses the interpersonal relations and the cause behind commitment; the legal perspective considers the effects of bonuses and penalties; and the psychological perspective evaluates how individuals and firms react to performance measures. Likewise, the incentive compensation plans for employees should be targeted on paying for their inputs rather than the value of their job.

1.3 Statement of problem

The traditional contracting system has experienced several problems associated with poor contract administration, performance delays, complicated processes, abominable environment, financial intensity, quality shortcomings, and deficient statements of work (Cooke and Williams, 2009; Cunningham, 2013: 4). The construction activities in both South Africa and Nigeria have also witnessed these problems. The introduction of performance metrics into construction projects is an attempt to resolve these problems but this has also resulted in misalignment of objectives, fragmented association between contracting parties, confrontational working culture, and risk-averse behaviours (Rahman and Kumaraswamy, 2004: 155; Love *et al.*, 2011: 129). Many researchers have advocated the use of incentives as motivational tools to reduce confrontations, promote cooperation and assign the appropriate allocation of risks among the contracting parties in order to improve performance objectives (Scott, 2001; Bower *et al.*, 2002; Tang *et al.*, 2007).

Previous studies have failed to incorporate the critical performance criteria (key performance goals) in incentive designs which could lead to over-investment in one area at the expense of other areas. For example, the use of a financial incentive plan only in a project may target financial gain thereby neglecting other major project objectives, such as time and quality. There is possibility that time-overrun may occur and if it occurs could result in cost increase. However, there is lack of empirical studies on how project drivers can influence project participants' behaviours in incentive design, its influence on motivational principles as well as the assumptions underlying the use of incentives. Broome and Perry (2002: 69) suggest that the use of incentives should take into account the constraints and the risk of a project as well as the motivational drivers that can propel project participants' actions.

Organisational performance is directly influenced by employees' job satisfaction and inputs (Ogwueleka and Maritz, 2014). The perception of employees regarded their duties and the organisation in which they work, will influence the degree of their job satisfaction as well as their levels of commitment. The degree of an employee's commitment can be improved by increasing and strengthening his/her perception on the support from the organisation while organisational justice remains a major predictor of the level of an employee's commitment (Saks, 2006; Zaman *et al.*, 2010). Murtaza *et al.* (2011: 73) defines organisational justice as the perception of employees about fair treatment in an organisation. As previously argued, this study provides the need to evaluate incentive mechanism based on organisational performance as well as employee performance because employees' commitments will direct influence organisational performance and productivity.

Most limitations associated with the use of incentives are centered on improper alignment of the contractor's objectives with the client's expectations in a project and the provision of inadequate incentives to motivate construction employees to perform well. This deficiency will be addressed by identifying the positive motivational drivers that can direct the construction employees towards improved productivity. This study adopts the critical-performance criteria (such as: time, cost, quality and safety/ health) to evaluate the impact of incentive mechanisms in construction projects. This thesis will assess the impact of incentives on motivational drivers and also identify the positive motivational drivers that can motivate construction employees to achieve contractors' objectives. This study will further evaluate the economic impact of incentive mechanisms in the construction industry with the view of adopting measures that can improve project outcomes. This thesis proposes to develop the best-suited framework for the use of incentives in construction projects thereby contributing towards best practice among the contracting parties in South Africa and Nigeria.

The next two sections (1.4 and 1.5) introduce the sub-problems related to the problem statement and each of these sub-problems will be linked to a hypothesis and then analysed in chapters seven and eight (data analysis).

1.4 Statement of sub-problems (SP)

SP1: Incentive mechanisms confronting project participants that do not elicit efficient behaviours that can influence the desired project outcomes.

SP2: The weights of various critical project-performance measures are often absent in the design of incentive mechanisms.

SP3: Organisational justice can influence construction workforce's behaviours towards improved project performance.

SP4: Incentive mechanisms are not optimally designed to fit into project risks and the organisational structure of the construction industry.

SP5: There is poor perception on the use of multiple incentives among contracting parties in the construction industry.

1.5 Hypotheses (H)

H1: The construction workforce behaviour can influence the project outcomes.

H2: The weights of various critical project-performance measures are fundamental tools to assess performance deliverables in projects.

H3: Lack of fairness in organisational justice will have a negative impact on project performance.

H4: The use of incentives that do not incorporate project risks will impact negatively on project participants and performance objectives.

H5: The level of perception on the use of multiple incentives is low among the contracting parties.

The problem statements and hypotheses are not mutually exclusive but are inextricably related in the development and validation of the research. Table 1.1 shows a summary of the relationship of the sub-problems with the research hypotheses.

Table 1-1: Relationship of sub-problems with research hypotheses

Statement of sub- problems	Corresponding hypotheses
Sub-problem (SP 1)	Hypothesis (H 1)
Sub-problem (SP 2)	Hypothesis (H 2)
Sub-problem (SP 3)	Hypothesis (H 3)
Sub-problem (SP 4)	Hypothesis (H 4)
Sub-problem (SP 5)	Hypothesis (H 5)

1.6 Research aim and objectives

The principal aim of this research is to evaluate the use of incentive mechanisms in improving project performance in construction projects in South Africa and Nigeria. In this regard, the following represent the specific objectives to be achieved:

i. Assessment of the impact of incentives on employee motivation and identification of positive motivational drivers that can motivate construction employees to achieve contractors' objectives.
ii. Evaluation of the sociological and operational constructs of performance in relation to incentive mechanisms in construction projects;

iii. Appraisal of the economic impact of incentive mechanisms in the construction industry with the view to measure the benefits and detriments; and

iv. Adopt the research outcomes to model for incentive payoffs and develop the best-suited framework for incentive mechanisms in construction projects in South Africa and Nigeria.

1.7 Research questions

The major question for this thesis is how can the construction workforce be rightly motivated to improve project performance thereby aligning the objectives of contracting parties towards improving performance criteria? In order to address this question, the following sub-questions were considered:

1. In what areas can construction employees be rightly motivated to achieve contractors' objectives?
2. To what extent do incentive attributes/elements influence project performance and organisational behaviours?
3. In what ways can organisational competency be improved to achieve project performance?
4. What are the benefits and challenges encountered in incentive contracts?
5. How best can incentive mechanisms be designed in the construction industry to achieve improved project outcomes?

1.8 Justification for the study

The concept of incentive mechanisms is still a developing field of knowledge and expertise in the construction industry. This practice has become prominent among other project areas through the introduction of "alliance" into "partnering system". It has also attracted many researchers from different countries which reveal a wide recognition of the impact of incentives on project success. However, there is little empirical research on the impact of incentives on workforce motivation and performance in the context of construction projects (Ling *et al.*, 2006: 58; Chapman and Ward, 2008: 660; Rose and Manley, 2011: 766). There is a great need for a study which can provide an objective assessment of the influence of incentive mechanisms on workforce motivation and performance.

The global increase in construction activities necessitates a better contracting strategy to promote best performance. Rahman and Kumaraswamy (2004: 155) identify the challenges associated with best performance as: misalignment of objectives, fragmented association between contracting parties and risk-averse behaviours. Many researchers have advocated the use of incentives as motivational tools to reduce confrontations, to promote cooperation and make an appropriate allocation of risks among contracting parties in order to improve performance objectives (Scott, 2001; Bower *et al.*, 2002; Tang *et al.*, 2007).

In South Africa, stakeholders have continuously expressed concern over the use of incentive schemes in project delivery. Some have attributed the use of incentives mainly as a tool for large-scale contractors in the construction industry which has attracted sympathy among government and regulatory bodies (Ogwueleka and Maritz, 2013: 84). The quest to discard the use of incentive mechanisms in the South African construction industry is ongoing, but if successful, what will be the 'faith of best performance' in the country? Or are the previous researchers wrong in their advocacies for the use of incentives as motivational tools to reduce confrontations, to promote cooperation and make an appropriate allocation of risks among the contracting parties? The Nigerian construction industry has dramatically promoted the use of incentives in project delivery but this has failed to achieve the specific objectives. Some have also attributed this to 'corruption in the society', but the question is "Can best performance be suppressed easily through corruption?" This study investigates the incentive mechanisms and their economic impact in order to identify the challenges and benefits, and also the way forward in promoting best performance in South Africa and Nigeria.

1.9 Research methodology outline

This thesis adopts an explanatory sequential approach of mixed methods research approach for data collection which is based on ontology and epistemology philosophies. The use of an explanatory sequential approach is embedded on the research paradigms of post positivism and constructivism. Post positivism guided the collection and analysis of quantitative data followed by constructivism which aided in the collection and analysis of qualitative data. The choice of this approach was based on the pre-interviews conducted at the early stage of the study which reveal that the majority of project stakeholders are not willing to explore and discuss incentive issues as it relates to construction projects. They opted out because most of them are not familiar with the formal practice of incentive mechanisms; they commented that most incentives are usually given based on the discretion of managers. Pre-interviews revealed that most of the stakeholders are accustomed with constructs of incentive mechanisms but cannot align them to the practice. In order to achieve the objectives of this study, this thesis created a strong quantitative orientation by using important variables and quantitative instruments to measure the construct of primary interest.

The study plan involves target, accessible and sample populations. Target population for this study comprises project participants in Gauteng, South Africa and Abuja, Nigeria. Gauteng is the smallest of the nine provinces of South Africa geographically but with the highest population of about 12.3million. It also has the highest level of construction activities. Likewise, Abuja is the Federal capital territory of Nigeria with highest record of construction activities. Most of the multinational companies have their headquarters in Abuja; likewise the construction-related associations and outfits. Accessible population includes public and private sector clients, registered consultants and construction companies in Gauteng province and the Abuja zone. For the selection of the accessible population, four major factors are considered such as: relevance, flexibility, access and applicability (see section 7.7 for details).

The research adopts a probability sampling method based on principles of randomness and probability theory and a purposive sampling for the selection of respondents and also case study interviewees. For quantitative data collection, the numerous and unclassified databases prompted the use of non-probability (purposive) sampling to identify the sample population and the stratified probability (random) was adopted to select the respondents from the sample frame using the calculated sample sizes. The choice of stratified random sampling of probability method is to address the problem of non-homogeneous populations in the sense that it attempts to represent the population much better than what can be achieved with simple random sampling. A purposive sampling technique was used to collect qualitative data for analysis by selecting the case study interviewees based on their designations and work experience. The findings from the quantitative data were transformed into semi-structured questions for the case study interviews.

The research focus is not merely to identify and resolve problems associated with the use of incentives but also to develop an efficient framework for incentive systems in construction projects. The use of case study interviews is to provide an in-depth analysis of “how” and “why” relating to the studied construct in the studied environment. This allowed for the key aspects of incentives in construction to be studied and conclusions were drawn based on the research problem thereby creating positive contributions to the existing body of knowledge.

1.10 Delimitation of the scope of the study

The study is limited to the evaluation of incentive mechanisms and the economic impact on performance-based contracting systems in South Africa and Nigeria. Based on the four main factors, which are relevance, flexibility, access and applicability, this study was restricted to project participants in Gauteng province, South Africa and Abuja, Nigeria. As already noted, the Gauteng province is the most populous province in South Africa with the highest level of construction activities. Abuja is the Federal capital territory of Nigeria where most of the multi-national companies have their headquarters including construction-related associations and outfits.

1.11 Key assumptions of the study

Assumptions are conditions that are taken for granted and may be accepted as true without proof (Leedy and Ormrod, 2010:5). In relation to the sub-problems, the following assumptions provide a guide to the understanding of this study as conceptualised:

i. Incentive mechanisms have the capability to align project participants' efforts towards the delivery of project objectives;
ii. The use of multiple incentives can improve overall performance thereby avoiding the investing of one's efforts in a single area at the expense of other areas;
iii. A performance-based contracting system promotes a more equitable alignment of risks and incentives among the contracting parties;
iv. Incentive mechanisms can be measured by sharing of resources, knowledge, risks and profit/ losses in contract agreements against the performance indicators; and
v. The concept of incentive mechanisms is still a developing field of knowledge and expertise in the construction industry.

1.12 Structure of the thesis

This thesis is structured in eleven chapters:

Chapter one involves the introduction of the research setting, the formulation of the research problem, the statement of the research problem, sub-problems and hypotheses. It further discusses the research aim, objectives, justification and outline of the methodology. The chapter concludes with the delimitation of the scope of the study, key assumptions and structure of the thesis.

Chapters two and three present the general review of academic literature on incentive mechanisms and the country context. *Chapter two* outlines the concepts, philosophies and definitions of incentives mechanisms. It further discusses the fundamentals and types of incentives, how they are designed, payment strategies, incentive provisions in contract arrangements and others. *Chapter three* describes extensive workforce motivation, project participants' behaviours and performance improvements in construction projects. It also discusses the effect of incentives on project performance, identifying the benefits and challenges.

Chapter four deals with the country context of South Africa including the description, and the challenges and benefits associated with best performance.

Chapter five discusses the project environment and setting of Nigeria and also the challenges and benefits associated with best performance.

Figure 1.1 reveals the framework of the extensive review of related literature.

Figure 1.1: The framework of the extensive review of related literature

Chapter six introduces the theoretical aspect of the research, which is anchored on the overview of incentive mechanisms in project performance. The variables of the research and a general framework for data analysis are therefore introduced. It presents the theory that explains why the research problems exist and the body of knowledge in which the theory can be located.

Chapter seven describes the survey methodology applied for data collection and the underlying concepts for the choice of research instruments. It concludes by describing the research design/strategy, data collection instruments and consequent validity.

Chapters eight and nine present the quantitative data analysis for both South Africa and Nigeria which include the presentation of research results and tests of hypotheses.

Chapter ten discusses the qualitative data analysis for South Africa and Nigeria where the views of case study interviewees based on the quantitative results were obtained for better interpretation of research findings.

Chapter eleven presents the framework development and the validation process for the incentive framework and the modeling process of employee and organisational incentive payoffs in construction projects.

Chapter twelve contains an overview of the research, summary of findings, conclusions and recommendations. Considerations are given to research limitations, contributions to knowledge and areas for further research on this topic.

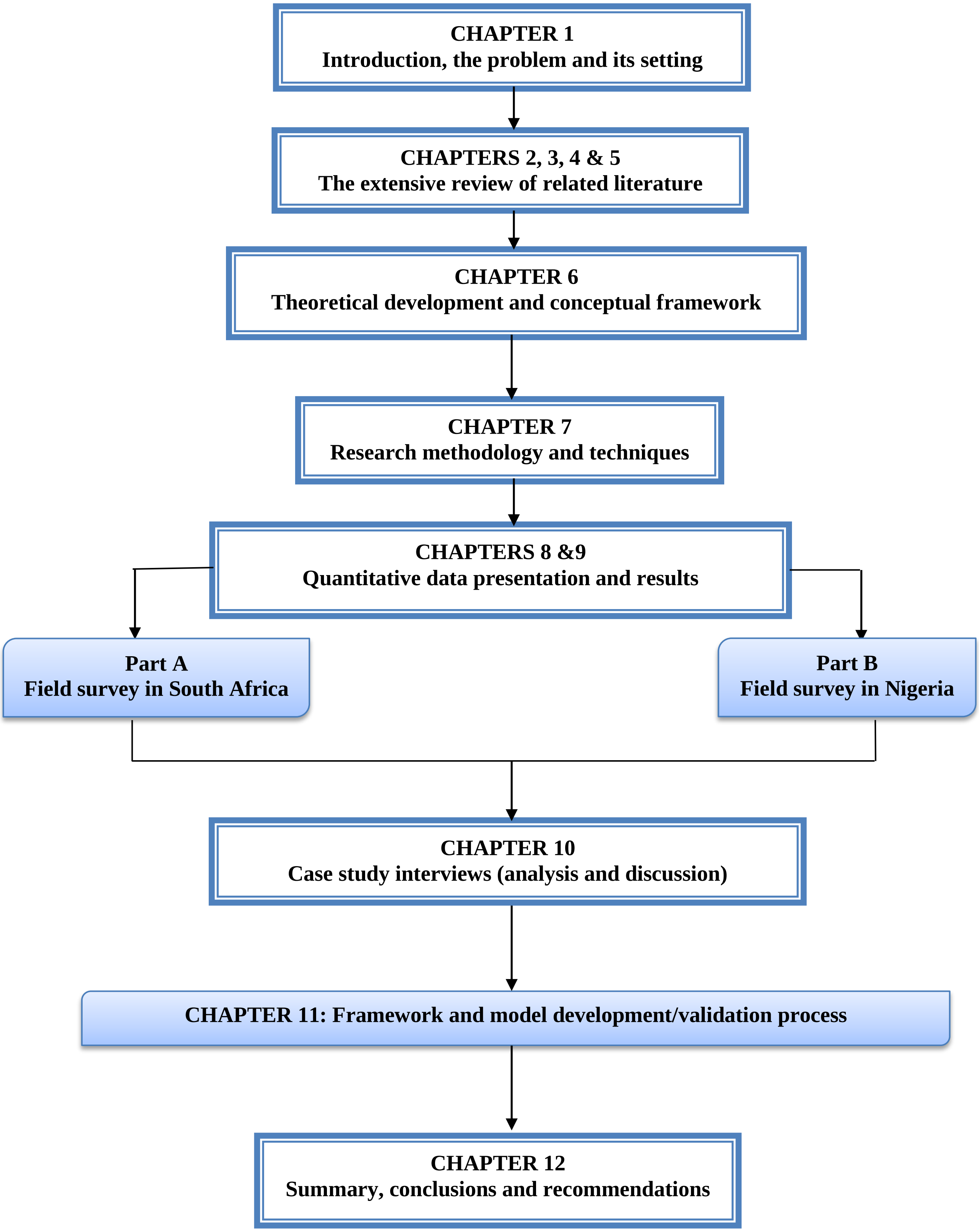


Figure 1.2: Graphical representation of the thesis structure

1.13 Chapter summary

This chapter discussed the concept of PBC as stipulating project objectives and emphasising the expected results and tie payments to the deliverables. This process allows for the use of performance techniques and incentives to reward organisations for good performance and sometimes penalise them for failing to achieve the project outcomes. This chapter reviewed that incentives are adopted basically in two different levels in the construction industry namely: the organisation and the employee. The use of incentives in the organisational level is recommended to achieve higher returns where bonuses and/or penalties are tied to project objectives such as time, cost, quality and safety/health either separately or a combination of two or more objectives. In the employee level, incentives are used to enhance employees' performance towards improved productivity.

The key problems associated with the use of incentives at both levels are centered on improper alignment of the contractor's objectives with the client's expectations in a project and the provision of inadequate incentives to motivate construction employees to perform well. Based on these, the research aim, objectives and questions were formulated for the study. The study will be carried out in South Africa and Nigeria based on four factors, which are relevance, flexibility, access and applicability.

CHAPTER TWO

INCENTIVE MECHANISMS IN CONSTRUCTION PROJECTS

2.1 Introduction

This chapter presents the general overview of the key issues and variables for incentive mechanisms in construction projects. Section 2.2 discusses the concepts, philosophies and general definitions of incentives; section 2.3 describes the overview of incentives in partnering processes. The theoretical fundamentals associated with the use of incentive mechanisms in project performance are described in section 2.4. Section 2.5 focuses on how incentive schemes are designed in construction projects while payment strategies in incentive-based contracts are elaborated in section 2.6. Types of contractual incentive-based projects are highlighted in section 2.8, this explains the strategies used to implement or incorporate incentives in contracts. Finally, the summary of related literatures in incentive mechanisms is discussed in section 2.9.

2.2 Concepts, philosophies and definitions of incentives

The general view and concern about improving performance is focused on developing capacity issues. Capacity development does not automatically translate into better performance; it requires some fundamental elements to propel it to achieve the desired outcomes (Boesen and Therkildsen, 2004: 5). Incentive systems and motivations are critical tools for capacity development as they enable individuals and organisations to perform their functions effectively, efficiently and sustainably. Motivation comprises the initiation, direction, intensity and persistence of behaviour while incentives are external measures that are designed and established to influence the motivation and behaviour of individuals, groups or organisations (UNDP, 2006: 5).

The word "incentive" is derived from the Latin "incentivus", meaning "to stimulate" or "to provoke", and when incentives are properly employed, they can stimulate contractors to support, and perhaps even adopt, the goals and objectives of clients (Neil, 1990). Incentive is the internal psychological process or internal power that is guided by the goal or object to stimulate and maintain individual activities. This process includes three connotations: the first is to meet the individual's target or outcome; the second is to determine the goal or outcome and how to achieve the mental process; and the third is the social process whereby an individual's behaviour is influenced by others. The philosophy of incentive is that an individual's latent abilities, both mental and physical, can be expanded in far greater abundance than he/she normally utilises. The objective of incentives is to improve the efficiency of employees by causing them to work more effectively in lesser time and at a greater pace with better application to their job, without detriment to their health.

Generally, an incentive plan is introduced before the actual event while reward or penalty associated with the incentive plan is implemented during or after completion. The ability of an incentive mechanism to encourage collaboration and an environment of trust is driven by the intention of the formal reward to promote effort towards high-level performance (Volker and Rose, 2012: 2). The major problem with incentive design is that it can fail to reflect organisational goals. This might lead to contractors focusing on performance areas which are explicitly rewarded and neglect goals which are harder to specify and measure (Akerlof and Kranton, 2005: 13). It is important to design incentives to collaborate and align the whole team's effort, focusing on more efficient ways to deliver the objectives of the team and the project (Thomas and Thomas, 2005:193).

The general goals of incentive systems are to ensure that risks and rewards are commensurately and fairly distributed among the contracting parties concerned and that they are tailored to achieve the specified project objectives (Bresnen and Marshall, 2000: 588). The design of incentive mechanisms depends on the type of inter-organisational governance approach used for managing the relationship (Datta and Roy, 2012: 362). The relational approach is more likely to be self-enforcing, and in most cases, implicit or informal, for example, knowledge sharing, reputation, information exchange as well as market and resource access. The transactional approach will often require additional enforcement and active monitoring, which may be explicit or formal in nature and documented in contracts.

A process whereby a contractor is motivated to achieve value-added services over and above those specified originally and which are of material benefit to the client, can be referred to as incentivisation (Bower *et al.*, 2002: 38, citing HM Treasury, 1991). It produces a more proactive, cooperative relationship between the contracting parties and reinforces the cultural shift away from the traditional and adversarial approach towards better relational contracting. To effectively adopt incentivisation in a contract, the following prerequisites are required (Bower *et al.*, 2002: 38 citing, HM Treasury, 1991):

i. A clear and precise objective;
ii. A broad understanding of the market structure;
iii. An efficient contract management process;
iv. An evaluation of the potential benefits at the procurement planning stage; and
v. An effective pre-planning of payments to ensure that adequate provision is made to meet all potential incentive payments.

2.2.1 General definitions of incentives

Incentive theory is at the core of economics. This may be due to its contribution to the understanding of the theory of value in large economies. Rational behaviour in the market is difficult to postulate by economists, for example, the delegation of a task to an agent who has unspecified objectives. Conflicting objectives and decentralized information are the two basic ingredients of incentive theory (Laffont and Martimort, 2002: 12). Incentive theory emerges from the division of labour and exchange. The common definitions of incentive in the general context are:

> '*Economic incentive is a system of measures that uses material means to motivate participants in production to work for the creation of social product'.*
>
> The Great Soviet Encyclopedia, 1979: online

> *'Incentives are policy instruments that increase the comparative advantage of forest plantations and thus stimulate investments in plantation establishment and management'.*
>
> Food and Agriculture Organisation of the United Nations, 2004: online

> *"Incentive is any measurable advantage accorded to specific enterprises or categories of enterprises by (or at the direction of) government'*
>
> UNCTAD, 2003: online

> *'Incentive is an inducement to motivate an organization…or individual in order to place greater emphasis on how to achieve an objective or to act in a certain way'.*
>
> Broome and Perry, 2002: 60

In the context of project implementation, Smith (1998) describes incentives as '*bribes*' and '*sweeteners*'. This is in line with the following definition:

'An incentive is something, such as punishment or reward that induces actions'

Construction Industry Institute, 2013: online

Incentives involve different connotations which are: first, the likely conditions under which the reward was offered; second, the presumed motives of the person administering the reward, and third, the relationship between the agent and the recipient of the reward. There are numerous definitions of incentives in different contexts and project frameworks. This thesis adopts the definition of incentive as stipulated by Broome and Perry (2002) for this study, this definition focuses on motivating workforce to achieve project goals or objectives. The choice of this working definition is in line with Lahdenpera and Koppinen (2003: 483), who emphasise that a confrontation relationship between the contracting parties can be prevented through the use of incentive designs focusing on rewards rather than on penalties.

2.3 Overview of incentives in partnering processes

In the construction industry, a price-based competitive process has remained the most commonly adopted traditional method of tendering (RICS, 2007). In this process, a number of bidders are given a clear specification of the work to be carried out and they are required to submit a price for doing so with the contract almost invariably being awarded to the lowest bidder. The use of a price-based competitive process has become flawed over the years. Many researchers and related organisations have advocated for a change, not only in the price-based method, but also in traditional construction contracts (Carpenter *et al.*, 2003; Akintan and Morledge, 2013). Traditional construction contracts adopt the lowest bidder selection process for bid selection. This may place extreme pressure on the bidders to provide a marginally adequate bid to cover the work which may result in a situation where contractors feel compelled to find profits in variations and claims (Carr, 2005: 1168).

A traditional construction contract can be referred to as a project contract which involves multiple parties (including subcontractors) and each party is appointed on a separate contract with a variety of separate terms and conditions. Each party may owe little or no allegiance to the entire project, or to any other member of the team except the one with whom he/she is contracted out (Thomas and Thomas, 2005: 200). This may not only be difficult to manage but also creates conflict among the project participants. The use of traditional construction contracts to meet clients' expectations and contractors' objectives has led to distrust and conflicts among contracting parties (Egan, 1998). The demand to improve performance through cooperative strategies thereby reducing confrontations and promoting equity in allocation of risks amongst the contracting parties, led to the introduction of partnering in the early 1980's in Japan and USA (Naoum, 2003: 73). The definition of partnering in the construction industry context has various forms in academic research and in business practice.

As previously stated, "Partnering is a concept which provides a framework for the establishment of mutual objectives among the building team, with an attempt to reach an agreed dispute resolution procedure as well as encouraging the principle of continuous improvement" (Naoum , 2001: 1). Successful partnering is characterised by the existence of mutually beneficial goals and a high level of inter-organisational trust among the contracting parties. These arrangements range from 'short-term once-off arrangements associated with a single project' to 'long-term commitments between two or more organisations' with emphasis on how these processes can be used to achieve the business objectives.

Various guidelines and handbooks have been published to promote the partnering processes (OGC, 2003; Ronco and Ronco, 2005). The concept of partnering has been increasingly institutionalised and is also linked to a definite set of tools and procedures. These tools and procedures may include: charters and dispute resolution mechanisms, team building exercises and facilitation workshops, total quality management, business process mapping, incentive plans, formal integrative mechanisms, benchmarking and continuous improvement programmes (Bresnen and Marshall, 2002; Bygballe *et al.*, 2010; Eriksson, 2010). Table 2.1 displays the types of partnering relationships that form the basis of selection and applications.

Table 2.1: Types of partnering

Types of partnering	Relationship	Basis for selection	Conditions for use
Project	Once-off	Competition/ negotiation	For all projects; best for high value
Strategic/full	Long-term	Competition/ negotiation	For medium-long term strategy
Post-award	Once-off	Competition	Public projects including series of small projects
Pre-selection	Once-off/long-term	Negotiation	Any project, advances selection of contractors
Co-ordination agreement	Once-off/long-term	Competition/ negotiation	Any project, agreement overlaid on standard contract
Semi-project	Once-off	Limited competition	All projects where scope of negotiation is limited

Source: Institution of Civil Engineering Surveyors, 1997.

2.3.1 Contract and trust in partnering

Partnering is concerned with having a working relationship among project stakeholders based on respect, trust, teamwork, commitment and shared goals. Recent studies reveal that partnering has failed to achieve a good working relationship in project delivery (Tang *et al.*, 2008; Laan *et al.*, 2011). Clarke (2012) highlights the weaknesses associated with partnering as follows:

i. The success of partnering project depends on personal commitment and trusting relationships which may be difficult to develop;

ii. It requires investment in developing new processes, training and teambuilding to maximise prospects of project success;

iii. It creates a pure barrier to pure market forces and competition outside of the partnering arrangements; and

iv. Risk of legal uncertainty and unpleasant relationships.

Lu and Yan (2007: 242) argue that the relationship existing in a partnering system is based on a good faith rather than a formal contract. Biljsma-Frankema and Costa (2005: 261) further emphasise that formal contracts are only required when there is lack of trust or when contracts and general formalisation of a relationship can complement or reinforce the process of team building. Recent studies have emphasised that it is difficult to establish and maintain collaboration between clients and contractors without a formal commitment (Kadefors, 2004: 877; Bresnen, 2007: 367; Laan *et al*., 2011). Contracting parties are people with different purposes and who act in different ways. Researchers have considered the process of drafting a formal contract to promote a joint learning process, mutual understanding and long-term and trusting exchange relationships (Vlaar *et al.*, 2006: 1629; Popp and Zenger, 2002: 709). This might be difficult to achieve through the process of partnering.

2.3.2 Alliance contracting in partnering

The use of a formal contract is necessary to achieve commitment among the contracting parties. Trust necessitates collaboration to go beyond self-interest and to reflect more stable cooperative intentions among the contracting parties. However, these collaborative actions can only be induced through contractual sanctions and incentives. The incorporation of alliance contracting into partnering is intended to overcome the weaknesses of partnering. This is underpinned by the incentive design whereby the sharing of resources, knowledge, risks and profit/losses are properly defined among parties in a moral/contract agreement, measured against the key performance indicators (Tang *et al*., 2008: 460).

Incentive arrangements which consist of social and contractual components can influence the effectiveness of an alliance contract (Volker and Rose, 2012: 3). These can be applied in both pre-construction and construction stages. In the pre-construction stage, these arrangements are focused on establishing clients' expectations so that they can be acceptable to both contracting parties in order to propel positive motivation actions towards achieving clients' goals. During the construction stage, the procurement phase is centered on establishing legal collaborative agreement while the execution phase creates an evaluative platform for project outcomes.

The key philosophical principle in the selection of an alliance contract is that a contractor's profit is earned through performance and not his/her ability to make and to win claims (Bower, 2003: 9). In alliances, all parties are bound to a risk/reward scheme where they all share savings or losses depending on the success or otherwise of the project. Alliance contracts enable mutual interests to exist between multiple parties through team-based gain-and/or pain-sharing arrangements. The risk/reward model encompasses joint budgets and committed cost and time targets, risk and reward formulas and bonus mechanisms (Hauck *et al.*, 2004: 145).There are two types of alliances, namely: a) project alliances and b) strategic alliances. Project alliances are formed for single projects and they are dissolved when the projects are completed while strategic alliances are long-term arrangements which are used to deliver a program of projects or to carry out certain operational functions of a business. The essential components of a project alliance are as follows (Ross, 2003):

i. The selection of participants is based on capability approaches and systems plus subjective criteria, such as enthusiasm, commitment and interaction with stakeholders;

ii. A commercial framework is created to drive the “best-for-project” decisions which are consistent with an environment of exceptional performance and also to enhance rewards for all participants;

iii. There is a commercial framework that shares the rewards for outstanding performance and the penalties for poor performance. This may be referred to as a gain/pain-share regime;

iv. All risks are shared by all members of the alliance team;

v. The only way that profits are increased is when performance exceeds ‘business-as-usual’ outcomes;

vi. An integrated team is formed and personnel are selected on a “best-for-project” basis;

vii. All decisions at the most senior/project board level must be unanimous; and

viii. A ‘no blame’ culture in which there will be no formal disputes.

Notwithstanding the recent use of alliance contracting which incorporates contractual incentive systems, the industry is still faced with continuing challenges related to the subtle balances required in designing risk and reward systems that can motivate project participants (Rose, 2008: 1).

2.4 Fundamentals of incentive mechanisms in project performance

The design and implementation of a successful incentive scheme require the inclusion of fundamentals which are targeted towards achieving project success. The Construction Industry Institute (1995) highlights the channels through which incentives can be used to improve project performance as:

i. Align the project participants on common objectives;

ii. Drive the definition of the project;

iii. Create interdependence among project participants;

iv. Establish a mutually supportive work environment;

v. Create communication channels and enhance team building; and

vi. Reward desired behaviour.

Henneveld (2006) describes incentive-based relationship contracts as a contractual arrangement where contracting parties agree to work together as an integrated team in a relationship that is based on the principles of equity, trust, respect, openness, no dispute, and no blame. As previously discussed, the purpose of incentive contracts is to ensure that risks and rewards are commensurably and fairly distributed among contracting parties and that they are tailored to specific project objectives (Bresnen and Marshall, 2000). Incentive compensation plans are tools used to induce risk-adjusted measures and appropriate risk allocation amongst the contracting parties thereby aligning workforce behaviours with project goals. Risks and rewards are two fundamental elements in incentive compensation plans although the construction industry is still faced with the challenge on how to effectively design project risks and reward systems to achieve best performance. Risk is to be shared;

therefore the contractor should not be allocated a reward for unforeseen occurrences beyond his jurisdiction. The sub-sections discuss the two essential measures in project delivery which are the key project objectives and risk allocation.

2.4.1 Project performance indicators

Performance is often regarded as the critical indicator used in measuring the success of any organisation. Construction organisations have devoted attention towards the investment in management strategies that can enhance performance at different levels. Defining and evaluating performance differ among multidisciplinary project teams where there are different individual predetermined goals and expectations of the project (Cheung *et al.*, 2013: 941). Success of a project has been previously defined as the completion of project activities within constraints of time, cost and quality (Ogwueleka, 2011). As previously stated, Kerzner (2013) stipulates that the success of a project is measured by the completion of all work items, such as project duration, project budget, meeting the performance level (quality)/specification, good acceptance by users, within the scope and minimum acceptable level, project efficiency, and corporate culture. This has broadened the expectations of most project stakeholders in project delivery.

In practice, project performance is often assessed by comparing the client's expectations with actual realisation in projects (Yu *et al.*, 2005). It is important to understand that the characteristics of projects are unique and dynamic therefore there is a need to adopt a strategy which is efficiency and effective to achieve project success. Lim and Mohamed (1999) argue that it is ideal to complete a project using a win-win approach for all project teams. This implies that it is essential to consider not only the client's expectations but also the objectives of other team members in project delivery.

Iyer and Jha (2005: 295) identified factors adversely affecting performance of projects as: conflict among project participants, ignorance and lack of knowledge, presence of poor project specific attributes and lack of cooperation, hostile socio-economic and climatic conditions, reluctance in timeous decision-making, aggressive competition at tender stage and short bid-preparation time. Meeampol and Ogunlana (2006: 3) further emphasise that cost performance is influenced by '*management of construction resources, budget management, construction method and communication'* while time performance depends on '*choice of construction method, management of construction resources, schedule management, supervision and control and communication'.* The study conducted by Cheung *et al.* (2013) grouped the key criteria for project performance using hypothetical statements as shown in Table 2.2. Wang *et al.* (2013) identified six project performances and their indicators, described in Table 2.3.

Table 2.2: Taxonomy of project performance

Factors	Hypothetical Statements
Minimised project time and cost and maximised quality control	
	1. Generally, the project was completed on schedule
	2. I believe the construction project progress was well performed
	3. The project was completed within budget
	4. Cost control during construction stage was efficient
	5. Defects were minimised in the project
	6. I believe that the cost of the project was reasonable
Satisfactory and worthwhile quality	
	7. The quality of the building was satisfactory.
	8. I believe that the building satisfied the client's special requirements
	9. I believe that money spent on the project was worthwhile
Effective time control	
	10. The proper use of effective scheduling smoothed the construction stage
	11. The claim for extension of time was reasonable

Source: Cheung et al. (2013: 945)

Table 2.3: Project performances and their indicators

Project performances	Indicators
Quality	
	1. Quality management system
	2. Quality planning and control
	3. Quality outcome
Time	
	4. Time estimation and program
	5. Schedule change control
	6. Timeous completion of project
Cost	
	7. Cost change control system
	8. Measurement and correction
	9. Cost outcome
Safety	
	10. Preventive actions (training and protection)
	11. Safety control
	12. Responding to incidents
Project migration	
	13. Equitable rewards to migrants
	14. Long-term support to migrants
	15. Migration outcome
Ecological and environmental impacts	
	16. Appropriate organisational policy and requirements
	17. Assessment of ecological and environmental impacts
	18. Governance structure on managing ecological and environmental issues
	19. Management responsibilities and processes
	20. Outcomes of managing ecological and environmental issues

Source: Wang et al. (2013:1172)

The measurement of a firm's performance is important for the assessment of the firm's outputs since organisational performance is one of the most important constructs. A firm's performance is multifaceted and dynamic; therefore the choice of performance measures may affect the outcomes and interpretations (Deng and Smyth, 2013). Jin *et al*. (2013) further argue that the BSC approach does not incorporate critical dimensions such as project management and supplier performance. In their study, the six dimensions for measuring performance of international construction firms were identified as: financial performance, market performance, customer perspective, stakeholders, internal business processes, and learning and growth (see Table 2.4). Deng and Smyth (2013) further reveal thirty-six (36) performance indicators used to measure a firm's performance as indicated in Table 2.5. The

Construction Industry Development Board (CIDB) Act (38 of 2000) stipulates the construction industry indicators (CII) to be used to assess performance in the construction industry at different levels as indicated in Table 2.6. Similar studies have also identified indicators for assessing project performance as goal achievement, project efficiency, team cohesion, project efficiency, organisational success and impact on the customer (Shenhar *et al.*, 2001; Patrashkova-Volzdoska *et al.*, 2003).

Table 2.4: Indicators for measuring performance of international construction firms

Factors	Sub-factors
Financial performance	
	1. Total asset turnover
	2. Return on equity
	3. Turnover growth rate
	4. Operating profit
	5. Per-capita sales
Market performance	
	6. Number of dominant sales
	7. Ratio of foreign income
	8. Number of operating countries
	9. Growth rate of overseas income
Customer perspective	
	10. Value realization of customers
	11. Proportion of regular customers
	12. Cooperation with customers
Stakeholders	
	13. Sustainable capacity
	14. Social responsibility
	15. International reputation of brand
Internal business processes	
	16. Number of core businesses
	17. Average profit rate
	18. Proportion of profit from construction businesses
	19. Coordination and integration of businesses
	20. Supply chain
Learning and growth	
	21. Efficiency of research and development (R&D) input and output
	22. Application of IT
	23. Employee satisfaction
	24. Organisation and management efficiency
	25. Knowledge and information sharing

Source: Jin et al. (2013: 1160)

Table 2.5: Performance indicators used to measure a firm's performance

Performance indicators	Measurement method
1. Profitability (short-term & long-term)	Subjective
2. External satisfaction	Subjective
3. Overall performance	Subjective
4. Schedule performance	Subjective
5. Cost performance	Subjective
6. Quality performance	Subjective
7. Revenue/sales	Subjective/Objective
8. Growth in contract awards	Subjective
9. Safety performance/experience modification rating	Subjective
10. Market share	Subjective
11. Business efficiency	Subjective
12. Human resources development	Subjective
13. Return on investment	Subjective/Objective
14. Productivity	Objective
15. Technological capability	Subjective
16. IT implementation	Subjective
17. Cash flow	Subjective/Objective
18. Organisational competency	Subjective
19. Partner performance	Subjective
20. Cost savings	Subjective
21. Revenue/sales growth	Subjective/Objective
22. Safety performance/recordable incidence rates	Subjective
23. Innovation	Subjective
24. Market returns	Objective
25. Learning and growth	Subjective
26. Improved term of insurance	Subjective
27. Improved term of bank loans	Subjective
28. Company image	Subjective
29. Product image	Subjective
30. Competitive advantage	Subjective
31. Market advantage	Subjective
32. Number of profitable services	Subjective
33. Growth sales margin	Subjective
34. Net income before tax	Objective
35. Return on sales	Subjective

Source: Deng and Smyth (2013)

\

Table 2.6: Construction industry indicators used to measure performance

Construction industry indicators	Measure
Employer's satisfaction	
	1. Project milestone dates achieved
	2. Contractors' performance
	3. Agents'/consultants' performance
	4. Quality of materials used
Contractors' satisfaction	
	5. Profitability
	6. Performance of the employers and their agents
	7. Quality of the contract documentation
	8. Management of variation orders and claims
	9. Payment delays
	10. Performance of their materials suppliers
Consultants' satisfaction	
	11. Time allowed by employers for planning
	12. Delays in the payment of professional fees
	13. Deviations by employers from their own approved procurement procedures

Source: Republic of South Africa, CIDB Act, 38 of 2000

2.4.2 Risk allocation in construction projects

In reality, risk is inherent in every decision anyone takes and it has the potential of impacting either positively or negatively in projects. Burtonshaww-Gunn (2009:10) defines risk as 'the threat or possibility that an action or event will adversely or beneficially affect an organization's ability to achieve its objectives.' This can be related to time, cost, performance, and many other influential factors in any project but in decision theory, risk is concerned with the distribution of possible outcomes, their likelihood and their subjective values (Kwak and LaPlace, 2005: 691). Buertey *et al*. (2013, citing Perminpova *et al.*, 2008) further describe risk as an 'event that could have either a negative impact on project outcomes or opportunities that are beneficial to project performance'. Project risks cannot be totally averted; therefore they must be recognised, assessed and managed during construction activities. Luka and Muhammad (2014) emphasise that most construction projects fail due to inability to properly identify risks and assess their impact on project performance.

Project risks might arise from a variety of sources and are of several types, namely: environmental/political, hazard/safety, market, innovation and technical/functional (Arowojolu-Alagwe and Adegoke, 2013). In some cases, uncertainty has been used in place of risk in literature and practice, and also the other way around. Buertey *et al.* (2013) further differentiate "risk" as the occurring of uncertain discrete event that is estimated through probabilistic analysis while "uncertainty" is the uncommon state of nature where there is absence of information to a desired outcome. Project risks have their origin in the field of uncertainties but they are made of two events, namely: probability and impact. Project risks are measured in terms of the effects of an event (positive or negative) and the probability of event occurring, or a combination of both (Neill and Al-Battaineh, 2011). Project risks play an important role in decision making and may affect the performance of a project (Wiguna and Scott, 2005).

The study conducted by Roque and Marly (2013) further reveals that appropriate risk management has a positive impact on the perception of success in projects. Risk allocation in projects has attracted different scholars on how best to effectively allocate risks among contracting parties but there is lack of empirical study on how to interweave risk elements in incentive compensation plans. Success and profitability in construction projects can be actualised by proper integration of project risks with rewards. Neill and Al-Battaineh (2011) emphasise that the choice of project delivery method is influenced by the client's specific tolerance for cost/schedule risk, the client's requirement to a level of involvement in the detailed design selection process and the level of supervision during design and construction.

In a win-win approach where both the client's expectations and the objectives of other team members are involved, risk tolerance for all parties should be taken into consideration. Contracting parties have different views and values which can influence the degree of risk-taking. The decision to allocate a risk to a party should consider whether the risk is within the party's control. Risk tolerance involves both the probabilities of inherent risk occurrences and the resulting impact of those occurrences (Kwak and LaPlace, 2005: 692). The capability of a party to control a certain risk will determine if such risk should be allocated or not. In most cases, clients tend to allocate more risks to contractors and accept as little risk as possible for themselves. The study conducted by Wiguna and Scott (2005) in the Indonesian construction industry, reveals that most risk factors cannot be controlled or managed by contractors whereas most contractors are expected to accept these project risks. This may result in the contractor fortifying the contract price, knowing that the responsibility for unforeseen circumstances is vested solely on him.

For the purpose of this study, the assessment of risk factors in performance is to identify the critical risk factors that can influence project performance as it relates to incentive mechanisms. Kwak and LaPlace (2005) examine factors affecting risk tolerance from different perspectives as indicated in Table 2.7 and Adnan (2008) identifies risk factors involved in joint venture projects as indicated in Table 2.8. Osipova and Eriksson (2011: 1156) identify three factors which influence risk allocation in construction projects as the form of contract, form of payments (price sharing) and risk management. Table 2.9 indicates the comparative analysis of risk allocation from different literature as outlined by Ke *et al*. (2010). Other studies on risk allocation in construction projects were identified and compiled as potential risk elements for this study.

Table 2.7: Factors affecting risk tolerance from different perspectives

Risk tolerance	Factors
Firm	
	1. Financial stability
	2. Project diversification
Project manager	
	3. Job security
	4. Corporate culture
Project stakeholder	
	5. Project objective

Source: Kwak and LaPlace (2005: 691)

Table 2.8: Risk factors involved in joint-venture projects

Groups	Factors
Internal risk factors	
	1. Financial problems
	2. Management
	3. Company policy
	4. Over-interference
	5. Employment
	6. Allocation of work
	7. Accounting of profit and loss
	8. Technology transfer
	9. Allocation of staff positions
Project specific factors	
	10. Cash flow problems
	11. Project relationship
	12. Incompetence of suppliers
	13. Conditions of contract
	14. Demands and variation by client
External risk factors	
	15. Economic fluctuation and inflation
	16. Policies, laws and regulations
	17. Fund repatriations
	18. Import restrictions
	19. Force majeure and societal
	20. Security
	21. Environmental factors

Source: Adnan (2008: 104 & 105)

Table 2.9: Comparative analysis of risk allocation preferences from different sources

Risk	**Factors**
Political	
	1. Termination of concession by government
	2. Expropriation and nationalisation
	3. Political opposition
	4. Change in laws
	5. Unstable government
	6. Project approval and permits
	7. Influential economic events
	8. Changes in industrial code of practice
Construction	
	9. Availability of finance
	10. Improper design
	11. Insolvency of subcontractors
	12. Ground conditions
	13. Site availability
	14. Construction/design changes
	15. Labour disputes and strikes
	16. Land use
	17. Waste of materials
	18. Construction cost overruns
	19. Construction completion
	20. Supporting utilities risk
	21. High financial cost
	22. Unproven engineering techniques
	23. Protection of geological and historical objects
Operation	
	24. Operation cost overruns
	25. Operator default
	26. Quality of operation
	27. High maintenance cost
	28. Frequency of maintenance
	29. Low operating productivity
	30. Residual assets risk
	31. Condition of facility
Legal	
	32. Contractual risk
	33. Third party tort liability
	34. Ownership assets
	35. Insolvency of concession company
	36. Inflation risk
	37. Interest rates
	38. Foreign currency exchange
	39. Force majeure
	40. Residual risk
	41. Weather

Source: Ke et al. (2010: 485)

2.5 The design of incentive schemes in construction projects

As previously noted, the main objectives of incentive schemes are to increase efficiency by reducing the cost of building, increase productivity and provide the opportunity for the employees to increase earnings. De silva (1998: 3) describes earnings or pay as the most important and contentious element in the employment relationship which is of great concern to the construction industry, employers and employees. To the construction industry, it affects the aspects of macro-economic stability, such as employment, inflation, purchasing power, and socio-economic development. It represents a significant part of employer's costs which has influence on the employees' performance, competitiveness, ability to recruit, and retention of its workforce. To the employee, it is essential to motivate or measure the value of his services or performance. Higher productivity gives firms a more competitive edge over their opponents; this can also be a prerequisite for long-term survival. Incentive schemes can be designed in three different forms, namely: financial, semi-financial and non-financial schemes.

2.5.1 Financial incentive schemes

These schemes are focused on inducing employees to achieve the stipulated project objectives in anticipation of monetary benefits (Whitmore, 2012: 1). Many researchers have proven the use of financial incentives to be effective in improving work quality, reducing time taken and reducing costs (Rose and Manley, 2010; Ajayi, 2007). The use of financial incentives is aimed at increasing efficiency by enhancing the motivation of employees to work harder and smarter by offering a financial reward in order to attain project goals that are above minimum standards (Sliwka, 2003; Rose and Manley, 2005: 5). This mechanism is designed to improve project outcomes for the social benefit of tax-payers and building users while also creating positive cultural change and supporting industry development (Rose and

Manley, 2005: 5). This can be achieved through allowing contractors and consultants to share in clients' success from projects by considering a wide range of performance areas, such as cost containment, schedule performance and quality of workmanship (Rose and Manley, 2010: 253).

Bower *et al.* (2002: 39) identify three main types of financial incentives used in construction contracts as: a) share-of-saving incentives; b) schedule incentives; and c) technical performance bonuses. The share-of-saving incentives follow the principle that cost savings are shared between clients and contractors based on an agreed formula. Schedule incentives are used to offer a premium to the contractor for early completion of the project. Technical performance bonuses are given to the contractor for meeting performance targets based on a wide range of performance targets, for example, quality and functionality. On the contrary, Mehta (2011: 1) highlights three associated risks that excessive reliance on financial incentives may create as follows:

i. They may enhance performance but do not guarantee that the performance improvement will come with ethical behaviour and actual improvements;

ii. They demoralise employees who do not get them and actually reduce performance; and

iii. They can generate a sort of addiction, especially where employees are working for incentives.

Other examples of financial incentive schemes are premium bonus, profit sharing, measured day work, simple piece work, geared incentive schemes and group incentive schemes (Saka and Ajayi, 2011: 583).

2.5.2 Semi-financial incentive schemes

Semi-financial incentive schemes have the attributes of both financial and non-financial incentives which are geared towards compensating for jobs that are objectively measured. They may be classified as those which have some monetary benefits but are not directly linked to output and wages. Saka and Ajayi (2011: 585) emphasise that the use of semi-financial incentive schemes produces the most satisfactory results when compared to other incentive schemes. The efficiency of these schemes relies on the company's goals, existing employee attitudes and managerial capabilities adopted during implementation. Examples of semi-financial incentive schemes are health schemes, saving schemes, housing, site welfare provision and pension schemes (Saka and Ajayi, 2011: 585).

2.5.3 Non-financial incentive schemes

Non-financial incentive schemes are indirect rewards, which focus on providing psychological benefits for employees. These are centred on conveying appreciation to individual employees or teams in memorable ways, showing the task performed is inherently meaningful (Silverman, 2004:3). They are indirect rewards which are targeted at providing psychological benefits for employees. The use of these schemes is embedded in theories of motivation which emphasise that motivation to improve quality of output can achieved through satisfaction of higher needs (Maslow's theory), awareness of the role of groups in the workplace (Mayo's theory) and the need to provide motivators (Herzberg's theory). Examples of non-financial incentive schemes are recognition, praise of good work, communication, empowerment, job autonomy, enlargement and rotation (Armstrong, 2010: 161).

2.6 Payment strategies in incentive-based contracts

Performance can be linked to payments by tailoring the acceptance provisions and payments for contract deliverables to performance objectives. De Silva (2004: 3) highlights the four main goals of performance compensation as: a) equity among beneficiaries, b) efficiency objectives, c) micro-economic stability through high employment levels and low inflation, and d) efficient allocation of the labour market. Performance compensation has increased dramatically as a result of the widespread concern over inefficiencies at workplace and also the belief that it can raise productivity growth and improve profitability (Bryson *et al.*, 2011). Fundamentally, performance compensation is focused on paying employees for their inputs, rather than the value of their job. The criteria for performance assessment may be based on individual, group or organisation, or a combination of criteria. There are three major types of performance compensation, namely:

I. *Piece-rate systems*

The incentives paid under piece-rate systems are measured by the individual outputs where outputs are quantifiable and directly correlated with the employee's efforts (Bauer and Erdogan, 2013). For example, a contractor may pay bricklayers based on the number of bricks laid per day.

II. *Individual incentives*

Bauer and Erdogan (2013) describe individual incentives as 'one-time rewards that follow specific accomplishments of employees'. The literature review identifies three types of individual incentives as:

a. *Merit pay* is referred to as pay increases or increments which are based either on the individual pay for performance or on a performance-related bonus plus a fixed wage or salary (Bryson *et al.*, 2011: 9). Merit pay is usually based on subjective measures of the employees' performance although this form of assessment can be affected by biases whether of a personal nature, or due to prejudice against or favouritism for some ethnic, gender, age, and sexual preference group (Bryson *et al.*, 2011: 9). De Silva (2004: 7) stipulates that this type of pay lacks workability and effectiveness due to its poor performance-appraisal system.

b. *Sales commissions* are usually adopted as reward systems for individual accomplishments and are mostly used in sales companies to motivate employees. These reward systems are measured on the number of sales made which are usually based on percentage ratio.

c. *Awards* involve the appreciation of employees' contributions through awards, plaques or any other form of recognition. Employee recognition is a means of communication which provides fair returns for employees' efforts, reinforces the organisation values and improves overall performance (Adecco, 2013).

III. Group incentives

Group incentives are categorised into three types, namely: gain-sharing, profit-sharing, and employee stock plans.

a. *Gain-sharing* is not strictly based on profit; rather it can be referred to as a compensation system based on an agreed sharing formula between employees and the employer which is shared upon improved performance, resulting in productivity gains (De Silva, 2004: 8; Bryson *et al.*, 2011: 11).

b. *Profit-sharing* is a scheme where employees are entitled to a share of profits where the share may be in cash or a deferred payment kept, for example, in a special fund or share options (De Silva, 2004:8; Bryson *et al.*, 2011: 11).

c. *Employee stock plans* are schemes where employees are given the opportunity to own shares in the firms in which they work in exchange for performance bonuses (Bryson *et al.*, 2011: 14). This scheme may involve losses as well as gains for the employees. If the shares are tradable, employees' incomes will be affected by the firm's performance in the form of dividends but employees may choose to recover their wealth through selling of shares.

Other performance compensation plans are highlighted as follows: annual bonus, one-time incentives, long-term incentives, lump sum incentives, competency-based pay, pay for quality, quota-rate incentives, fixed-rate incentives, employee stock-ownership plan, suggest/proposal program, and team-based pay (HR Focus, 2001; IRF, 2002).

2.7 Incentive provisions in contractual arrangements

Incentive provisions can be incorporated in a contractual strategy with significant potential to address performance problems. For example, the provision of time incentive for early completion, cost incentive for cost saving, quality incentive for zero or minor defects, safety incentive for complying with stricter safety/health rules and standards and a combination of incentives to make improvements in more than one performance area (Bubshait, 2003: 64). Different types of contracts in which incentive provisions can be applied are outlined below:

2.7.1 Fixed-price contracts

The type of incentives incorporated in fixed-price contracts allows the client to pay the contractor a stipulated amount for the entire scope of work with the risk of overspending carried by the contractor (Berends, 2000: 166). The contractor carries all the risks of losses associated with higher expected costs but this might be of benefit to the contractor if the project cost turns out to be less than expected. This requires the contractor to be fully responsible for the performance costs and any resulting profits (or losses) (Ferguson, 2010: 14). Given a risk-averse contractor, the client might be expected to pay a premium to the contractor for bearing cost uncertainty. If the uncertainty is very high, contractors may require a very large premium. Fixed-price contracts are most efficient for the client when there is low uncertainty and the project effectiveness, efficiency and risks are controllable by the contractor.

Fixed-price contracts can be categorised into fixed-price incentive contracts and fixed-price contracts with award fees. In fixed-price incentive contracts, the final contract price and profit are calculated based on a formula where a cost incentive is incorporated into the fixed-price contract to form a fixed-price incentive contract (Rubin *et al.*, 1999). The contractor is motivated to complete the project within budget in order to share cost savings with the client. Bubshait (2003: 64) further classifies fixed-price incentive contracts into two types: a) guaranteed-maximum, and b) bonus and penalty incentives.

The guaranteed-maximum is a hybrid arrangement consisting of a cost disbursement and a call option for a fixed-price contract. This is most effective when the contractor has control over the design phase of the project (Boukendour and Bah, 2001: 565). In this contract arrangement, the contractor guarantees to complete the project within the stipulated contract period in full accordance with the drawings and specifications. The actual cost will not exceed the initial guaranteed-maximum project cost. The bonus and penalty incentives are used to reward contractors for early completion of their tasks or to penalise them for late completion. The fixed-price contract with award fees is used to motivate a contractor where his performance cannot be measured objectively (Ferguson, 2010: 15).

2.7.2 Cost-plus or cost-reimbursable contracts

Cost-plus or cost-reimbursable contracts are usually adopted when fixed-price contracts are inappropriate due to project risks associated with costs (Ferguson, 2010: 15). The contractor is reimbursed his actual costs plus a fee which is either a fixed price or a percentage of the actual costs (Broome and Perry, 2002: 60). The fee includes any item excluded in the actual costs, for example, off-site overhead and profit. There are various ways to set share fractions when designing a cost-plus incentive, including capping the client's share of overrun risk. For example, the client's share of profit can be capped at 30 percent above the target price, whereby the contractor pays 100 percent of any further overrun (Rose, 2008: 24). However, it is contended that this share fraction may provide a negative incentive for the contractor to increase his costs. Therefore its use is not advisable and should be limited to low cost projects, emergency work, and short duration projects (Bubshait, 2003: 64).This process also lacks both incentive for cost reduction and disincentive for cost increase.

Alternatively, capping can be adopted for both profit-sharing and loss-sharing. For example, assuming the actual cost is below the target price, the contractor is allocated a share of profit for cost-sharing (Rose, 2008: 24). Figure 2.1 illustrates the share profile using capping:

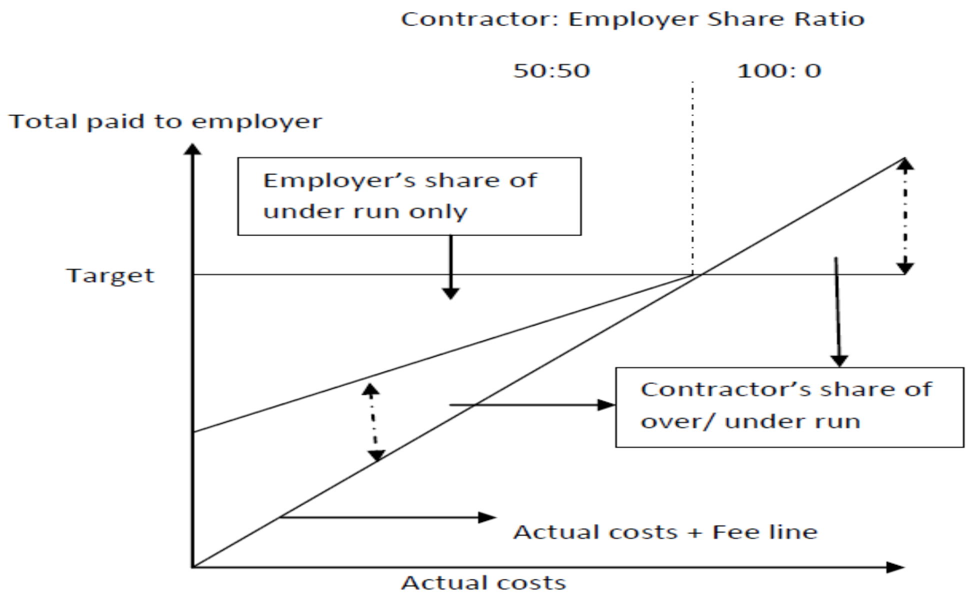


Figure 2.1: Share profile with capped employer commitment (Broome and Perry, 2002: 60)

In designing a sharing profile for a cost-plus contract, four major determinant factors to consider are outlined below (Rose, 2008: 26, citing Broome and Perry, 2002):

i. Balancing the client's objectives which can be a combination of quality, cost and time with the contractor's primary aim, which is maximising profit;
ii. Project constraints;
iii. Allocation of share fractions to manage risk; and
iv. Consideration of the level of risk that each party can manage.

Cost-plus contracts enable both clients and contractors to share the difference between the actual cost and the target cost (budget) in an agreed proportion where there is cost under-run or over-run (Broome and Perry, 2002: 61). These contracts encourage contracting parties/ stakeholders to work together to minimise the actual costs whereby clients are focused on minimising the total cost paid and contractors are motivated to maximise their profit margin above their specified fee through cost savings. This allows for the reimbursement of all expenses incurred by contractors from the work, together with a fee (Broome and Perry, 2002: 61). Cost-plus contracts are grouped into four types, namely: a) cost-plus-fixed contract; b) cost-plus-incentive fee; c) cost-plus-award fee and d) cost-plus-percentage contract (Chappell *et al.*, 2001: 21).

2.7.2.1 Cost-plus-fixed contract (CPFC)

In a CPFC, the contractor is reimbursed for his actual expenses, plus an additional fee for his services. This contract lacks efficient incentive mechanisms for project cost control and to complete the project in an efficient manner. However, the project is well-defined at the early stage therefore the contractor cannot inflate prices to cover risks. There are usually high quality outputs in this type of contract.

2.7.2.2 Cost-plus-incentive contract (CPIC)

CPIC requires a negotiation for delivery, performance or cost incentives whether individually, or a combination of both, plus a target cost, a target fee, or a minimum and maximum fee, and a fee adjustment formula (DOE, 2010: 26). This encourages economic efficiency and good performance where the cost reimbursement contract type is necessary.

2.7.2.3 Cost-plus-award fee contract

Cost-plus-award fee contract has the characteristics of both CPFC and CPIC; the contractor’s performance is measured against an award fee plan and evaluation criteria where a fee is given for achieving or exceeding the stipulated performance standards (DOE, 2010: 28). This provides a greater incentive for a contractor’s economic delivery than CPFC and CPIC.

2.7.2.4 Cost-plus-percentage contract (CPPC)

In a CPPC, the contractor is reimbursed the actual cost of material, labour and equipment along with a predetermined percentage of its costs (Tang *et al.*, 2003:36). It can be categorised into two forms, namely: a) cost-plus-fixed-percentage contract and b) cost-plus-variable-percentage contract. The cost-plus-fixed-percentage contract is suitable where the client is undecided on the budget and finished materials and therefore provides flexibility for material and design changes. It also encourages the contractor to complete as early as possible since the fee earned is measured against the total cost and are not based on completion time. Cost-plus-percentage contract does not determine the maximum price. However, the contractor has to prepare a detailed and reliable estimate.

In a cost-plus-variable-percentage contract, the contractor is paid a variable percentage of the project cost plus an agreed reward if the actual cost is below his estimated cost or an agreed penalty fee. But if the actual cost exceeds his estimated cost, the contractor could be penalised. This contract provides incentives to reduce costs and to allocate risk for cost overruns. Figure 2.2 shows an illustration of cost-plus/cost-reimbursement with percentage fee:

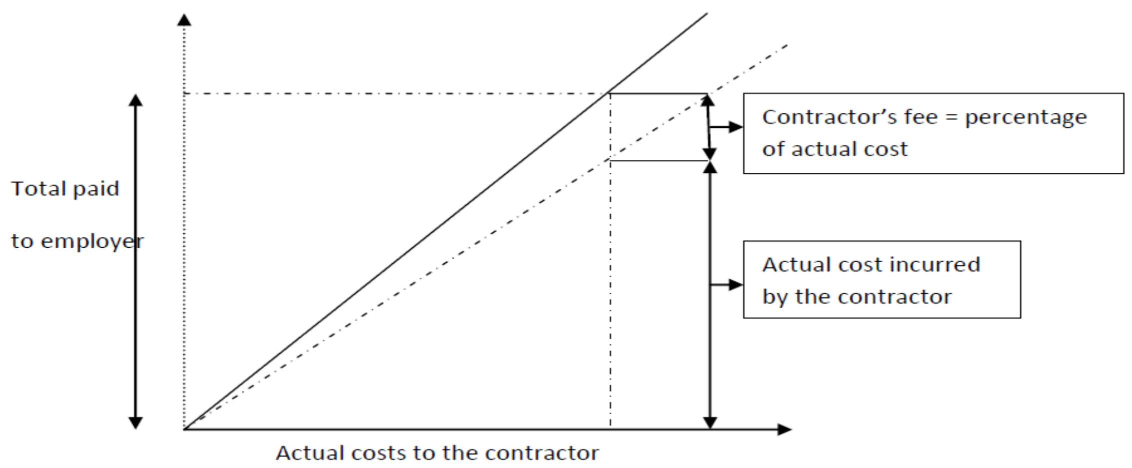


Figure 2.2: Cost-plus/cost-reimbursement contracts with percentage fee (Broome and Perry, 2002: 60)

2.7.3 Target cost contracts

They are basically a slight variation of the cost-reimbursable contracts where the client and the contractor agreed on an expected (target) cost before the commencement of project. This is usually achieved by using a priced bill of quantities for prime cost (Tang *et al.*, 2003: 36). Any savings or losses between the initial target cost and the actual cost on project completion are shared among the contracting parties using a predetermined share ratio as stated in the contract. This might require a payment method where contracting parties mutually agreed on a sharing formula to adopt in the allocation of benefits and losses (Bower *et al.*, 2002: 39). The actual project cost is measured against an estimate or a target cost of the project and the difference is shared between the employer and the contractor, whether a profit or loss (Tang *et al.*, 2003: 36).

The calculation of the cost-sharing fraction for a target cost contract has attracted many researchers focusing on the most effective cost-sharing formula for sharing profits and losses among clients and contractors in the construction industry (Perry and Barnes, 2000: 203; Broome and Perry, 2002: 62). Broome and Perry (2002) present an algebraic formula for payoff in a target cost contract illustrated in Figure 2.3 using a fee of 50:50 split.

Chan *et al.* (2011: 753) summarise the benefits of target cost contracts as: enhanced cost control, improved working relationship, better time, and quality control. The cost control offers a more realistic price ceiling or a target cost for projects. An improved working relationship enables contractors to achieve better value and project performance by aligning their own financial objectives with the overall project objectives. Construction activities are usually initiated in a target cost contract before the design is fully completed in order to facilitate better control of time. Clients retain more stringent control over the team of design consultants during the pre-contract and post-contract stages thereby ensuring compliance with the initial stipulated design. The target cost concept can be used to overcome the weaknesses of a cost-plus fee (Twort and Rees, 2004: 32).

The total payout by client = actual costs + fee (50:50) + (target cost – actual costs)*contractor's share.

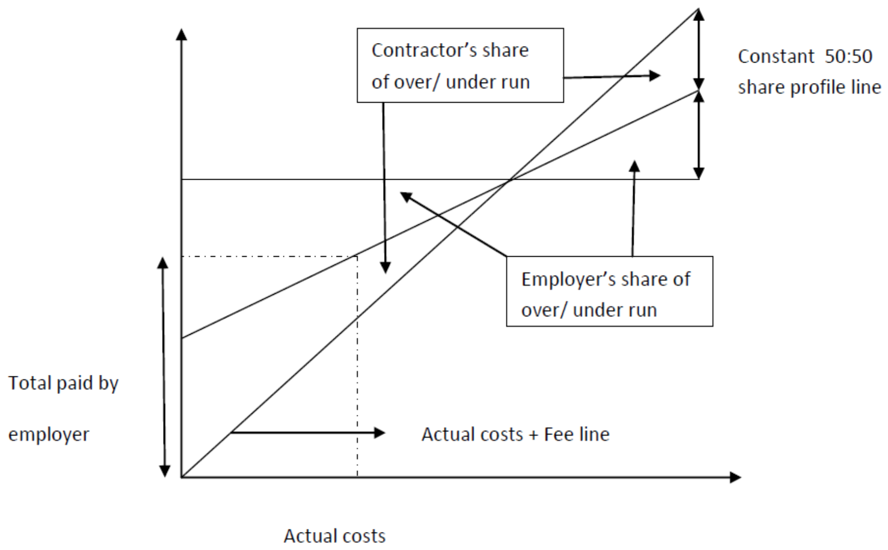


Figure 2.3: Target cost contracts with equal share profiles (Broome and Perry, 2002: 60)

2.7.4 Performance-based contracts (PBCs)/payment-based on final outcomes

Incentives used in performance-based contracts (PBCs) are usually related to completion time where bonuses might be paid for early completion and penalty fees might also be deducted for late completion. Contractors' incentive payoffs are usually based on their performance evaluation reports and the criteria for evaluation are mostly determined by the client. In some PBCs, the contract conditions may include evaluation intervals, performance criteria, incentive mechanisms and risk/benefit sharing formats but in most cases, it is unclear on how these incentives are transferred to sub-contractors (Datta and Roy, 2012: 363). The study conducted by Gruneburg *et al.* (2007: 698) reveals the existence of large perceived supplier risks which might affect the clients' expectations in PBCs. In PBCs, incentives are used to motivate contractors by allocating bonuses together with their prescribed fee when the stipulated minimum acceptable performance levels are exceeded (Washington, 1997: 255). In most cases, incentive bonuses are used to keep contractors' expenditures below the targeted project costs by specifying an incentive bonus for cost under-run (Lahdenpera and Koppinen, 2003: 486).

Performance is generally measured using elements that have an effect on schedule or cost, such as quality, safety/health, technical management and utilization of resources, productivity and responsiveness. The payoffs given to contractors are usually based on the final outcomes, for example, the realisation of expected standard of reliability and competence (OGC, 2003). Incentives are used to minimise or eliminate challenges associated with project execution which may include cost overruns, schedule delays and failure to achieve the specified results (DOE, 2010: 32).

2.8 Types of contractual incentive-based projects

Contract incentives are processes where clients try to secure certain project goals through different contracting channels. Incentives are generally incorporated in contracts to promote employee motivation to achieve clients' expectations by offering either a profit-sharing arrangement or performance-bonus to contractors for achieving the project outcomes (Bower *et al.*, 2002). It is important to understand that the major concern of any organisation is to operate profitably. The use of rewards for recognition when performance exceeds expectations can be seen as an efficient means to motivate the contractor (Maritz and Ogwueleka, 2013: 2). Incentives can be incorporated in projects as follows:

2.8.1 Cost incentives

Cost incentives are usually considered as a combination of enticement and threat where bonus and/or penalty are directly tied to the final cost of construction for clients (Bower *et al.*, 2002: 39). In a contract arrangement with cost incentives, contracting parties agree on a target cost and any cost under-runs and over-runs are shared based on an agreed formula. The crucial elements of cost incentive contracts are as follows (Blyth, 1969):

a. A target cost which should be the best estimate, mutually agreed with by both contracting parties, of what the costs will be when the work is done;

b. A target fee which is the amount of profit payable if the actual costs equal the target cost; and

c. The share formula which describes the way in which any differences between the actual cost and the target cost are to be distributed between the contracting parties.

2.8.2 Schedule and delivery incentives

A schedule incentive is usually regarded as more of a threat than an enticement where a premium is paid to the contractor whenever a delivery is made earlier than a targeted date. When the targeted date passes, the contractor is expected to pay a penalty (Bower *et al.*, 2002: 39, citing Ashley and Workman, 1986). Schedule incentives are usually based on a day-unit rate of measurement, such as a predetermined amount paid for each day for early completion measured against the project cost, since schedule delays usually increase costs. Schedule and delivery incentives can be combined with cost incentives in a contract but this combination will require a well-designed scheme to implement. In designing such a scheme, it is also important to consider contractors' risks with rewards offered (Defence Acquisition University, 2001: 28).

2.8.3 Technical or performance incentives

Technical or performance incentives are often linked to performance measures other than cost and schedule. It is designed to cover the areas of performance improvement, such as quality, operation, non-disturbance, design integrity and safety/health (Lahdenpera and Koppinen, 2003: 483). In this type of incentive design, a contractor can be offered a reward for achieving one or more specified level of performance in the project specification. The use of a quality performance bonus is effectively applied by offering contractors additional profit if they are able to achieve the predetermined performance levels (Bower *et al.,* 2002: 38). Operational rewards are used to improve operational performance, thereby increasing the chances of achieving the project success (Lahdenpera and Koppinen, 2003: 483). A bonus incentive can also be given to contractors to minimise the disturbance caused by construction activities, to reduce the risk of accidents (safety/health) on a construction site and to facilitate design integrity based on the original design intentions (Lahdenpera and Koppinen, 2003: 483).

2.8.4 Multiple incentive contracts

Multiple incentive contracts are applicable where the performance targets, such as quality and functionality, are required. The purpose of combined incentives is to motivate contractors to meet or surpass all performance goals, on or before a target date, within or at a target cost and within the specified quality. Multiple incentive mechanisms can be regarded as multi-objective systems where the total bonuses awarded to contractors might include the sum of partial bonuses or losses of any of the performance targets. This does not affect the opportunity of attaining other performance targets (Lahdenpera and Koppinen, 2003: 490). Legal Information Institute (2012: 16.402-4) further emphasises that a multiple incentives arrangement is ‘structured to motivate the contractor to strive for outstanding results in all incentive areas since outstanding results may not be attainable for each of the incentive areas.

All multiple incentive contracts should include a cost incentive (or constraint) that operates to preclude rewarding a contractor for superior technical performance or delivery results when the cost of those outweighs their value. This study focuses on improving performance targets through the incentive reward program. The use of multiple incentive mechanisms involves converging the multi-objective systems which may include cost, schedule and delivery, quality, operation (waste), safety/health, and design integrity.

Table 2.10: Summary of types of contractual incentives for construction projects from the literature review

	Cost incentive	Schedule/delivery incentive	Technical/performance incentive	Multiple incentive contracts
Performance milestone	*bonus or penalty are directly linked to final construction *combination of enticement and threats	*a day unit rate of measurement *directly linked to project cost *involve threats	*link to performance measures, other than cost and schedule *measured against project quality, design reliability, functionality and safety/health	*measured against all performance goals *achieve functionality and quality on or before target date and within or at target cost *multi-objective systems
Reward allocation	*cost over-runs and under-runs are shared based on agreed formula *when final cost equals target cost, the target fee is allocated	*early delivery brings premium while late delivery results in penalty	*offer a reward for achieving one or more specified levels	* partial bonuses/ losses awarded for each performance goal
Benefits	*minimise project cost	*minimise project duration *positive impact on final project cost	*reliability and functionality are achieved in projects *more safer construction processes	*overall performance goals are achieved *any partial bonus does not affect the opportunity to achieve other bonuses
Detriments	*other performance goals are neglected	*performance objectives, other than cost and schedule can be compromised	*probability of cost and time over-runs	*require extra skills

2.9 Chapter summary

This chapter discussed the general concepts of incentive mechanisms which include philosophies and definitions. It elaborated the overview of incentives in partnering processes, how and why incentive mechanisms may be used in construction projects. Furthermore, this chapter identified that the use of incentive mechanisms is still faced with challenges relating to having a subtle balance in the design process. The major problem with incentive designs is that if they fail to reflect organisational goals, this might lead to contractors focusing on performance areas which are explicitly rewarded and neglect goals which are harder to specify and measure. It is important to design incentives in more efficient ways so as to reflect the objectives of the contracting parties and the project. As noted, core elements of performance objectives are identified as: cost, quality, duration and safety/health. Factors influencing each of these core elements were discussed in section 2.4.1.

The theoretical fundamentals associated with the use of incentives are identified as risks and rewards. Factors affecting risk allocations in incentive compensation plans were reviewed in section 2.4.2. As noted, the literature review reveals that incentive schemes can be designed basically in three different forms, namely: financial, semi-financial and non-financial. Examples of these incentive schemes were identified in section 2.5. Payment strategies adopted in incentive-based contracts and incentive provisions in contractual arrangements were reviewed in sections 2.6 and 2.7. Different types of contractual incentive-based projects were outlined in section 2.8.

These types of contractual incentive-based projects were discussed based on performance milestones, reward allocation, benefits and detriments (see summary on table 2.10). The review shows that cost, schedule/delivery and technical/performance incentives have limitations associated with focusing on a specified performance goal at the expense of other performance goals except multiple incentives which require only extra skills to implement. Multiple incentives are identified as multi-objective systems which can be used to achieve functionality and quality, to complete on or before target date and within or at target cost.

The next chapter explores the effect of incentives on workforce motivation and productivity.

CHAPTER THREE

WORKFORCE MOTIVATION AND INCENTIVES

3.1 Introduction

This chapter discusses the key factors or elements influencing workforce motivation and project performance. As previously discussed, incentives are tools which can be used to drive these elements/factors to improve performance. This chapter presents the need to understand the different components that constitute best performance in projects. Based on this, related literatures on the effect of organisational justice/behaviours, workforce competencies and motivation are elaborated. Furthermore, this chapter explores the effect of incentives on project performance and their economic impact on the construction sector. Past studies on the frameworks of incentive mechanisms are also reviewed. Finally, the chapter summary of related literature in workforce motivation and incentives is highlighted.

3.2 Organisational justice in construction practice

Employees who are committed in any organisation are most likely to meet customers' needs and are motivated to maximise their abilities (Fatt *et al.*, 2010). Zaman *et al.* (2010) advocate organisational justice as a strong predictor of organisational commitment. Organisations are social systems where human elements (workforce) are basically the driving force for effectiveness and efficiency. Perceptions of employees can affect their levels of commitment in any organisation. As previously noted, Murtaza *et al.* (2011: 73) defines organisational justice as the perception of employees about fair treatment in an organisation. People are naturally responsive to the justness of events and situations in different contexts (Tabibnia *et al.*, 2008). Saks (2006) emphasises that the degree of an employee's commitment can be improved by increasing and strengthening his/her perception of the support from the organisation. The perception of an employee regarded his/her duties and the organisation in which he/she works, affects his/her subsequent attitude/behaviour which will influence the degree of job satisfaction. Employee's job satisfaction and job performance are two major parameters that effect project performance. This is in line with the study conducted by Iqbal (2013) which emphasises that employee's job satisfaction has a direct impact on his/her behaviour, performance and also job satisfaction.

Employees, being human beings are motivated by different stimuli; the organisation provides an environment in which they can interact socially. One major concept that is important to human social interaction is justice. Justice influences an employee's behaviour wherefore perceiving injustice will affect employee's job satisfaction and also create negative effect on performance (Iqbal, 2013). Kontakos (2007, citing Beugre, 1998) states that 'in studying justice, what is important is not the reality but the subject's perception of reality'. People are naturally responsive to the justice of events and situations in their everyday lives across a variety of contexts (Owolabi, 2012, citing Gopanzao, 2009). As previously noted, perceptions of employees towards organisational justice can be measured against the degree to which the organisation provides its employees with appropriate, fair and respectful treatment, adequate and accurate information, resources and rewards. Most employees feel more motivated when they are rewarded fairly for their genuine contributions to their organisations in accordance to organisations' policies. It is essential to note that the perception of fairness in organisational justice is not limited to rewards but also respect for people. Unfair perception leads to dissatisfaction with outcomes or decisions therefore there is a need to examine employees' perceptions in relation to organisation justice.

Justice instigates integrity while organisational justice initiates an environment for individuals to work together to achieve a common goal. The perception of injustice in an organisation can undermine the morale of employees which might reduce their spirit of effort and activity. Therefore, we can rightly say that the level of perceived fairness of an employee is determined by the level of perceived justice. The individual's perception of decisions taken can influence his/her subsequent attitudes and behaviours. The principle of organisational justice is anchored on the perception of inequity in distributive issues. The equality of the type of decisions taken and how they are implemented regarding rewards can significantly affect the motivation of construction workforce towards achieving clients' goals (Bierhoff *et al.*, 1986). Aghaei *et al.* (2012: 2442) highlight the contributing factors to organisational justice as fairness in pay and bonuses to staff, the enforcement procedure, involvement of employees in decision making, ethical consideration, respect and honesty in dealings with employees, provision of suitable and timeous feedback processes, appreciation of good performance and the furnishing of an interactive environment, and good communication among employees. Colquitt (2004) further developed the three key theories of organisational justice namely: distributive, procedural and interactional justice (Colquitt, 2004).

3.2.1 Distributive justice

Distributive justice refers to the treatment on an equal basis of employees in terms of salary, working hours, promotion and other rewards (Adams, 1965). The "Adam's equity theory" quotes 'the employees are satisfied when they feel that the rewards have been equally given according to their input and there is no difference as compared to others'. This relates to fairness of decision outcomes where the reward is fair enough to motivate the recipients and does not exceed the value of benefits to the providers. It involves the manner in which economic and social goods/services are distributed in a society, focusing on the fair distribution of rewards (Longnes and Scanlon, 2001). This is required to set an appropriate intensity to fairly compensate for the providers' risks and to promote effort (Rose and Manley, 2010: 6). A higher intensity increases the providers' margins in response to their increased efforts (Rose and Manley, 2010, citing Zenger, 2000). Factors influencing distributive justice as recommended by Cohn *et al*. (2000) and BPI (2013) are as follows:

i. Needs - consideration of other's basic needs;
ii. Deservingness - recognition for meritorious performance,
iii. Productivity - appropriate rewards/compensation to employees based on their productivity;
iv. Effort - reward based on effort involved;
v. Proportional equality - equal share in the value of work by team members;
vi. Scarcity - effective use of available resources;
vii. Contribution - maximising the employee's common good; and
viii. Sacrifice - reward/compensate for voluntary services.

3.2.2 Procedural justice

Procedural justice focuses on the employee's perception of fairness of managers' decisions based on the rules and procedures that regulate a process (Nabatchi *et al.,* 2007). This involves decision-making processes that lead to decision outcomes. For example, there is a need to express fairness in the performance measurement process which will determine the reward allocation. Most employees are interested in knowing which decisions have been made and how they have been made. For example, if the managers' exercises regarding the evaluation of the employee's performance are perceived to be unfair according to the rules and regulations this may lead the employee presuming that there is no justice and become frustrated (Murtaza *et al.,* 2011: 74). It is important to have equality in dealings with employees in order to promote motivation and the commitment of employees towards achieving project goals (Colquitt, 2004). Murtaza *et al.* (2011: 76) further differentiate procedural justice as the process or means of taking decisions while distributive justice deals with ends or outcomes of the decision taken. The determinants for efficiency in procedural justice in an organisation are (Baldwin, 2006: 3):

i. Voice principle - an opportunity for employees to present information or voice their concerns before decisions are taken;
ii. Consistency - availability of standard criteria for measuring employees performance;
iii. Neutrality - unbiased decision making;
iv. Accuracy - the use of updated and correct information;
v. Correctability - provisions to address grievances or appeal procedures;
vi. Representativeness - taking the concerns of employees into consideration; and
vii. Morality and ethicality - eliminating age, gender, nationality, and other extraneous factors in decision making.

3.2.3 Interactional justice

Muzumdar (2011: 5) restates that interactional justice is defined by sociologist John R. Schermerhorn is the degree to which the people affected by decision are treated by dignity and respect. This implies that the communication process between reward providers and recipients, such as honesty and respect, will significantly impact on work motivation. It refers to the treatment that an individual receives when decisions are made and can be promoted by providing explanations for such decisions and communicating the decisions with sensitivity. The study of Rose and Manley (2010: 6) stipulates that negative reactions from recipients occur as a result of poor treatment received by a service provider or a client. Principles of interactional justice are closely supported by economic reciprocity theory which states that an agent prefers an environment of fairness, with an honourable intention for good reward (Fehr and Falk, 2002). Interactional justice relates to the quality of the interpersonal treatment that people receive when procedures are implemented. This form of justice does not pertain to the outcomes of procedures associated with decision making but rather focuses on whether or not people believe that they are treated fairly when decisions are implemented. Fair interpersonal treatment necessitates that employers communicate truthfully and treat people with courtesy and respect. Baldwin (2006: 4, citing Bies and Moag, 1986) stipulates that the key aspects of interactional justice which can enhance people's perceptions of fair treatment under interactional justice as:

i. Truthfulness - presentation of realistic and accurate information;
ii. Respect for people - dignity in dealings with employees and mediating conflicts;
iii. Propriety - avoidance of improper or prejudicial elements such as racism or sexism; and
iv. Justification - willingness to provide explanations for actions taken.

A construct validation study by Colquitt (2001) proposes that interactional justice should be split into two components, namely: a) interpersonal and b) informational. Interpersonal justice is the perception of respect and propriety in one's treatment. This reflects the degree to which people are treated with politeness, dignity and respect by the service providers in executing procedures or determining outcomes. Informational justice involves the adequacy of explanations given in terms of their timeliness, specificity and truthfulness. It focuses on the explanations provided to people that convey information about why procedures were used in a certain way, or why outcomes were distributed in a certain fashion. Other similar studies on factors of interactional justice were reviewed and the identified factors were adopted in this study (Randeree, 2008; Usmani and Jamal, 2013).

3.3 Workforce behaviour in project implementation

"Behaviour" is an observable skill, characteristic or application of knowledge displayed by a person required for effective performance. Workforce/organisational behaviour is a field of study that investigates the impact that individuals, groups and organisational structure have on human behaviour within an organisation, for the purpose of applying such knowledge towards improving organisational effectiveness (Robbins *et al.*, 2009: 7). Organisational behaviour elucidates the characteristics of an individual's actions within him/herself, in a group, in an organisation, or within an environment (Posas and Fisher, 2008: 93). Proper understanding of organisation behaviours will assist to explain, forecast and manage human behaviours in any organisation (Brooks, 2003: 2). Effective management of people is a critical component for organisation competitiveness. The study of organisational behaviour is concerned with what people do and how their behaviour affects the organisation's performance. Workforce behaviour is grouped into two types of variables: a) dependent and b) independent variables (Robbins *et al.*, 2009: 17; Ivankova, 2007: 11 &12).

3.3.1 Dependent variables that influence workforce behaviour

Key dependent factors affected by the activities of independent variables are stipulated as follows:

a. Level of absenteeism

Absenteeism can have a direct effect on cost. For example, if people are always unavailable to do their jobs then the organisational goals might be difficulty to attain. Variables that contribute to direct cost are: wages paid to absent employees, high cost of replacement workers and administrative costs of managing absenteeism. Indirect costs incurred through high absenteeism are: reduced productivity, safety/health issues, poor morale among employees, excess time spent in discipline and replacements, and poor quality of goods/services (Personal Finance, 2013). Factors that can influence absenteeism were identified as: personal factors (for example, personal attitude, age, seniority, gender and ethic) and workplace factors (for example, pressure at work, work routine, job satisfaction and environment) (Slezak, 2012).

b. Employee turnover

Employee turnover involves both voluntary and involuntary permanent withdrawal from any organisation. This action is regarded as problematic to human resource managers in various organisations (Khatri *et al.*, 1999). The intention to leave a job is an immediate precursor to actually leaving. Most studies on employee turnover devoted greater attention on turnover intention but employee turnover intention is proxy for actual employee turnover. The turnover intention is affected by many external factors (Khatri *et al.*, 1999):

i. Demographic factors, for example, age, tenure, level of education, level of income, and job category (managerial or non-managerial);

ii. Controllable factors, for example, job satisfaction (pay, nature of work and supervision), organisational commitment and organisational justice (distributive and procedural); and

iii. Uncontrollable factors, for example, perceived alternative employment opportunities and job-hopping.

c. Job satisfaction

Job satisfaction involves the degree of contentment which an individual has with his or her job. This can be as a result of extrinsic rewards offered to employees (for example, pay or salary) or intrinsic satisfaction derived from the nature of the work itself, recognition and a sense of achievement. Job satisfaction has remained a justifiable objective for any organisation (Robbins *et al.*, 2009: 20). Farhat *et al.* (2013, citing Korman, 1977) classify factors that determine job satisfaction of an employee into two types, namely:

i. Organisation factors, for example, occupational level, job content, considerate leadership, pay and promotional opportunities, working conditions, respect from co-workers, relationship with supervisors, opportunity for advancement, workload and stress level, and financial rewards; and

ii. Personal factors, for example, personality job fit, work itself, educational level, role perceptions, gender, and career development.

d. Productivity

The measure of effectiveness and efficiency has a direct impact on an organisation's productivity. Effectiveness is the extent to which an organisation can achieve project goals while efficiency is concerned with how inputs are conveyed into outputs at lowest cost. Low productivity can widely affect the financial stability of an organisation. Therefore, it is necessary to consider factors affecting productivity. Table 3.1 presents factors affecting labour productivity as identified in the literature review conducted by Gundecha (2012).

Table 3.1: Factors affecting labour productivity

Factors	Sub-factors
Manpower	
	1. Lack of experience
	2. Absenteeism
	3. Alcoholism
	4. Age
	5. Lack of competition
	6. Disloyalty
	7. Personal problems
External	
	8. Delays in supervision and inspection
	9. Variations in the drawing/rework
	10. Incomplete drawings
	11. Design changes
	12. Payment delays
	13. Complex designs in the provided drawings
	14. Implementation of government laws
	15. Training sessions
Communication	
	16. Change orders
	17. Misunderstanding
Resource	
	18. Poor site conditions
	19. Lack of construction materials, tools & equipment
	20. Poor facilities for workers

Miscellaneous		
	21.	Weather conditions
	22.	Working overtime

Source: Gundecha (2012: 17)

e. Organisational citizenship behaviour

Organisational citizenship behaviour involves the discretionary behaviour that is not part of an employee's formal job requirements but it is targeted towards promoting effective operation of an organisation. The extent to which employees demonstrate organisation citizenship behaviour is a function of ability, motivation and opportunity (Organ *et al.*, 2006: 93). Table 3.2 reveals factors affecting organisational citizenship behaviour as identified in the literature review by Chen (2008).

Table 3.2: Factors affecting organisational citizenship behaviour

Project or content factors
1. Managers' trust and respect
2. Dedicative corporate culture
3. Involvement of employers
4. Flatter organisation
5. Educational background and work experiences
6. Ending ability towards uncertain environment
7. Career value
8. Interactional justice
9. Procedural justice
10. Career ability
11. Distributive justice
12. Character of employers
13. Scientific and correct performance evaluation
14. Career interests

Source: Chen (2008: 59)

3.3.2 Independent variables that influence workforce behaviour

Independent variables that have direct impact on dependent variables of workforce behaviour are categorised into three sub-levels namely:

a. Individual-level variables

Human beings are different and they possess certain intact characteristics that might have direct effect on their behaviours at work. The individual-level variables are represented as follows (Robbins *et al.,* 2009: 20):

i. Perceptions: This is the process of interpreting messages of our senses to provide order and meaning to the environment (Johns and Saks, 2007). Perception is a complex cognitive process and it differs from one person to another. People's behaviours are influenced by their perceptions of reality, rather than the actual reality. There are three components of perception, namely: a) perceiver (attitudes, motives and expectations); b) target that is being perceived (novelty, background, sound, and size); and c) situational context of occurrence (time and place).

ii. Learning process: Learning is the acquisition of new behaviour from new or re-interpreted knowledge through external or internal experience (Torrington *et al.,* 2005). A learning culture assists and supports creativity thereby promoting change in an individual's attitude to a large extent. This study focuses on learning as a way of creating relatively permanent change in behaviour. Learning new skills and upgrading the earlier skills on a continuous basis have created major challenges to employees where different jobs may require different skills to perform. Learning has become a powerful incentive for employees to be retained in various organisations and also to make significant contributions based on their individual behaviours (Dartey-Baah and Amponsah-Tawiah, 2011: 12).

iii. Motivation: Motivating employees to complete their work efficiently and on time is one of the major tasks for effective project management. This requires a set of forces that can cause employees to choose certain behaviours from other alternatives.

Employees who perceive that they have greater control over their work activities will more likely excel within an organisational structure than those employees without such control.

iv. Personal attitude: Attitudes are molded by the collaboration of situations, experiences and values and they can be learned from or carried to the work environment. Pickens (2005:44, citing Allport, 1935) defines attitude as a ‘mental state of readiness, organised through experience, exerting a directive or dynamic influence on the individual’s response to all objects and situations to which it is related’. Employees’ attitudes can influence their morale, productivity and turnover intentions.

b. Group-level variables

People tend to behave differently in a group context. This is influenced by the patterns of behaviours they are expected to exhibit and the degree of attraction among themselves. The variables affecting behavioural change are categorised as:

i. Communication within the group;

ii. Communication with other groups;

iii. Level of conflict in a group; and

iv. Level of cohesiveness.

c. Organisational structure-level variables

Organisational structure-level variables involve the formal structures of groups or individual behaviours within any organisation. They are affected by the following factors, namely:

i. Formal structure: This is defined as ‘the planned coordination of activities of a number of people for the achievement of some common, explicit purpose or goal, through the division of labour and function and through a hierarchy of authority and responsibility' (Ivankova, 2012: 22, citing Schein, 1988). Formal organisations comprise different objective sets of people at different levels which can contribute to the fulfillment of organisational goals.

ii. Work processes: These are sequences of activities that transform inputs into outputs by accomplishing the work description for any organisation (Toloei and Abbasi, 2008). They are categorised as: operational and administrative processes. Operational processes involve production while operational processes refer to the day-to-day running of business.

iii. Technology: It is a tool that cannot replace managers but it can provide an instant solution to problems of management and information' (Gagnon and Dragon, 1998: 25). The use of technology can influence organisational behaviour and contribute to performance evaluation.

iv. Human resource policy: This involves a strategic and coherent approach to the management of an organisation's most valued assets which are employees. Employees contribute individually or collectively to the achievement of a company's objectives (Nazeri *et al.*, 2012: 167).

v. Organisational culture: It can be defined as shared values within an organisation which are targeted towards producing diverse patterns of behaviours (Tepeci, 2001: 8). It influences how people set personal and professional goals, perform tasks, and administer resources.

3.4 Measuring organisational competencies in construction projects

Competencies are defined as ‘the knowledge, skills, traits, attitudes, self-concepts, values, or motives directly related to job performance or important life outcomes shown to differentiate between superior and average performers’ (Shippmann *et al.*, 2000). This requires the need for a measurable human capability to drive meaningful achievements in projects. Measuring competency is essential to ensure that organisations understand where to devote greater attention in order to maximise their resources. There are four elements of organisational competency identified in the literature review: knowledge, skills, abilities, and personal characteristics.

3.4.1 Knowledge sharing

The ability to create new knowledge, to circulate knowledge within an organisation and to utilise the knowledge into new products quickly, is the bedrock of success in any organisation. Rapid development of science and technology has created dynamic market competitions where the growing importance of capturing, sharing and innovating experiences and knowledge provide competitive advantages for organisations (Liu and Liu, 2009). Knowledge can be classified as: a) tacit knowledge and b) explicit knowledge. Explicit knowledge is codified, physically stored in either paper or electronic format, and shared in forms of data or scientific formulas while tacit knowledge is highly personal and it is stored in people’s heads and acquired through experience (Liu and Liu, 2009). Knowledge sharing is crucial to enhance project success. Grillitsch *et al.* (2007:21) identified factors to be considered for a successful knowledge transfer; significance of the knowledge, employee acceptance and involvement and the transfer medium. Ismail *et al*. (2009) propose a framework for knowledge sharing in project management as shown in Figure 3.1.

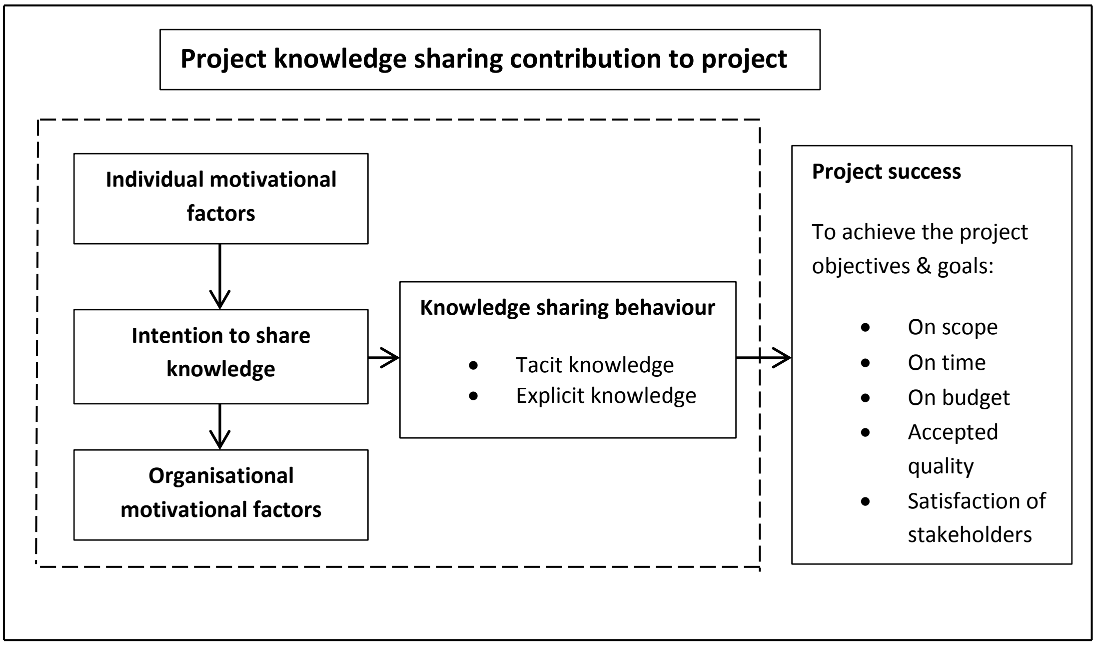


Figure 3.1: Framework for knowledge sharing contribution to project (Ismail et al., 2009: 52)

3.4.2 Skills and technology transfer

Skills gap is the disparity between an organisation's current capabilities and the skills required to achieve project objectives (ASTD, 2012: 4). Different skills are required at different organisational levels whether individually or in a group. Peterson and Van Fleet (2004) define skill as the ability to either perform some specific behavioural task or to perform some specific cognitive process that is functionally related to some particular task. Likewise, technology transfer is regarded as the process of conveying technology from one entity to another. This process is regarded as successful if the receiver can effectively utilise and assimilate the transferred technology (Ramanathan, 1994). The transfer of skill and technology is beneficial for economic advancement, knowledge advancement and project performance (Waroonkun, 2007). The literature review reviews factors influencing skills and technology transfer and they are presented in Table 3.3.

Table 3.3: Review of factors influencing skills and technology transfer

Factors	Author(s)
1. Technology transfer method	Lin and Berg, 2001; Waroonkun, 2007
2. Work ethic	Waroonkun, 2007; Soltanzadeh and Khoshairat, 2012
3. Willingness to transfer technology	Waroonkun, 2007
4. Intent to learn technology	Waroonkun, 2007
5. Cultural traits of transferor/transferee	Waroonkun, 2007; Lin and Berg, 2001; Soltanzadeh and Khoshairat, 2012
6. Transfer environment	Waroonkun, 2007; Soltanzadeh and Khoshairat, 2012
7. Level of involvement of transferor/transferee	Soltanzadeh and Khoshairat, 2012

3.4.3 Abilities

Ability denotes 'employee perceptions regarding management's competence and skills' (Johns and Saks, 2007). The ability of an employee to perform in an organisation is influenced by the organisation's ability to meet its mission and also propel employees to improve performance within an organisation. There are several factors that can affect the employee's ability to meet project expectations categorised into two groups, namely: a) individual factors and b) organisational/job factors (Service Canada, 2011).

Table 3.4: Factors that affect employee's ability

Factors	Sub-factors
Individual	1. Personal circumstances 2. Physical/emotional problems 3. Inappropriate personal behaviours 4. Incompetence 5. Job mismatch
Organisation/job	6. Poor leadership 7. Lack of clarity 8. Cumbersome work processes 9. Unrealistic policies and procedures 10. Work environment 11. Inadequate tools and support 12. Poor reward system 13. Feedback

Source: Service Canada (2011)

3.4.4 Personal characteristics

The personal characteristics of employees have a dominant role to play in any organisation's success. Most firms try to realise competitive advantage over others by improving their employees' satisfaction with the intention of influencing their personal characteristics (Gursoy and Swanger, 2007: 225). Previous studies reveal that personal characteristics, for example, personality traits, values and beliefs affect thoughts and actions in a consistent way across different situations (Weiss and Adler, 1984; Staw *et al.*, 1986). Likewise, interactional psychologists describe individual behaviours as a composition of both personal and situational attitudes (Muzumdar, 2011). Personal values, beliefs, and attitudes are elements of personal characteristics which can influence employees' efforts in any organisation. Factors influencing personal characteristics are social network (family and friends), work ethics, lifestyle, religion, culture, technology, media/music, historical events, and educational institutions (Andersson *et al.*, 2005; State of New South Wales (DET), 2009).

3.5 Review of factors influencing organisational performance

Dramatic change in technology has driven greater demand for organisational performance. In an attempt to improve performance, most organisations have focused on how to improve human capital, value-creating skills, competencies, talents, and abilities of their employees (Elias and Scarbrough, 2004). Evaluation of organisational performance has created a platform for assessing employees in a workplace, with the intention of examining their current performance and maximising their future potentials (Atkinson and Shaw, 2006). An organisation creates a unique environment where learning strategy, structure and design, trust culture, and technology factors are paramount to the overall project performance (Galbraith, 2002; Rhodes *et al.*, 2008: 89).

a. Learning strategy

Organisational learning is a process of acquiring new ideas that lead to improvements in the way that it does business (Bauman, 2005: 23, citing Garvin, 1993). Organisational learning is considered as a process of change in an organisation's knowledge which can be acquired through previous experience (Argote, 2013: 31, citing Fiol and Lyles, 1985). The acquisition of organisational knowledge will result in organisational learning (Argote, 2013). McCluskey (1996) identifies factors influencing learning as: a) individual motivation, b) corporate context, c) learning context, d) recognition of knowledge acquisition, e) pre-service training, f) role of instructors and learners in the learning-scenario and g) assessment. Four contextual factors that can affect the probability of learning are: a) corporate culture, b) strategy that allows for flexibility, c) organisational structure that allows for innovativeness and new insights and d) the environment (Argote, 2013, citing Fiol and Lyles, 1985).

b. Structure and design

The organisational design involves 'mapping out an organisational structure and aligning it with all aspects, functions, processes and strategies within a business' (Connor *et al.*, 2012). Tran and Tian (2013, citing Underdown, 2012) defines organisational structure as 'the formal system of task and reporting relationships that controls, coordinates and motivates employees so that they cooperate to achieve the organisational goals'. Ledbetter (2003: 21, citing Snook, 1988) highlights purpose, goals, size, environment, and technology as factors that influence organisational design. A firm's technology (economies of scale and scope), availability of efficient projects and profitability of successful projects were identified as factors influencing organisational structure (Berkovitch *et al.*, 2010).

c. Trust culture

The provision of a trust culture within an organisation is an important tool for achieving project success. Cardona and Elola (2003 citing Rousseau *et al.*, 1998) describes trust in this context as 'a willingness to be vulnerable to the action of another person, based on positive expectations about the other person's intentions and behaviour'. Emerson (1841) quotes *'trust men and they will be true to you; treat them greatly, and they will show themselves great'.* Trust culture can be influenced by personal factors and the boss's behaviour as indicated in Table 3.5 (Aitziber and Pablo, 2004). Zhi-hong and Yu-hui (2013: 644) further highlight the independent variables of trust culture among top management as: conformance in norm, stability of the system, transparency, attribute environment, and security mechanism.

Table 3.5: Characteristics that promote trust culture

Characteristics	Sub-factors
Personal factors	1. Demographic characteristics (age, gender, race/ethnic group) 2. Personal characteristics (past experience, personality and cultural background) 3. Professional competence of the boss (knowledge and skills)
Boss behaviour	4. Consistency 5. Integrity 6. Communication 7. Delegation 8. Consideration

Source: Aitziber and Pablo (2004)

d. Technology

Technology is a substantial factor which has both constructive and disruptive influence on employee behaviour towards organisational performance (Richards, 2013). It provides two basic capabilities for knowledge sharing by integrating knowledge and network creation (Noor and Salim, 2012: 169). Technology transfer, as discussed in section 3.4.2 indicates that the adoption of new technology can easily be simulated through new training, process enhancement and documentation.

3.6 Motivation and contracts

The concept of motivation refers to 'internal factors that impel action and external factors that can act as inducements to action' (Holmes, 2011: 1). It is a set of energetic forces that originate from both within as well as beyond an individual's being, so as to initiate work-related behavior and also to determine its form, direction, intensity, and duration. This involves goals and physical or mental activity which can be instigated and sustained. Geen (1995) re-affirms that motivation can be used to propel three aspects of action which are direction (choice), intensity (effort) and duration (persistence). Motivation is also tied to human behaviour as it possesses the ability to influence management's attempts to increase productivity whether positively or negatively (Gonzalez, 1991: 6).

Motivation can be aligned in a contract strategy by maximising the likelihood of project objectives being achieved while taking into consideration the constraints and risks involved in the project, and also the strengths and weaknesses of contracting parties (Broome and Perry, 2002: 63). It is essential to note that the motives of contracting parties differ; most contractors are concerned with being profitable while most clients are focused on optimising time, cost and performance/quality to achieve project objectives (Broome and Perry, 2002: 63). As noted, most contractual arrangements between clients and contractors are confrontational, reflecting considerable mistrust and leading to an increase in the contractors' premiums for averting significant risk levels (Zaghloul and Hartman, 2002: 422).

It is also important for an organisation to create an 'umbrella' strategy to manage motivation of all employees within the company (Holmes, 2011: 55). This strategy should involve the procedures for setting goals or tasks thereby ensuring that each progress is monitored, all achievements are acknowledged to promote good co-worker relationships (Holmes, 2011:

55). When a contract strategy is vexed by underlying suspicions, the level of motivation and commitment may be seen as exploitation which might cause the project efficiency to suffer significantly. They are basically two types of motivation, namely: a) intrinsic and b) extrinsic.

3.6.1 Intrinsic motivation

Intrinsic motivation is defined as the motivation that comes from within an individual, rather than from external or outside rewards. Even though the individual might seek rewards, he/she derives pleasure or satisfaction in completing an assigned task (Bainbridge, 2013: 1). This may be referred to as performing an activity for its inherent satisfaction, rather than for some separable consequence (Ryan and Deci, 2000: 56). This occurrence was first recognised within the experimental studies of animal behaviour where it was noted that many organisms engage in exploratory, playful and curiosity-driven behaviours even without any external prods, pressures or rewards (White, 1959: 299). For example, it was demonstrated that monkeys will learn to disassemble puzzles for no reward other than having the opportunity to manipulate things (Harlow and McClearn, 1954: 74). Similarly, rats can systematically select the path in a maze which leads to an opportunity to explore additional mazes (Montgomery, 1954: 62). Intrinsic motivation is an important construct that reflects the natural human propensity to learn and to assimilate (Ryan and Deci, 2000: 54).

Many researchers and psychologists have studied what makes an activity intrinsically motivated and several theoretical reasons have been identified. People can be motivated intrinsically by the desire to manipulate or to challenge the reduction of uncertainty, personal causation, curiosity, fantasy, competition, recognition, cooperation, competence, and self-determination (White, 1959: 303; Kagan, 1972: 55; Deci and Ryan, 1985: 43; Malone and

Lepper, 1987: 235). In spite of these, it is possible that personal objectives of an intrinsically motivated individual might not align with project objectives (Osterloh and Frey, 2000: 543).

3.6.2 Extrinsic motivation

Extrinsic motivation is a construct that occurs whenever an activity is carried out in order to attain some separable outcome (Ryan and Deci, 2000: 60). Extrinsic motivation can also be referred to as the motivation that an individual derives from outside or external; the individual is motivated to perform a task for anticipated satisfaction of some reward even if he/she has little or no interest in doing it (Bainbridge, 2013: 1). Likewise, Muller and Louw (2004: 170) define extrinsic motivation as an undertaking to attain an end state that is separate from the actual behaviour which can be determined by some external contingencies, such as good marks or avoidance of negative consequences.

In 1911, Taylor's "Principles of Scientific Management" introduced the concept of behaviourism, where human beings' actions can be categorised as negative and positive reinforcements. These principles are reinforced on the notion of rewards and punishments, also referred to as 'carrot and sticks'. Many researchers have argued for the use of rewards to motivate is based on the assumption that if people are paid sufficiently, they will be motivated to do just about anything (Brooks, 2009: 25). Regardless of the benefits derived from extrinsic motivation, the use of extrinsic rewards can induce a platform for cheating which will be contra-productive (Noop, 2012: 1).

Is it possible to rely on intrinsic motivation to achieve a desired task? Human beings have a fundamental thirst for knowledge, challenge, development and responsibility which have grown into acceptance (McGregor, 1960). Ryan and Deci (2000: 72) further affirm that humans are motivated by three basic psychological needs; competence, relatedness and autonomy. When the three basic needs are satisfied, the individual is intrinsically motivated, but if one of these needs is unsatisfied, then it will require extrinsic factors to motivate such an individual. There are several misconceptions about what drives employee motivation (Morse, 2003). It is important to understand that a combination of factors can motivate employees, not just one type of extrinsic or intrinsic reward (Manion, 2005).

3.7 Motivation of construction workforce

The construction industry employs a high percentage of any country's workforce with the highest record of job losses when compared to other industrial sectors (Rosen *et al.*, 2001; ETA/Business Relation Group, 2004). Over the past decades, the construction workforce has experienced a shift from the original blue collar (routine work) to white collar (knowledge work). This involves the continuous process of creating new insights and beliefs that will define problems, apply the new knowledge to solve these problems and then further develop new knowledge through the action of problem solving (Nonaka *et al*., 2000: 14). Today's highly competitive and rapidly evolving working environment demands that businesses be able to respond to changes in market conditions, legislation, technology or public expectations (Curtis, 2004).

In recent times, the construction industry has received an increasing interest in new innovations among practitioners and academics (Reichstein *et al.*, 2005: 634). New innovations consist of new methods, materials and technologies in construction project implementation. Despite these new improvements, statistics reveal that 65 percent of the executed projects do not achieve their objectives (Hass, 2007).The non-compliance with project objectives has resulted in poor project performance. Previous studies have shown that even talented employees with excellent technical and project management skills can perform poorly if they are not motivated effectively (Wiley, 1997: 266; Snell, 1999; Germann, 2004).

Motivation is an act of manipulation which has both positive and negative implications (Shanks, 2011). From the logical and rational approach, it is presumed that employees are motivated to respond to inducements from project managers but it is not always the case. In the modern workforce, the use of incentives and rewards to motivate employees might be increasingly difficult to improve performance even if they are well-designed. For example, the use of compensation as a motivational tool can only get to a point but if it is predictable then it becomes an entitlement and not a motivator (Morse, 2003: 18). It is therefore important to adopt appropriate rewards and recognitions which can motivate an individual positively towards achieving the desired project outcomes.

Motivation of employees is tricky which requires a clear understanding of concepts, principles and myths about motivation in order to effectively utilise it (Shanks, 2011; Atchison, 2003: 20). Employees, being people who are different, act in different ways and are motivated by different stimuli. Motivation is focused on redirecting the employee's energies towards optimistic job-related behaviours (Manion, 2005). This requires proper understanding of the employee's strengths and weaknesses so as to find out what will be needed to get specific employees to perform and also on how to capitalise on the ways in which the employee learns in order to motivate him/her correctly (Brickingham, 2005: 72).

As previously noted, motivation is considered as an intermediate variable between principal project activities and project performance (Sharp *et al.*, 2007; Rose and Manley, 2011: 767). The nature of the construction industry relies heavily on its workforce to remain competitive and profitable (Hermanta and Xiao-Hua, 2008). Throughout history, both practitioners and academics have sought the most effective ways of motivating their construction workforce. Volker and Rose (2012: 3) emphasise that an incentive's ability to induce motivation, is found in the principles of work motivation theories.

3.7.1 Review of workforce motivational drivers

Many researchers have studied motivational tools in different contexts. Lifson and Shaifer (1982) argue that proper understanding of factors influencing the decision making process in an organisation would allow for the key and major decisions to be reviewed and discussed regularly. In the study conducted by Hermanta and Xia-Hua (2008: 6), a total number of 13 sub-criteria and 25 project attributes were identified in relation to workers' motivation and work productivity in Australia. The study conducted by Asad and Dainty (2005: 234) shows that job security and completing challenging tasks are significant motivators for UK construction professionals, skilled craftsmen and unskilled labour. Likewise, the study conducted by Olomolaiye and Ogunlana (1989: 184) reveals job security as a significant motivator among construction employees in Nigeria.

The research carried out in Turkey by Parkin *et al.* (2010) identified ten motivating factors and eight de-motivating factors influencing Turkish construction workers. The study emphasises the use of internal and cultural forces to motivate construction workers. Working conditions, recognition, organisational support and design process efficacy are identified as significant motivational factors in Ireland (Oyedele, 2009:195). Ng *et al.* (2003) examine de-motivating factors influencing foremen, plant operators, carpenters and steel fixers in civil engineering projects in China. The research paper authored by Uwakweh (2006: 528) observes the level of motivation among construction apprentices throughout the mid-western cities of America. Huang and Lu (2008: 528) also investigated the job satisfaction of sub-contractors' workforce employed in Taiwan.

The study on whether the occupational groups are motivated by different motivating factors as conducted by Holmes (2011: 54) in New Zealand. The study reveals that the choice of motivational factors is influenced by the characteristics of an individual's occupational group. Yisa *et al.* (2000) in their study in the Iranian construction industry report that the international political situation and economic sanctions have produced market instability which has a direct influence on factors affecting the motivation of construction site managers. Their study listed 20 motivators and 15 de-motivators influencing employee motivation in Iran. Jarkas and Radosavljevic (2013) identified 23 motivational factors from their literature review which were used to assess the productivity of construction masters in Kuwait.

There are numerous other factors that affect employee motivation, which are commitment (Stum, 2001), management theories (Whittingto and Evans, 2005), quality of life (Sirgy, 1986), consumerism and culture (Trigg, 2004), demographic variables (Mathieu and Zajac, 1990), promotion and job satisfaction (Schwarzwarld *et al.*, 1992), salary, financial incentives and rewards (Cohen and Gattiher, 1994), good relationship and sense of belonging (Alogg *et al.*, 1995) and a good induction program and training (Gaertner and Nollen, 1989). Ogunlana and Chang (1998) emphasise that the selection of motivators may differ in the context of culture and working environment. For the purpose of this study, the identified motivational drivers were used to assess the impact on construction employees in South Africa and Nigeria. Table 3.6 presents the summary of employee motivational drivers in the construction industry with cited authors.

Table 3.6: Summary of employee motivational drivers from the literature review

Employee motivational drivers	Author(s)
1. Income increment	Hermanta & Xia Hua, 2008; Parkin *et al.*, 2010; Yisa *et al.*, 2000
2. Flexibility of working hours	Hermanta & Xia Hua, 2008; Holmes, 2011; Mercer, 2011
3. Benefits/bonus reimbursement/incentive	Mercer, 2011; Yisa *et al.*, 2000
4. Achievement/design process efficacy	Hermanta & Xia Hua, 2008; Holmes, 2011; Oyedele, 2009; Parkin *et al.*, 2010; Jarkas & Radosavljevic, 2013
5. Responsibility	Parkin *et al.*, 2010
6. Tuition reimbursement/ organisational support	Oyedele, 2009
7. Fairness of pay/salary	Mercer, 2011;
8. Prospect for promotion	Parkin *et al.*, 2010; Schwarzwarld *et al.*, 1992; Yisa *et al.*, 2000
9. Work itself (quality level & clarity)	Mercer, 2011; Parkin *et al.*, 2010;Yisa *et al.*, 2000; Jarkas & Radosavljevic, 2013
10. Advancement/completing of challenging tasks	Hermanta & Xia Hua, 2008; Holmes, 2011; Yisa *et al.*, 2000
11. Working relationship & communication	Gaetner & Nollen, 1989; Hermanta & Xia Hua, 2008; Holmes, 2011; Ng *et al.*, 2004; Parkin *et al.*, 2010; Yisa *et al.*, 2000
12. Good supervision	Ng *et al.*, 2003; Yisa *et al.*, 2000; Jarkas & Radosavljevic, 2013
13. Working conditions (availability of materials and tools)	Olomolaiye & Ogunlana, 1989; Yisa *et al.*, 2000; Jarkas & Radosavljevic, 2013
14. Personal life	Parkin et al., 2010; Sirgy, 1986
15. Job security	Asad & Danity, 2005; Ng *et al.*, 2004; Olomolaiye & Ogunlana, 1989; Yisa *et al.*, 2000
16. Job status	Schwarzwarld *et al.*, 1992; Yisa *et al.*, 2000
17. Timely payments	Yisa *et al.*, 2000; Jarkas & Radosavljevic, 2013
18. Participation in decision making	Yisa *et al.*, 2000
19. Physiological & safety needs	Parkin *et al.*, 2010; Yisa *et al.*, 2000; Jarkas & Radosavljevic, 2013
20. Working facilities (provision of rest area & transport)	Mercer, 2011; Ng *et al.*, 2004; Parkin *et al.*, 2010; Yisa *et al.*, 2000; Jarkas & Radosavljevic, 2013
21. Company's prestige (financial stability)	Mercer, 2011; Yisa *et al.*, 2000; Jarkas & Radosavljevic, 2013
22. Overtime allowance	Yisa *et al.*, 2000; Jarkas & Radosavljevic, 2013
23. Training of staff	Hermanta & Xia Hua, 2008; Holmes,

	2011; Mercer, 2011
24. Respect for people	Hermanta & Xia Hua, 2008; Mercer, 2011; Parkin *et al.*, 2010; Trigg, 2004
25. Consumerism/culture of people	Ogunlana & Chang, 1998
26. Gaining proficiency	Holmes, 2011; Mathieu & Zajac, 1990
27. Management theories	Mercer, 2011; Ng *et al.*, 2004; Whittingto & Evans, 2005
28. Creativity	Holmes, 2011; Ng *et al.*, 2004
29. Work life balance	Mercer, 2011
30. Demographic variables	Mathieu & Zajac, 1990
31. Environmental factors/increment weather	Ogunlana & Chang, 1998; Yisa *et al.*, 2000; Jarkas & Radosavljevic, 2013
32. Commitment	Stum, 2001
33. Timely response to requests & inspection	Jarkas & Radosavljevic, 2013
34. Unrealistic scheduling & performance expectation	Jarkas & Radosavljevic, 2013
35. Extent of change orders during execution	Jarkas & Radosavljevic, 2013
36. Recognition, credit and acclaim	Ogunlana & Chang, 1998; Oyedele, 2009; Parkin *et al.*, 2010; Yisa *et al.*, 2000; Jarkas & Radosavljevic, 2013

3.8 The use of incentive schemes to improve performance

Incentive-based contracts instinctively increase the demand for leadership, thereby intensifying the participation of project managers. The failure of any incentive-based contract to harmonise with the project setting may induce undesired behaviours which will restrain the realisation of trust and cooperation among contracting parties. The study conducted by ISPI/IRF (2002: 17) reveals that organisational settings can create a negative impact on employees' attitudes; this will adversely affect the realisation of project goals through incentives. Likewise, Cameron and Pierce (2002) stipulate that rewards propel performance and job interest among employees. Incentives are not limited to operational workers only but also top management. Incentives can be adopted to influence individuals, organisations and the enabling environment (UNDP, 2006).

Most managers are faced with the challenges of creating a suitable environment for knowledge sharing and learning among employees while most employees are reluctant to encourage and support the knowledge sharing process. Knowledge gives one organisation a competitive edge over another; it gives one employee a competitive edge over another within an organisation (Milne, 2007: 28). Over the years, the use of incentives to acquire knowledge and skills to perform an assigned task has proven effective (ISPI/IRF, 2002: 9). According to Ismail *et al.* (2009), knowledge sharing is influenced by both individual and organisational motivational factors in an organisation. Wang and Noe (2010: 117) further differentiate between knowledge sharing, knowledge transfer and knowledge exchange. Knowledge transfer represents the interchange of knowledge between different departments or organisations, rather than individuals, while knowledge exchange embodies both knowledge sharing among employees and knowledge seeking from others (Wang and Noe, 2010: 117, citing Szulanski *et al.*, 2004). Incentives, as motivational tools can effectively propel all aspects of knowledge both within and outside an organisation. There are basic principles required for effective incentive design so as to provide proper benefits to an organisation and employees. These are (Camilleri, 2011: 103 & 104):

i. The incentive design must strike the balance between rewarding the team's effort and individual's effort;
ii. It should not encourage individual competition but foster collaboration;
iii. It must be designed to establish performance measures and ensure that they are measurable in order to have a positive effect on performance;
iv. Incentive designs must be effective in all economic conditions; and
v. The incentive design must be aligned to focus on serving the client.

The ability to perform at an individual level is based on the individual's personal skills and how he/she is motivated. Employees, who believe that they are motivated, are most likely to be creative and industrious in their duties. Incentives are essential for building the individual's capacity and abilities by motivating skills development and bridging the gap between organisation requirements and employees' needs (Al-Nsour, 2012: 79). UNDP (2006: 5) highlights two attributes influencing individual motivation as: a) intrinsic motivation, and b) moral incentives. Intrinsic motivation has been previously discussed (see section 3.6.1) while moral incentives are related to the emotional, psychological and humanitarian needs of employees. The attributes that influence moral incentives in a working environment are identified as supervision, leadership role, work relationship, working conditions, and participation in decision-making (Al-Nsour, 2012: 79).

The ability to manage a project effectively is contingent on the performing organisation's ability to manage project processes by aligning goals and strategies of the organisation to achieve project goals. Rose (2008 : 12, citing Tang, 2002) emphasises that 'there is no better way to induce behavioural change than factoring an incentive element into the procurement system … the major clients are in an ideal position to drive for enhancements through this route'. Incentive mechanisms are introduced into a project contract to build strong, trustful and sustainable relationships among the contracting parties. History, mission, culture, and incentive design can affect the impact of incentives on organisational motivation (UNDP, 2006: 6). The increasing awareness of and concern about the impact of infrastructure and facility construction on the physical environment has created the demand to attune each project to its cultural, organisational and social environments. Proper understanding of a project environment requires the identification of project stakeholders and their ability to influence the project environment positively for better delivery of the change the project is designed to set up. Security issues, rule of law, culture, and civil engagement are measures that influence incentives in an enabling environment (UNDP, 2006: 6).

3.9 Economic aspect of incentive schemes in the construction industry

According to classical economists Smith (1976) and Marx (1867), compensation systems based on employee performance are perceived as a way to correct some imperfections in labour, product and capital markets that affect the employment relationship. By motivating employees to be more efficient at work, it also increases their attachment and interests for their enterprises. Incentive schemes can be used to improve interpersonal relationships, raise job satisfaction, lower absenteeism, reduce waste of intermediate material or capital, and lower turnover rates, all of which should produce a lasting effect on the company's performance (Bryson *et al.*, 2011: 6, citing Smith, 1776; Marx, 1867). The belief that incentives can improve performance lies at the heart of ample economic analysis but notwithstanding, such a belief can be contested. Most economists believe that incentives will likely motivate workers to produce more while some organisational psychologists argue that an extrinsic incentive may displace an intrinsic incentive to perform, thereby reducing output in some settings (Kohn, 1993: 1). Kadefors (2004: 177) stipulates that the use of incentives can induce undesired behaviour and restrain the formation of trust and cooperation among contracting parties if they are not designed and implemented carefully.

Economic development is a process which involves winners and losers and it also affects the input and output market structures. Anderson and Wassmer (2000) define economic development as 'cash or near-cash assistance provided on a discretionary basis to attract or retain business operations owned by large businesses'. The type of incentive to adopt varies in terms of expenses or the organisation that will eventually finance the project. Globally, economic development incentives are used to promote economic diversification by inducing growth in the targeted areas, stimulating job creation and improving construction activities in stagnant areas with the intention of generating long-term positive taxable revenue for the organisation. This prevalent use of incentives has generated the occurrence of strategic interactions through incentive negotiations where firms announce their plans to create new jobs or otherwise, in exchange for incentives (Gabe and Kraybill, 2002: 703).

The study conducted by Walker and Greenstreet (1991: 26) reveals that economic development incentives may have a positive effect on a firm's decisions. Comparable studies emphasise that economic development incentives affect employment growth (O'Huallachain and Satterthwaite, 1992: 42; Gabe and Kraybill, 2002: 723). In some cases, the net result of an incentive package may result in an unfair competitive advantage being bestowed on one market participant to the detriment of other existing firms where the reason for the provision of incentives is not properly assessed in order to understand all the effects, directly or indirectly; positively or negatively (Alwang *et al.*, 2001).

The construction industry has strong multiplier linkages with other industries in the economy, for example, mining, transport and manufacturing. Productivity improvements within the construction sector have a significant effect on economic growth and are inextricably interrelated to the economy (ACIL Tasman, 2005; Seeley, 1997). The ability to attract new business and maintain existing business is crucial for any country to maintain a healthy economy. Research conducted by Hampson and Brandon (2004) reveals the common barriers to industry growth in construction companies within Australia and the UK as: a) a fragmented and adversarial industry structure, b) a short-term approach to finance and planning, c) risk-aversion, and d) poor profit margins. Many organisations use incentives to induce industry growth through improved performance. A classic example of an economic analysis of incentive structures is supply and demand curves where the economic theory predicts that the market tends to move towards an equilibrium price.

3.9.1 Economic benefits associated with the use of incentive schemes in projects

Recent economic developments have encouraged many organisations to consider better ways of driving performance within limited compensation budgets. The use of salary increases only has not proven too effective in most organisations. Incentives have become the most powerful tools to improve employees' outputs, to drive performance and to establish a clear link between performance and rewards within an organisation (Kochanski *et al.*, 2013: 1). The major aim of incentive design is to align the interests of all levels of employees with the interests of project stakeholders or clients (Gordon and Kaswin, 2010: 2). An effective incentive design plan must focus on how to increase performance by encouraging the delivery of specific goals and desired behaviours and also to communicate and reinforce messages around corporate aims and personal performance (Turzak, 2008: 1). Gordon and Kaswin (2010: 2) identified four features of an effective incentive plan as: a) top management support, b) communication, c) performance management, and d) appropriate rewards. Regardless of these features**,** incentive plans may fail to motivate employees due to the following reasons (Rao, 2010):

i. Performance pay may impede employees' motivation due to certain factors, such as ambiguous instructions, lack of clear goals, unavailability of tools, and a hostile workforce;
ii. When incentive rewards are viewed as punishment, not rewards;
iii. Incentive rewards might rupture work relationships by encouraging individuals to pursue self-interest at the expense of teamwork;
iv. Incentive rewards can have unintended consequences through inspiring employees to concentrate on areas where they are being measured and neglect other areas; and
v. Rewards might undermine responsiveness and intrinsic motivation.

Rao (2010:1) further highlights the essential processes for implementing an effective incentive plan as follows: a) ensuring the performance levels are adequate to motivate employees; b) link the incentive plan to a contract strategy; c) set an effective standard by calculating their rewards based on their levels of effort in both design and construction; and d) view the standard as relationship management/a contract with employees. Incentives are generally viewed from the cost-benefit perspective where the costs for incentives are compared to the derived benefits. Benefits for incentives are: flexibility in reaching project targets, encouragement of technological innovation, improved relationships between parties, substantial cost savings and better management (PPRC, 2008). Improving customer satisfaction and increasing skill levels are also regarded as advantages of incentive mechanisms (Yauch, 2006: 2146). Kaput (2013) further identified healthy competition as an advantage of incentive plans.

3.9.2 Economic challenges associated with the use of incentive schemes in projects

Construction activities are dangerous, with the potential to pollute the environment and built products are not often defects-free (Construction Industry Review Committee, 2001: 953). The nature of the construction industry encourages the award of contracts to lowest bidders where contractors will have no choice but to adopt a short-term view on business development with little or no interest on how to enhance long-term competitiveness. This might result in cutting their costs and profits to the minimum thereby strangling the sustainable approach in construction. The construction process is largely labour intensive, complex, dynamic and uncertain and it requires highly motivated workers to achieve project success (Abdulsalam *et al.*, 2012: 1196). Since the 1980's, there has been a conflicting perspective on the use of rewards for employee motivation. Intrinsic rewards have received stronger support from the academic field while extrinsic rewards have also obtained greater support from project practitioners (Schweyer and Stotz, 2011: 5).

It is important to understand that the use of incentives and rewards are inextricably linked with project risks (Thomas and Thomas, 2005: 197). It is essential to note that some outcomes can be incentivised while others are much harder to be influenced through incentives. The right question is how to artfully and wisely design an incentive program in order to be effective for each situation, task and person? (Schweyer and Stotz, 2011: 1, citing Bassi, 2010). The foremost challenge faced in the design of incentive schemes, is to align formal incentive mechanisms with informal governance arrangements in a complimentary way (Volker and Rose, 2012: 3). Likewise, Heathfield (2012: 1) emphasises that compensation through incentive payments are tricky and challenging since employers want to remain in businesses and empower their employees to boost performance.

Human beings are intelligent and endlessly creative when it comes to improving their personal well-being at everyone else's expense. Therefore, it is important to consider how people react before measuring their performance. IPC (2008: 1) states that incentive programs have proven to boost performance at an average of 25 percent for individuals and 44 percent for project teams if they are conducted in ways that can address all issues related to performance and human motivation. Another challenge with incentive programs is the lack of adequate knowledge on the constructive design of incentive programs that will yield the desired outcomes. This is in line with the study conducted by Chun (1993: 159), which identifies the two major economic problems restricting the use of incentive contracts as a lack of experience on how to budget for incentive contracts and how to handle the savings from these contracts.

Other common challenges associated with incentives are also identified as: scheduling difficulties, approval of changes, sacrificing quality for speed, adverse relationships among working teams, budget difficulties, and delays in review of specifications and requirements (Raduescu and Heales, 2005: 4). In the study conducted by Wild *et al.* (2012: 18) on the constraints affecting incentives that can impair performance in project delivery from the political-economic perspective, it identified the common constraints as political market imperfections, policy incoherence, lack of effective performance oversight, collective action challenges, and moral hazards.

3.10 Review of the past studies on incentive plans or frameworks

Li *et al*. (2003) adopted a bar-code technique to assess the effectiveness of an incentive reward program (IRP) in motivating employees to miminise construction wastes in Hong Kong construction sites. The bar-code technique is used to track the real-time data of construction materials on site, to monitor consumption or usage rate and to provide historical data for construction materials usage. The experiment was conducted on a project consisting of two identical 34-storey residential blocks using a 6-day cycle and nine (9) working groups. The research findings demonstrate the importance of IRP in reducing wastage of construction materials but the experiment failed to consider other aspects of performance, for example, time, quality and safety/health. The study reveals that employees may decide to reduce quantity of construction materials used in order to have excess used materials with the intention of being rewarded from the IRP.

Bei (2013) conducted a similar study in the construction industry by developing an incentive reward model for team-based performance. Technical abilities and personal performance were used as parameters for measuring incentive team-based reward model. The study argued for rewarding an employee based on team's efforts and not individual's contribution. It is important to note that the use of incentive compensation plans are often targeted towards motivating employee's skill building, supporting organisation structure and shaping workplace culture (APA, 2008). Therefore, it may be difficult to achieve where the reward system is focused on compensating for team's effort. There is no doubt that diverse skills, personalities and motivations of team members contribute to team success but individual rewards may be a good strategy for meeting deadlines and short-term projects (APA, 2008).

The construction sector falls within this category where timeous completion of assigned tasks is a priority for meeting short-term contracts. Project managers are left with the task of managing competing interests of team members which include freeloaders who don't contribute adequately and high performers who tend to prefer individual rewards. This poses the need for rewarding individual's effort. Sinclair (2003) emphasises that distributing rewards equally among team members can encourage lower productivity.

Baker (1992), in a paper titled 'Incentive contracts and performance measurement', emphasises that incentive payoffs should be given on two separate piece rates where one is for the expected level of performance measured against his level of effort and the other is the difference between the expected level and the actual value realised based on the performance measure. The most prevailing problem affecting incentive modeling is the inability to account for the scarcity of explicit incentive provisions in contracts (Holmstrom and Milgrom, 1991: 34). For example, the absence of a timely completion clause relies on the ability to monitor other aspects of performance. Laffont and Martimort (2001: 148) developed a model to describe incentive feasible contracts in a moral hazard environment. The study revealed that where employee's efforts cannot be directly observed then employee's effort should be qualified based on the observable and verifiable production level only.

3.11 Chapter summary

This chapter revealed the key factors or elements influencing workforce motivation and project performance. It identified that individuals, groups and organisational structure play an important role in the success of any organisation. The three key theories of organisational justice which are distributive, procedural and interactional justices and factors influencing each of these theories were discussed in section 3.2. Workforce behaviour is seen as an essential element which explains why and how an individual's or a group's actions influence an organisation or the environment. The literature review identified two types of variables influencing workforce behaviour as dependent and independent variables and the key factors affected these variables were also elaborated on section 3.3. Measuring competency is essential in order to ensure that organisations understand where to focus greater attention for effective maximisation of their resources. Major elements of organisational competency have been identified as knowledge sharing, skills and technology transfer, abilities and personal characteristics and their sub-factors were discussed in section 3.4. The literature review further identified the key drivers of organisational performance and their parameters in section 3.5.

The review of this chapter also showed that even talented employees with excellent technical and project management skills might not achieve their full potentials if they are not motivated effectively. Motivation is tricky where the motives of contracting parties differ. In the construction industry, motivation is considered as an intermediate variable between principal project activities and project performance. Therefore, there is a need to identify workforce motivational drivers which can bridge the gap between clients' objectives and contractors' expectations. Workforce motivational drivers are reviewed from different literature sources in order to assist with the measurement of the impact of these drivers on improving performance. The link between organisational culture and project performance has been established where human social interaction in any organisation influence project success.

Behaviours have been identified as a major driver of organisation performance in the construction industry. There are several parameters reviewed in this study that influence behaviours such as organisational justice, employee motivation and employee behaviour, they form the sociological constructs for evaluating performance in relation to incentive. The operational metrics of performance as reviewed in the literature focused on the performance objectives, organisational competencies, management attributes and risk allocations and they form the operational constructs for evaluating performance of incentive mechanisms in projects. The use of incentive schemes to improve performance and the causes and effects on these incentives on individual, organisational and the enabling environment have been examined. It indicated that the ability to attract new business and maintain existing business is crucial for any country to maintain a healthy economy. Many organisations use incentives to induce growth through improved performance but the economic impact of incentives has recorded both benefits and challenges. The review of the existing benefits and challenges from other countries provides a benchmark to assess the economic impact of incentives in South Africa and Nigeria.

The review of the past studies on incentive models is used to identify strengths and weaknesses and also aids in developing a framework which will improve or eliminate their lapses. There are two existing models reviewed, the first model focused on cost performance but failed to incorporate other aspects performance metrics. The second model argued for incentive payoffs modeling based on team performance and not individual’s contribution, this failed to consider the structure of construction sector which focused on meeting deadlines and short-term projects. The literature review revealed that in the construction sector, timeous completion of assigned tasks is a priority for meeting short-term contracts. As noted, project managers are left with the task of managing competing interests of team members which include freeloaders who don't contribute adequately and high performers who tend to prefer individual rewards. Distributing rewards equally among team members might not adequately motivate high performers, this may lead to reduced productivity.

The next chapter discusses the project environment and settings for the countries under investigation; this enables us to understand the structure of both countries in relation to construction projects and the studied construct.

CHAPTER FOUR

PROJECT ENVIRONMENT AND SETTINGS IN SOUTH AFRICA

4.1 Introduction

This thesis investigates the research problem as it relates to the South African construction industry, it is essential to uncover project environment and its settings. This chapter presents an outline of country contexts, economic and business environments, contractual procedures, and the influence of the construction industry on the labour market. It further reviews the current practices of incentives and their economic impact on construction activities in South Africa. Lastly, this chapter summary presents the key findings from South Africa.

4.1 Synopsis of South Africa

South Africa covers 1, 219, 090 square km and is located on the southern tip of Africa. The country has about 51.77 million people with 60 percent of the population under the age of 35 (World Bank, 2011; BBC News, 2012; South Africa Info, 2013: 1). South Africa has a middle income emerging market and an abundant supply of natural resources (Central Intelligence Agency, 2012: 1). The infrastructure in South Africa is regarded as world class with widely available energy, a modern transport network and high-tech telecommunications facilities (South Africa Info, 2013). The government has substantially invested in public infrastructure and housing projects but there is a massive migration rate from rural areas to urban cities (World Bank, 2013). The country is divided into nine provinces, each with its own legislature, premier and executive councils.

4.2 Economic and business environment in South Africa

South Africa is the first nation in Africa to gain entry into Citigroup's World Government Bond Index. In 2012, the nation was ranked second among 94 countries in the open budget index prepared by the International Budget Partnership (World Bank, 2013). South Africa has enormous potential as an investment destination, offering a unique combination of highly developed first-world economic infrastructure with a vibrant emerging market economy (South Africa Info, 2013). The country is a member of BRICS (Brazil, Russia, India and China) club of emerging world economic powerhouses. It is regarded as one of the most advanced, broad-based industrial and productive economies in Africa. The economy of South Africa went into recession in May 2009 following an abrupt slowdown in mining and manufacturing sectors. The slowdown in the mining sector is not only attributed to labour strikes but also to the weak demand and muted commodity prices as well as labour and energy costs (Statistics South Africa, 2012).

The GDP growth was an average of 3.2 percent yearly since 1995 and 1.6 percent in per capita terms resulting in a total of 30 percent increase in per capita since the late 1990s. This has resulted in a rise in social welfare payments thereby creating a significant decline in the poverty rate from 50.8 percent of the population living below R422 per month between 2000 and 2009 to 34.5 percent in 2010 (World Bank, 2013). This indicates that the country is growing its potential although the issues relating to chronic unemployment are yet to be resolved (Maswanganyi, 2013). In pursuit of economic growth, the South African government embarked on economic reforms which are focused on promoting domestic competitiveness, growth and employment and also increasing the economy's outward orientation. These reforms have enabled a high level of macro-economic stability which have contributed to low tariffs, reduced taxes, fiscal deficit under control and relaxed exchange controls (South Africa Info, 2013).

The South African government, through the Department of Trade and Industry (DTI), has developed diverse means of promoting broader economic participation in the economy through the provision of incentive support measures. The DTI incentives are focused on job creation, investment and broadening participants through four channels, namely: a) black business supplier development programme, b) co-operative incentive schemes, c) emerging exporters' development programmes, and d) strong emphasis on SMMEs with the enterprise investment programme. South Africa operates a relatively diversified economy with one of the highest inequality rates in the world (World Bank, 2013). The business environment is considered to be largely attractive, with one of the most sophisticated networks in sub-Saharan Africa although the country is restricted by labour market rigidity (Informetrics and Trade/Industrial Policy Strategies, 2011: 14). The country's abundant mineral resources have played an important role in its economic development thereby making South Africa a leading international producer and exporter of gold, platinum and manganese. Regardless of the level of macro-economic stability, the nation is faced with key challenges of poverty, unemployment, shortage of skilled workers, and inequality (South Africa Info, 2013). The economic transformation agenda has remained incomplete, due to enduring issues from the previous apartheid system (World Bank, 2013).

4.3 General overview of the South African construction industry

Globally, the construction industry has the highest workforce which is also the case in South Africa. The South African construction industry has remained a vital player in the economy. It is crucial for job creation because of its labour intensive nature and its role in supporting other economic sectors through the provision of buildings and construction projects (CETA, 2008). The construction sector in South Africa is large, diverse and complex in nature with a vast number and range of employees (CETA, 2008). In spite of this, the employment rate in the construction industry has declined by 14.3 percent between 2008 and 2010, 6.7 percent in 2011 and 4.4 percent in 2012 with the current total employment of 986,000 employees (State of the Construction Industry, 2012). The construction industry has also benefited from the huge programme of government investment ahead of the 2010 World Cup (BBC News, 2012). Nevertheless, the South Africa Infrastructure (2013) reveals that the market infrastructure is still below average with an acute shortage of skilled workforce across different sectors. CIDB (2007, citing Maleka, 2006) emphasises the need to provide an environment for a bigger pool of skills to plug the gap of skills shortage.

The CIDB was established in 2000 with the mandate to monitor project implementation and evaluate their impact. In line with the rethinking of construction industry standards, CIDB developed CIIs, which focus on:

- Providing companies and projects with a simple method of establishing a performance measurement system;
- Providing organisations with a straightforward method of benchmarking their performance against others in the construction industry; and
- Tracking long term trends in performance and specifically, to demonstrate whether the construction industry was achieving the targets set out in Rethinking Construction (Rethinking Standards in Construction, 2006: 3).

CIIs are used to measure project performance at different levels, such as that of employer, contractor and consultant. For completed projects, the employer's satisfaction is measured for project milestone dates achieved, contractors' performance, agents'/consultants' performance, and the quality of materials used. Contractors' satisfaction is measured by their profitability, the performance of the employers and their agents, the quality of the contract documentation, the management of variation orders and claims, payment delays and the performance of their materials suppliers. For the consultants' satisfaction, the time allowed by employers for planning, delays in the payment of professional fees and deviations by employers from their own approved procurement procedures are also measured (Marx, 2013: 2). These indicators can be regarded as performance assessment indicators, not performance improvement indicators. It is focused on end products with less emphasis on how they are achieved.

4.4 Review of contractual procedures and project performance in South Africa

In the pursuit of fair, transparent and better contracting strategy, procurement reform began in 1995 focusing on how to restructure the tendering process to create employment and easy access for small, medium and micro enterprises. The Preferential Procurement Policy Framework Act (PPPFA) was initiated to stipulate how tenders should be evaluated and awarded to the bidder with the highest weighted points relative to price and other specific goals (CIDB, 2006: 3). This reform has remained significant in the public sector as a policy tool to streamline discriminatory and unfair practices during apartheid (Bolton, 2006: 193).

Procedures for project implementation was constituted in public procurement guidelines to promote the principles of good governance and the National Treasury also introduced a preference system to address socio-economic objectives (Ambe and Badenhorst-Weiss, 2012: 246). This has led to the introduction of the Competition Act of 1998, which prohibits anti-competitive conduct and such conduct, in the local context, refers to restrictive practices; for example, price fixing, predatory pricing, collusive tendering, and abuses by dominant firms. Notwithstanding the improved procedures, these methods and procedures for procurement are generic in nature and are not specific to a category of procurement, for example, services, supplies or engineering and construction works. There are usually six principal activities associated with a generic procurement process, which are stipulated as follows (South African National Standard, 2004):

i. The establishment of what is to be procured;

ii. A decision on procurement strategies;

iii. The solicitation of tender offers;

iv. The evaluation of tender offers;

v. The award of the contract; and

vi. The administration of the contract and confirmation of compliance with the requirements.

The shift from a predominant first-world oriented construction environment to a developing world construction environment in South Africa has infused the use of a framework for effective procurement systems in developing countries for project implementation (Thwala and Mathonsi, 2012: 14). This framework provides guidance which can be categorised into three procedures, namely: a) negotiated, b) competitive selection, and c) competitive negotiation (Thwala and Mathonsi, 2012: 14). Nevertheless, the South African construction industry still has what it takes to adopt non-traditional contracting procedures. There is evidence in the use of public-private partnerships in South Africa from late 1990's at a period of great fiscal discipline, where incentives were considered for off-budget spending. CIDB (2009:3) argued for a standard of uniformity in construction procurement by adopting standard forms of contract for engineering and construction works. Figure 4.1 indicates the procurement processes used in the South African construction industry. Regardless of these efforts to improve the industry, the annual CIDB survey from the nine provinces of South Africa, using responses from 282 clients and 1204 contractors on completed projects in 2009, indicates the need for project improvement (CIDB, 2010).

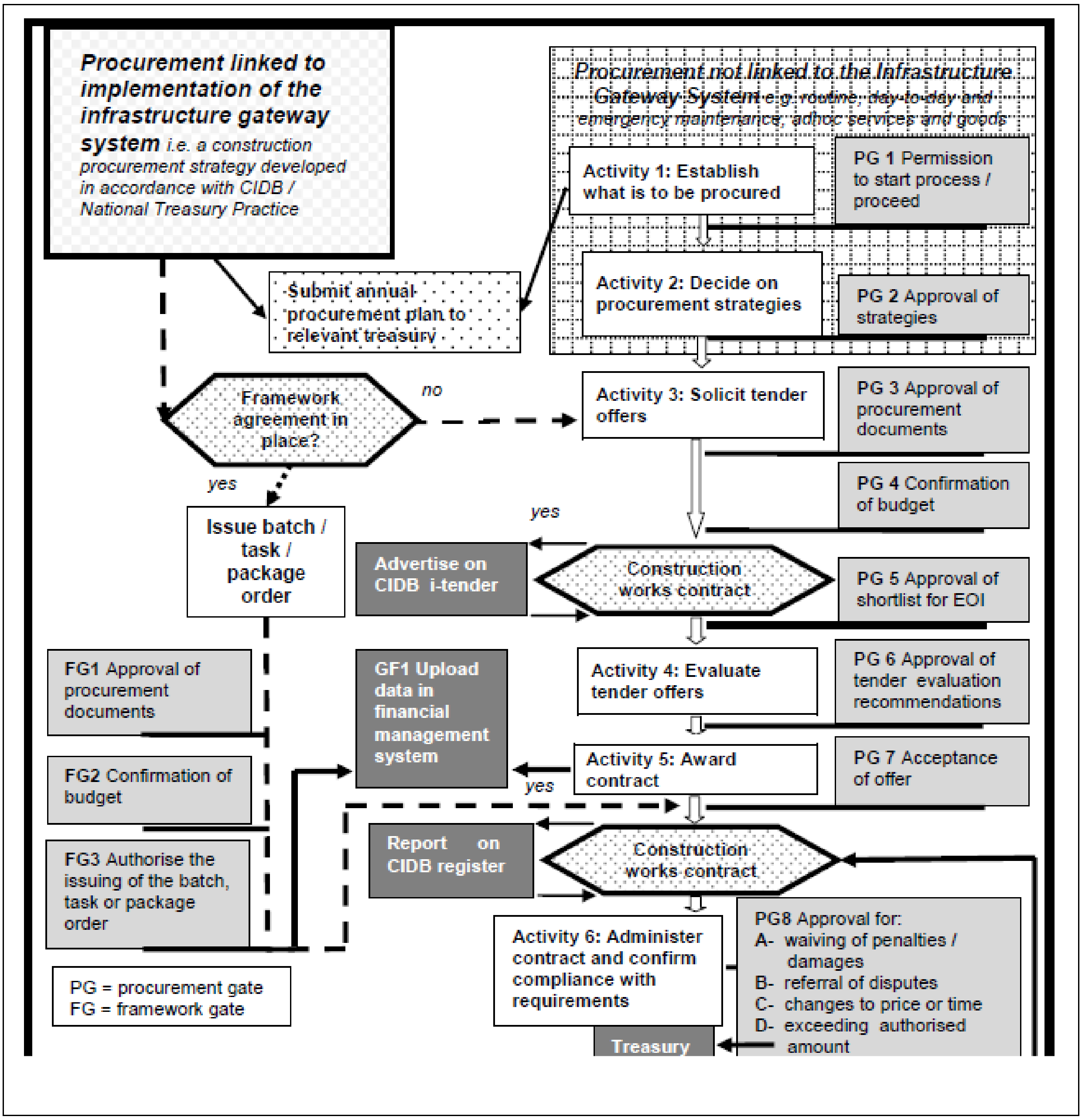


Figure 4.1: Procurement processes in the South African construction industry (National Treasury, 2012: 11)

4.5 Impact of the South African construction industry on the labour market

The government's commitment to economic transformation has led to the introduction of the Growth, Employment and Redistribution (GEAR) strategy. GEAR strategy is focused on creating an average annual employment growth of 2.9 percent, or 270,000 jobs per year (Burger and Woolard, 2005: 3). However, the economic growth has been much slower than predicted by the GEAR strategy following the financial crisis between 2008 and 2009. After a severe decline in employment in 2009 and early 2010, the labour market has begun to show signs of recovery (Budget Review, 2011: 39). In 2012, the total employment rate in South Africa was estimated to have grown by 2.3 percent. Regardless the improvement, the construction sector has witnessed a decline in employment from 1,057,000 employees in 2011 to 986,000 employees in 2012 (State of the Construction Industry, 2012: 24).

The construction industry employs 7.7 percent of the total labour force where approximately 63 percent is in formal employment and the majority of employees in the sector are either semi- or highly skilled. Regardless of the low contribution, the industry has played an important role in the labour market. According to Dlamini (2012), the importance of the construction sector is not related to its size but rather its role in economic growth. Investment in construction had maintained a sustained period of growth of approximately 10 percent per annum between 1970 and 1980. The industry witnessed a decline in investment growth during the economic downturn but since 2000, investment has expanded by 9.2 percent annually (Economic sector review, 2009: 2). South Africa has a diversified economy where different sectors contribute to the GDP. The construction sector contributes 8.9 percent of GDP and with the full implementation of all facets of GEAR in the construction industry; the industry might expand at a faster rate in the future (IDC, 2013).

4.6 The current practices of incentive mechanisms in the South African construction sector

In South Africa, there is a wide range of incentive packages which are focused on fostering and developing businesses and also on promoting employment and competitiveness. In the South African construction industry, previous documentations and interviews revealed the use of incentives in project execution. These incentive designs are focused on disincentives/penalties where contractors are penalized for late completion. Figure 4.2 illustrates the structure of an incentive plan, adopted by the Department of Public Works in South Africa which does not encourage early completion. Most contractors are not willing to complete their project works before the targeted completion date due to the daily payment of provisional and general fees. According to Ogwueleka (2010), the early completion of project works would not only save time but also cost and other related variables.

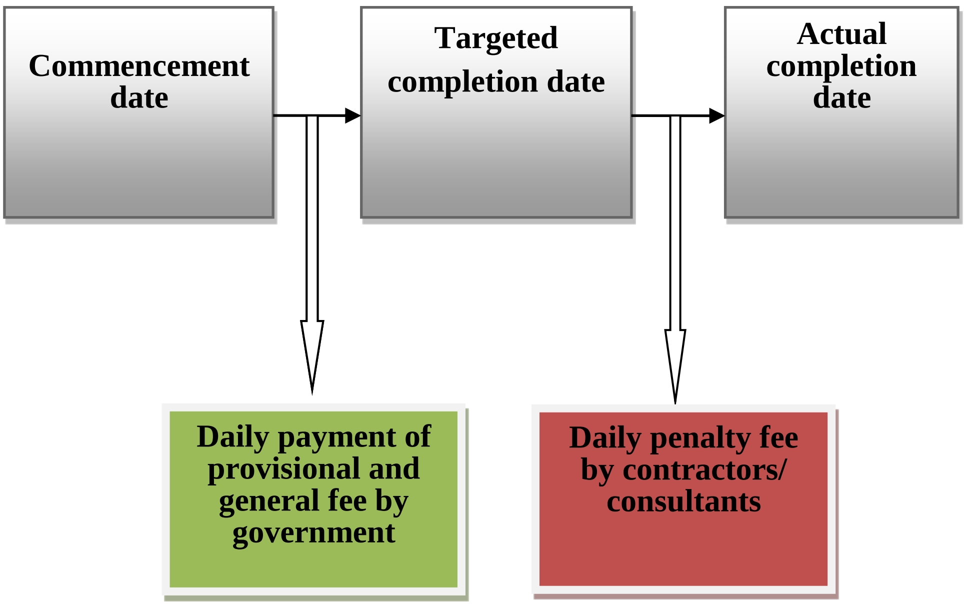


Figure 4.2: An illustration of the incentive plan adopted by the Department of Public Works, South Africa (Ogwueleka and Maritz, 2013: 90)1

The use of CIIs is based on the traditional contracting processes which lacks cooperative strategies (Ogwueleka and Maritz, 2013). CIIs are focused on end products with less emphasis on how they are achieved. This process might generate unpleasant relationships between clients and project participants thereby restraining the formation of good working relationships between the contracting parties based on respect, trust, teamwork, commitment, and shared goals/risks. CIDB (2007) advocates that 'the remedy to the shortage of skilled workers is not merely to equip new entrants with skills but to ensure that they gain the appropriate workplace experience to consolidate their craftsmanship, supervisory and professional capabilities'. The South African construction industry has recorded an acute shortage of skilled workers where the adoption of CII strategy will not only frustrate new entrants but also hinder the advocacy of the CIDB (Ogwueleka and Maritz, 2013). The appropriate workplace experience can only be created within a good working relationship. The concept of project performance assessment is based on the end product while project performance improvement encourages the consolidation of craftsmanship, supervisory and project capabilities (Ogwueleka and Maritz, 2013).

4.7 Chapter summary

This chapter explores a review of country contexts, economic and business environments, contractual procedures and the influence of the construction industry on the labour market. It further reviewed the challenges confronting the use of incentives in South Africa and how these incentives have failed to align clients' expectations with contractors' objectives. The existing incentive schemes focused on penalising contractors for any stipulated project duration but failed to encourage early completion which can influence cost saving.

CHAPTER FIVE

PROJECT ENVIRONMENT AND SETTINGS IN NIGERIA

5.1 Introduction

This thesis also investigates the research problem as it relates to the Nigerian construction industry. This chapter presents an outline of country contexts, economic and business environments, contractual procedures, and the influence of the construction industry on the labour market. It further reviews the current practices of incentives and their economic impact on construction activities in Nigeria. Lastly, this chapter summary presents the key findings from the literature review.

5.2 Synopsis of Nigeria

Nigeria, officially known as the Federal Republic of Nigeria, is situated in the tropical zone of the West African sub-region, which covers a land area of about 910, 770 sq. km (World Bank, 2010). The population statistic of Nigeria is estimated to be 162.5 million people with an annual growth rate of 2.52 percent (World Bank, 2011). The country is rich in natural resources which have resulted in massive industrial activities (UNICEF, 2013). Nigeria has relatively comprehensive advanced power, road, rail and ICT networks that cover the national territory, but a poor maintenance culture has devastated the infrastructure system. With the introduction of new democratic governance in 1999, the country has recorded tremendous economic growth which has created a significant impact on the infrastructure development.

5.3 Economic and business environment in Nigeria

Historically, the Nigerian economy was based on agriculture until the discovery of crude oil in commercial quantities. The exploration began in 1958 and since then, it has accounted for about 90 percent of the country’s gross earnings (NNPC, 2010). The country became a member of OPEC (Organisations of Petroleum Exporting Countries) in 1971. Challenges that confronted the Nigerian economy in the past three decades are linked to its overdependence on crude oil production. The country is a textbook example of an economy under the influence of Dutch disease with its deleterious impact on the development of other sectors (Akpobasah, 2004: 1). Diversification of the productive base of the economy away from oil has been a major challenge for successive governments. In 2003, the Federal Government of Nigeria (FGN) conceptualised reform based on a plan for economic recovery, growth and development. This plan, called the national economic empowerment and development strategy (NEEDS), was eventually launched in 2004 as a response strategy to numerous challenges facing the nation. The reform programme was designed to last from 2004 - 2007 for the first phase, and 2008 - 2011 for the second phase.

NEEDS is focused on raising the country's standard of living through several economic reforms. It therefore emphasises the evolution of a private-led market economy with competition as a driving force. The plan adopted several policy measures aimed at improving the business climate and spur non-oil economic growth. The specific objectives of NEEDS include: a) poverty reduction, b) employment generation, and c) wealth creation. This has transformed the agricultural sector through commercialising the small, medium and large-scale enterprise levels. By 2008, the Nigerian government began to show political determination to implement the market-oriented reforms urged by the IMF. These reforms include the modernisation of the banking system, removing subsidies and resolving regional disputes over the distribution of earnings from the oil industry (CIA, 2013).

With the view of becoming one of the top 20 economies in the world by 2020, the Nigerian government launched a programme known as Vision 2020, which is focused on economic growth. The country has also developed other economic reforms targeted at improving the business environment, such as economic liberalisation, deregulation, privatisation of state enterprises, improving the investment climate, pursuing public sector reforms, and public-private partnerships (Chiejina, 2012: 1). Regardless of these economic reforms, the country is still faced with enormous challenges which include insecurity, corruption, poor infrastructure and unemployment (Business Day, 2012).

The Nigerian government has adopted several measures to create a more stable business environment including the establishment of several anti-corruption agencies. These agencies are the Economic and Financial Crimes Commission (EFCC) and the Independent Corrupt Practices Commission (ICPC). They have contributed immensely to the improvement of transparency and accountability in the system and are gradually reducing the total cost of doing business in Nigeria. The non-oil sector of the economy has grown at an increased rate of 8.6 percent from 2000 to 2005 (Nigerian Bureau of Statistics, 2006) and has continued to grow at impressive rates since then, reaching 9.6 percent in 2007 (World Bank, 2008). In 2014, Nigeria's economy is estimated to be the largest in Africa and 24th in the world (The Guardian, 2014). Economic analysts have forecasted a jump closer to 40 and 60 percent (Rosenberg, 2013: 1; The Guardian, 2014: online).

5.4 General overview of the Nigerian construction industry

In the 1940s, construction contracting commenced in Nigeria with a few British and Italian companies operating but after the independence in 1960, there was an upward trend in construction activities (Olowe-Okere, 1985: 7). The oil boom created an overwhelming improvement in construction contracting in conjunction with an unprecedented level of degeneration of standards in the project delivery process. The majority of the large-scale projects were undertaken by the government. In recent times, large-scale projects are being constructed by both the government and the private sector (The Business, Trade and

Investment Guide, 2010/2011: 219). The government or public sector is built on the institutional and regulatory framework designed by the colonial masters. The design was intended to facilitate the implementation of various development plans for the administration at that time.

The public sector remains the major client in the construction industry while the private sector consists of a few foreign construction companies and local or indigenous contractors. Local contractors comprise mainly small-scale builders where their clients are those seeking the construction of single dwelling houses for families and the implementation process relies on labour-intensive methods of construction. This is probably because labour is considered cheap and therefore it is more economical than the capital-intensive option of construction. The small-scale enterprises in the construction industry are constrained by a poorly or inadequately developed market structure for professional services, high cost of finance, undefined property rights, insecurity in enforcement of contracts, lack of skilled labour force, administrative barriers, and lengthy procedures of business registration (Growth and Employment in States, 2010). The subcontracting sector of the Nigerian construction industry is not yet fully operational like in most developed countries, with most of the large companies finding subcontracting firms unreliable (Dantata, 2007: 76-78).

The construction industry in Nigeria plays an important role in facilitating the provision of facilities, such as transport, water, electricity, education, housing and health. Global Construction Perspectives and Oxford Economics (2010) states that 'regardless of the global economic collapse, in Nigeria, the construction industry is growing fast and is likely to grow astronomically over the next decade'. The president of the Nigerian Institute of Architects, Olatunji Bolu, reports that 'the construction industry in Nigeria has grown tremendously over the years and it is rich enough to drive the economy of the country which is the evident from its performance in the Stock Exchange and also the establishment of more consultancy outfits' (Business Day, 2011). The industry has been growing rapidly at about 12 percent per annum and much faster than the 2.5 percent growth rate for the overall GDP (Growth and Employment in States, 2010). By the second quarter of 2009, the percentage growth rate for building and construction was estimated at 11.82 percent. Nigeria's population is urbanising at one of the fastest rates in the world with only Nigeria and India estimated to enjoy higher growth rates than China in their construction output from 2009 to 2020.

Factors that have contributed to the massive growth in the construction industry include: general economic growth, increased economic activity, rapid urbanization, demographics and housing demand, and the increasing popularity of private-public partnership worldwide (Commonwealth Network, 2013: 1). Nigeria's surge in the construction sector has taken place despite some major challenges, for example, corruption, government bureaucracy and poor existing infrastructure (The Business, Trade and Investment Guide, 2010/2011: 219). The erstwhile Public Works Department (PWD), which is now renamed the Federal Ministry of Works and Housing (FMW&H), undertakes most Federal government construction activities. Although the traditional procurement system inherited from the British rule is still popular, other procurement routes/methods are increasingly being adopted for major construction projects in the country. For example, build, operate and transfer (BOT), construction management (CM), and design and build or construct (D&B).

5.5 Review of contractual procedures and project performance in Nigeria

Since the transfer of power from military to civilian government in 1999, the new democratic government has focused on establishing accountability, efficiency and transparency in the public procurement and contract award procedures. The demand for transparency in procurement procedures led to commissioning the World Bank to collaborate with some private sector specialists to study financial systems and general procurement-related activities in Nigeria. The study reveals that Nigeria may have lost several hundred billions of Naira over the last decades due to flagrant abuse of procedures for the award of public contracts, inflation of contract cost, lack of transparency, lack of competence-based competition, and merit. Based on their recommendations, the government decided to put an end to the widespread corruption in the country by establishing the Budget Monitoring and Price Intelligence Unit (BMPIU) in 2003, under the Office of the Principal Secretary to the President (www.bpp.gov.ng).

The mission of BMPIU is to use due process mechanisms to establish a transparent, competitive and fair procurement system which is integrity-driven to encourage spending within budget and to ensure speedy delivery of projects while achieving value for money without sacrificing quality and standards for the Federal government of Nigeria (Oguonu, 2007: 4). Figure 5.1 reveals the organisational mechanism of BMPIU. Due process is a central concept of Anglo-American jurisprudence which is adopted by countries practicing the common law system; Nigeria included (Uwakah, 1997: 2). The government inaugurated implementation strategies for BMPIU as follows: a) the regulatory functions for regulating standards including the enforcement of harmonized bidding and tender documents; b) certification functions for certifying federal-wide procurements in categories of resident due process and full due process certification; c) monitoring functions to supervise the implementation of established procurement policies; and d) training and advisory functions to co-ordinate relevant training programmes (Oguonu, 2007: 4, citing Ezekwesili, 2005). The procedures for due process review are as follows (Nigerisfirst.org, 2003):

i. Requirements for due process review, which include;

- The project policy file,

- Tender returns,
- Tender evaluation report,
- Contract award letter and agreement,
- Original contract bills of quantities (if any),
- Contract drawings (if any),
- Other contract documents,
- Financial summary and statements,
- Progress reports,
- Variation requests and variation orders arising, and
- Interim valuation and certificates.

ii. Preliminary discussions between BMPIU and beneficiary ministries/parastatals;

iii. Preparation of the draft report;

iv. Transmission of draft report;

v. Organisation of 'right of reply' meetings which aims at clarifying issues relating to denial of certification;

vi. Final report; and

vii. Granting or denying due process certification.

BMPIU states the eight processes of public contract procurement to be adopted in contractor selection by beneficiary ministries/parastatals as follows:

i. Project planning;

ii. Advertisement for award of contracts;

iii. Prequalification of contractors;

iv. Short-listing;

v. Tender action;

vi. Determination of the winning bid;

vii. Award of contracts; and

viii. Project execution.

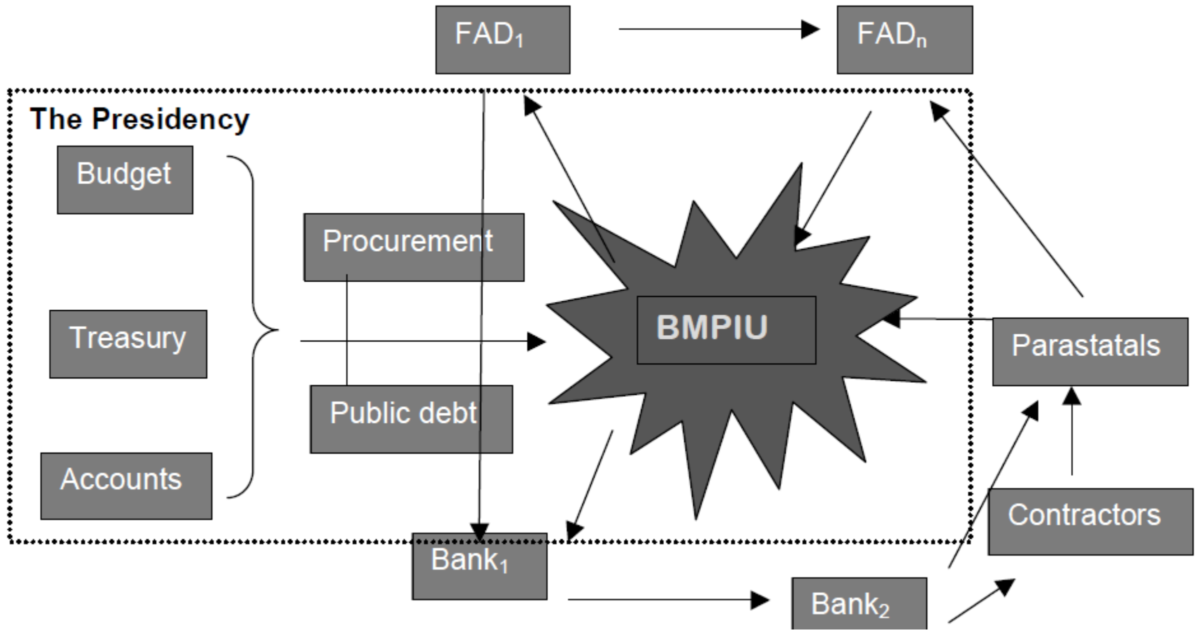


Figure 5.1: Organisational mechanism of BMPIU (Alfred, 2008)

In recent times, the Director-General of the Bureau for Public Procurement (BPP), Engr. Emeka Ezeh stipulated that the BMPIU strategy has saved the country more than $ 590 million in less than two years (Vanguard, 2010). Rebuilding the average Nigerian's confidence in the government's conduct of public and financial activities has also been encouraged (Ocheni and Nwankwo, 2012: 98). The BMPIU strategy improved project activities in the construction industry through different government ministries by representing the Federal government as a financier, a supplier or a client in project execution. These government ministries may include the Federal Ministry of Works and Housing (FMW&H), State Ministries of Works in various states, Ministry of Environment (MOE), Ministry of Water Resources (MOWR), Ministry of Lands, Survey and Urban Planning (MLSUP), Federal Environmental Protection Agency (FEPA), Education Trust Fund (ETF) and Ministry of Health (MOH). The building and civil engineering contractors in Nigeria are classified and registered by the FMW&H based on qualifications, capability and financial strength, ranging from classes A to D but the Public Procurement Act 2007 has re-categorised these classes from A to C.

5.6 Impact of the Nigerian construction industry on the labour market

Nigeria's construction industry has witnessed a high level of brain-drain from mass emigration of technical skilled personnel from the country to other countries (Arowojolu-Alagwe *et al.*, 2013: 86). This is in line with the study conducted by Gedamu (2002) reporting that over 200,000 Nigerian academics are now employed in the USA alone. The global demand for construction professionals has created a negative gap in the Nigerian construction industry. This has also resulted in a high percentage of economic migrants from the neighbouring countries (for example, Ghana, Togo, Cameroun, and Benin Republic) into the industry. Growth and employment in states (2010) reveals that about 30 percent of the construction workforce in Nigeria comprises migrated-skilled employees. Regardless of the mass academic emigration, the construction industry has observed an increase in both the size and educational level of the labour force. The enrolment of large numbers of college-educated employees and immigrants has contributed immensely to the industry's growth (Arowojolu-Alagwe, 2013: 89).

In 1980, the Nigerian construction industry contributed about 70 percent of GDP thereby making the industry one of the largest construction markets in Africa (Planning Committee on the National Construction Policy, 1989). The industry has experienced several improvements and lapses at different eras in Nigeria, for example, the pro-oil boom, the period of stabilization and structural adjustment, the period of guided deregulation and the full deregulation and private-public partnership period. The percentage of the workforce in the Nigerian construction industry has grown from 0.55 percent in 2006 to 0.61 percent in 2010 (The National Bureau of Statistics, 2012). The industry's contributions to economic growth vary from 'procurement of goods and services' to 'provision of buildings and other infrastructure'. Several existing factors have propelled growth in the Nigerian construction industry, which are:

i. General economic growth and increased economic activity;
ii. Rapid urbanization;
iii. Demographics and housing demand; and
iv. Increasing popularity of private-public partnerships.

Despite the low contribution of building and construction to economic activities, the industry remains crucial for job creation. This is probably because of the labour-intensive nature of the construction industry employing labour directly on the demand side and indirectly on the supplier's side. A high percentage of the construction workforce is employed on an informal basis which offers low job security and poor working conditions in addition to the unnecessary exposure to health and safety hazards (Okorie, 2011: 20).

5.7 The current practices of incentive mechanisms in construction projects in the Nigerian construction sector

Nigeria's government has also introduced a number of incentive programs to promote investment, employment, product mix and various other aspects of industry; for example, fiscal measures on taxation, effective protection of local industries with import tariffs, export promotion of Nigerian-made products, and foreign currency for international trade. The use of incentive schemes is fast becoming an increasingly popular technique in attracting, motivating, developing and retaining employees in organisations in Nigeria. The type of incentive schemes used in the Nigerian construction industry varies, ranging from financial, semi-financial to non-financial incentives. The study conducted by Kolawole and Boison (1999: 224) reveals that the bonus scheme under financial incentives as the most common incentive package adopted in the Nigerian construction industry.

The recent study conducted by Abdulsalam *et al.* (2012: 1200) further discloses that the implementation of non-financial incentives is more preferable to large construction companies than medium and small construction firms in Nigeria. Regardless of the use of a wide range of incentives, inefficient motivation of the workforce is listed as a major stumbling block to the improvement of labour performance in the Nigerian construction industry (Fagbenle *et al*., 2011: 256). The study conducted by Ude and Coker (2012: 38) reveals that there is a significant correlation between employee motivation and productivity in Nigeria. The disparity in productivity among foreign and indigenous construction firms is attributed to the non-implementation of incentive schemes (Ude and Coker, 2012: 38). It is evident that employees' needs have failed to align with employers' expectations in construction projects (Kolawole and Boison, 1999: 228).

5.8 Chapter summary

This chapter explores a review of country contexts, economic and business environments, contractual procedures and the influence of the construction industry on the labour market. It further reviewed the challenges confronting the use of incentives in Nigeria and how these incentives have failed to align clients' expectations with contractors' objectives.

The next chapter describes the theoretical and conceptual framework of this study thereby highlighting the intent and expectations for this research. It discusses the nature of the variables for this research as well as the underlying relationships within the variables.

CHAPTER SIX

THEORETICAL DEVELOPMENT AND CONCEPTUAL FRAMEWORK

6.1 Introduction

There was a need to lay a foundation for the theoretical and conceptual framework for this study. This helped to stimulate the research and the extension of knowledge by providing both direction and purpose. The earlier definition of theoretical framework by Bogdan and Biklen (1998) stipulates that it is "a loose collection of logically related assumptions, concepts or propositions that triggers thinking and research". A theoretical framework can also be referred to as the structure which holds or supports the research theory; it guides the research, allows for prediction and an increased understanding of boundary criteria for the discipline (Bak, 2004:17; Palm, 2007:27). In this regard, the theoretical framework for this study presents the theory that explains why the problems highlighted in the summary of literature review exist and identifies the body of knowledge in which the theory can be located. It also assists in the development of a conceptual model for this study showing how one makes logical sense of the relationships existing among the identified variables or factors which are significant to the problem under investigation.

The next section (6.2) presents the position of the theoretical framework for this study; it discusses the body of knowledge in which the research problem is located. It further gives a detailed explanation to the surrounding constructs for better understanding of the framework and how they relate to research objectives. Section 6.3 shows the conceptual framework for this study by exploring the impact of incentive mechanisms on project improvement; it also establishes the links and relationships between the independent and dependent variables. Finally, section 6.4 presents the summary of theoretical development and conceptual framework for this study.

6.2 The position of the theoretical framework

The theory of incentives emerged from the demand for a better way to motivate employees so as to achieve project objectives. The overall aim for the evaluation of incentive mechanisms is to identify motivational drivers which can bridge the gap between contractors' objectives and clients' expectations. The use of incentive schemes has led to the creation of an environment that fosters teamwork and collective initiatives to reach common goals or objectives. Motivation can be used to inspire, encourage and stimulate employees or project teams to achieve superior accomplishments. Employees, being human beings are motivated by different stimuli and they act in different ways. This study focuses on theories of motivation which emphasise that the level of motivation an employee and/or a team applies to a project can affect many aspects of project outcomes.

This area of research is part of the existing body of knowledge of workforce motivation and performance improvement in the construction context. The theoretical framework for this research lies at intermediate of motivation theories and workforce behaviour/project performance. The underlying objective is project performance and other issues relating to the two fields of research which are motivation theories and workforce behaviour. Figure 5.1 illustrates the position of the theoretical framework for this study.

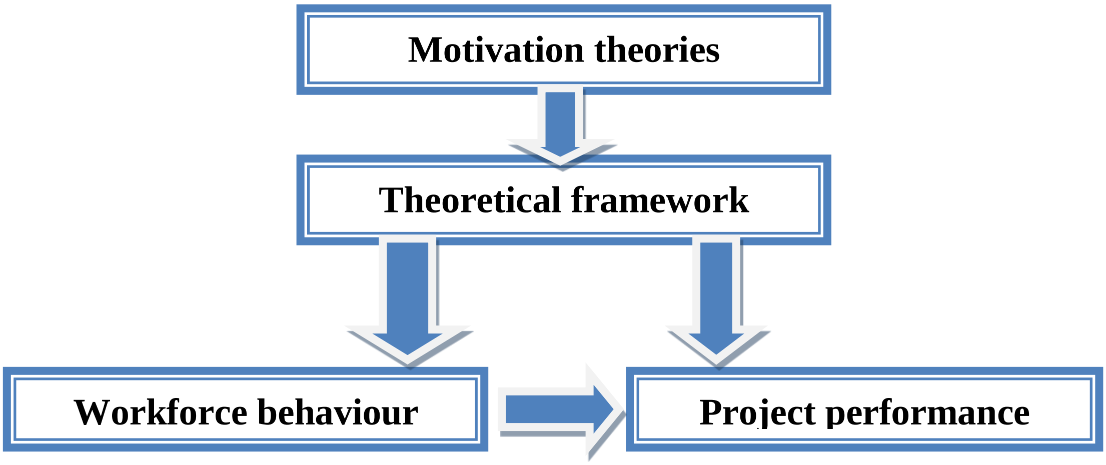


Figure 6.1: Position of the theoretical framework

6.2.1 Motivation theories

Employers have sought various ways to motivate their employees for increased performance. The basic understanding of what motivates people was embedded in "the whip and the carrot" approach. In the 1950's, after the Second World War, theories of motivation became visible through three notable founding theories: a) Abraham Maslow's hierarchy of needs; b) Douglas McGregor's X and Y theory; and c) Fredrick Herzberg's two factor theory. Over the years, these founding theories have been criticised by many academics. Since the beginning of the 20th century, management scientists, sociologists and psychologists have studied means of motivating human behaviour from different perspectives with several management theories for motivation being developed. These theories are referred to as contemporary theories (Parkin *et al.*, 2010; Seiler *et al.*, 2012). Most of these contemporary motivation theories are interlinked to the early founding theories and in some cases add or expand on the early founding theories. The literature review on motivation theories reveals the following theories:

6.2.1.1 Content theories

Content theories focus on the individual's needs and explain why it is important to consider the individual needs of employees with regard to work motivation (Seiler *et al.,* 2012). These theories try to describe why people are motivated in different ways and at different work settings. Needs theories and job content theories are derived from content theories. One of the earliest and best known content theories is Maslow's hierarchy of needs theory which was developed by psychologist, Abraham Maslow in 1943. It is based on a satisfaction-progression process where an individual satisfies a lower-level need then the next higher need in the hierarchy becomes the primary motivator. Maslow's hierarchy of needs theory involves physiological, safety, belonging, self-esteem and self-actualization. Although Maslow's needs hierarchy is one of the best known organisational behaviour theories, it is too rigid to explain the dynamic and unstable characteristics of employee needs. Nevertheless, it provides an important introduction to employee needs and it has also laid the foundation for Alderfer's ERG theory. In 1969, Clayton P. Alderfer simplified Maslow's theory by categorising the hierarchy of needs into three categories: a) existence, b) relatedness, and c) growth needs. ERG theory is based on the frustration-regression process and proposes that if an individual is continually frustrated in trying to satisfy a need in the hierarchy then the higher need will be required.

David McClelland (1961) in his book named "The achieving society" proposes a context for understanding the needs of people which is significant in understanding human motivation and behaviour. It is subdivided into three categories: a) the need for achievement, b) the need for affiliation and c) the need for power. Generally, need theories hold that an individual is motivated to do something if he or she comes across a certain need that may be accomplished directly or indirectly by performing the assigned work (Maslow, 1954; McClelland, 1965; Alderfer, 1972). The job content theory maintains that aspects related to job content can satisfy and motivate people to work (Hackman and Oldham, 1975). Herzeberg (1966) further explains job content theory by proposing a two-factor motivation theory, in a close link with Maslow's theory, as motivation-hygiene. Motivators/satisfiers are used to fulfill an individual's needs of meaning and personal growth. These may include achievement, recognition, work itself, responsibility, advancement and growth. Hygiene factors might create dissatisfaction if they are mishandled; they include company policy and administration, supervision, relationship with supervisor, working conditions, personal life, salary, relationship with subordinates, status, and security.

Douglas McGregor's theory X and theory Y integrated motivation with management philosophies, from scientific management with its reliance on extrinsic motivators, to new-wave management with emphasis on intrinsic motivational factors (Parkin *et al.*, 2009: 106). Theory X illustrates a pessimistic view of employees' nature and behaviour at work as: indolent, lacking ambition, disliking responsibility, self-centered, indifferent to organisational needs, resistant to change and gullible (McGregor, 1960). This theory is drawn from the scientific management school of thought where management's task is to redirect human energy for organisational purposes through extrinsic motivators, for example, close supervision, coercion and threat and tight controls over behaviour. Theory Y presents an optimistic view of employees' nature and behaviour at work. This theory supports the idea that a worker's behaviour within an organisational setting is a consequence of management philosophy and practice and it also highlights the potential of managing workers' human nature (McGregor, 1970).

Theory Y supposes that intrinsic motivators are used as a means of promoting self-control and self-direction for employees to work towards achieving project goals rather than controlling their work activities. Theory Z emerged from a combination of theories X and Y and it focuses on the organisation rather than the individual worker using the corporate culture as a means of control (Parkin *et al.*, 2009: 106). It offers the notion of a hybrid management style which is a combination of American and Japanese management styles. Theory Z assumes that employees who are disciplined can be trusted to do their job and desire to build happy and intimate working relationship with their subordinates, peers and superiors. Theory Z imposes a strong organisational culture that values a good working environment, where family, cultures, tradition, and social institutions are regarded as equally important as the work itself, with the potential to promote high productivity, high employee morale and satisfaction in any organisation (McAuley *et al.*, 2006).

6.2.1.2 Process or cognitive theories

Process or cognitive theories define motivation in terms of a rational cognitive process which focuses on behaviour as a result of a conscious decision-making process (Seiler *et al.*, 2012). These theories try to understand how and why people are motivated. The concept of these theories is supported by Adam's equity theory, Vroom's expectancy theory, Locke's goal setting theory and Skinner's reinforcement theory. Equity theory suggests that if the individual perceives that rewards received are equitable (that is, fair or just in comparison with those by others in similar positions in or outside the organisation), then the individual feels satisfied (Adams, 1963). Equity theory explores an individual's motivation to work, based on the fairness or sense of equality he or she detects in the relationship and also the amount of effort compared to the amount of benefits received (Rosen, 2011: 1).

Vroom's expectancy theory is a cognitive process theory of motivation that is based on the idea that people believe that there is a correlation among the effort they put in at work, the performance they achieve from their effort and the rewards they receive for their effort/performance. Vroom's expectancy theory explains why people want specific outcomes for their behaviours and inputs which may be thought of as rewards or consequences for performance they achieve, or the outcomes they receive (Nelson and Quick, 2003). This expectancy theory was first developed by Victor Vroom in 1964 and later expanded and refined by Porter and Lawler (1968). Expectancy theory is based on four assumptions (Vroom, 1964). The first assumption is that people join organisations with expectations for their needs, motivations and past experiences. Their expectations influence how these individuals react in any organisation. The second assumption emphasises that an individual's behaviour is a result of conscious choices made. The third assumption stipulates that people desire different things from their organisations, such as a good salary, job security, advancement and challenge. The fourth assumption states that people will choose among alternatives in order to optimise outcomes for themselves. These four assumptions are centered on three key elements, which are expectancy, instrumentality and valence.

In 1960, Edwin Locke introduced the goal setting theory of motivation. This theory states that goal setting is essentially linked to task performance and the specific and challenging goals, along with appropriate feedback, will contribute to high and more improved task performance. Basically, Locke's theory states that if an individual sets goals, he/she will be motivated to achieve those goals by virtue of having set them. There are several elements to consider for effective goal setting, namely that the goals must be clear, challenging, and attainable, with an effective feedback process. Reinforcement theory assumes that people's behaviour is influenced by the consequences of their actions. This is based primarily on Thorndike's law of effect, which posits that behaviour that resulted in pleasurable outcomes is most likely to be repeated (Skinner, 1969; Steer and Porter, 1991: 10-12).

6.2.2 Workforce behaviour

Extensive literature review has been done on workforce behaviour and its variables (see chapter three, section 3.3). The literature review focuses on past studies in relation to workforce behaviour in project implementation. The theoretical aspect comprises the study of organisational behaviour in social science and related disciplines. The study of organisation behaviour examines 'theoretically at the micro, human aspects of business organisation but contributes significantly to the applied management fields of personnel/human resources, business policy/strategy and organisational development/change' (Michie, 2013:1169). There are basically three theoretical frameworks in organisational behaviour which are cognitive framework, behaviouristic framework and social learning framework.

Cognitive framework emphasises 'the positive and freewill aspects of human behaviour' (Rao, 2011). This framework is based on the concept of expectancy, demand and intention where any individual sets or thinks about a goal, having the knowledge of the required behaviour to achieve such goal. It is applied in analysing perception, personality, motivation, decision making of human in the organisation. Behaviouristic framework focuses on observable behaviour and the interaction between the individual and the environment (Michie, 2013: 1169). This emphasises that an individual can exhibit different behaviours as product of environmental consequences. Social learning framework derives its assumptions from cognitive and behaviouristic frameworks which explain that the individual and the environment are interdependence of one another but they do not function as independent units rather in conjunction with the behaviour to determine the human behaviour (Michie, 2013: 1169).

6.2.3 Project performance

A project is 'a temporary endeavour undertaken to create a unique product or service and the process of achieving a successful project can be referred to as project management' (Comninos and Frigenti, 2006: 1). Project management is a systematic approach for planning and guiding project processes from start to finish following the process of initiating, planning, executing, controlling and closing (Rouse, 2008). Most construction projects are often complex and risky where multiple complex decisions are taken during a project life cycle based on many constraints, for example, shorter deadlines, tighter budgets, reduced human resources, and general uncertainty in the organisation. Proper management of construction projects is essential for ensuring that the planned improvements in quality, cost, and time are achieved in order to benchmark the achieved performance with that of similar projects and to identify potential for doing better (OGC, 2007: 4).

Project activities cannot be effectively shaped into a 'one-size-fits-all' or even 'one-size-fits-most' approach due to the nature of complexities involved. The involvement of different projects, environments, business drivers, acceptance criteria, technologies, timelines, legal implications and available skills and tools simply make any notion of a common universal approach unrealistic. These activities occur at different times and they require the development of distinct technical skills and management strategies to implement them. Phillips (2003: 354) emphasises that primary challenges of managing a project so as to achieve the stipulated goals are centered on four constraints namely: scope, time, cost and quality.

The Project Management Institute (2004) established nine knowledge areas in managing a project, which are integration management, scope management, time management, cost management, quality management, human resource management, communications management, risk management, and procurement management. These areas do not represent any particular approach; rather they can form a basis to build an approach to suit a particular project requirement. According to Atkinson *et al*. (1997: 28), successful construction project performance is achieved when project stakeholders meet their requirements whether individually or collectively. There is often a diversity of views among stakeholders on the evaluation criteria since the contracting parties often have different motives and it is essential to consider their motives in the project design.

Project success can be achieved by addressing and setting apart the three orientation criteria existing in the project life cycle which are procurement, process and result (Takim and Akintoye, 2002: 546). Kandelousi and Abdollahi (2011: 1827) support this opinion by emphasising that the proper understanding of project requirements right from the start will promote the selection of a successful project process which will provide a right direction for project managers and their team members. Perception of a successful project might vary based on the management's perspective which may differ from the key performance indicators (KPIs) (Cox *et al.*, 2003: 144). Most performance measures are dominated by conventional measures of time, cost and quality (Walker, 1995: 264). Low and Chaun (2006: 26) advocated that the measure of project success is not restricted to the traditional performance indicators. In recent times, other indicators have been developed to incorporate the measurement of other aspects of project performance such as health/safety, relationship between stakeholders and flexibility (Koelmans, 2004:231).

The demand to meet high performance levels in project delivery has harnessed the full power of the project management concept by focusing on more appropriate ways to achieve project objectives. The management processes used in the past years for project implementation are no longer effective. This has shifted from 'managing projects through successful completion' to 'integrating organisation strategy with project requirements' (Comninos and Frigenti, 2006). Organisations have sought for various ways to integrate their strategies with project requirements, using diverse tools and techniques. Incentive mechanisms are regarded as tools or techniques used in project management to achieve project requirements.

6.3 Conceptual framework

A concept is an image or symbolic representation of an abstract idea. The conceptual framework for this study is required to explore the impact of incentive mechanisms on project improvement. This framework is derived from the related concepts to guide the empirical study associated with this research by establishing the links and relationships between the independent and dependent variables. Jabareen (2009: 51) defines a conceptual framework as a 'network of interrelated concepts that together provide a comprehensive understanding of a phenomenon or phenomena'. The main focus is to show the existing relationships between different constructs that this study investigated. Figure 5.2 presents the conceptual framework for this study, illustrating the related variables and constructs.

The two aspects of conceptual framework for this study are project performance improvement and project performance assessment. The project performance improvement process involves the integration of incentive systems and performance metrics to develop a paradigm for an incentive framework. This paradigm is designed to achieve satisfaction among project participants through the use of incentive schemes, for example, financial, semi-financial and non-financial incentives. The paradigm is also focused on propelling motivational drivers, project objectives and satisfaction to influence the behaviour and motivation of individuals, groups and organisations. Performance assessment involves the direct impact of project performance improvement mechanisms on the satisfactory parameters influencing project participants, for example, employers, consultants, contractors and sub-contractors. Their impact may either lead to "rewards and payment" or "defaults and penalties".

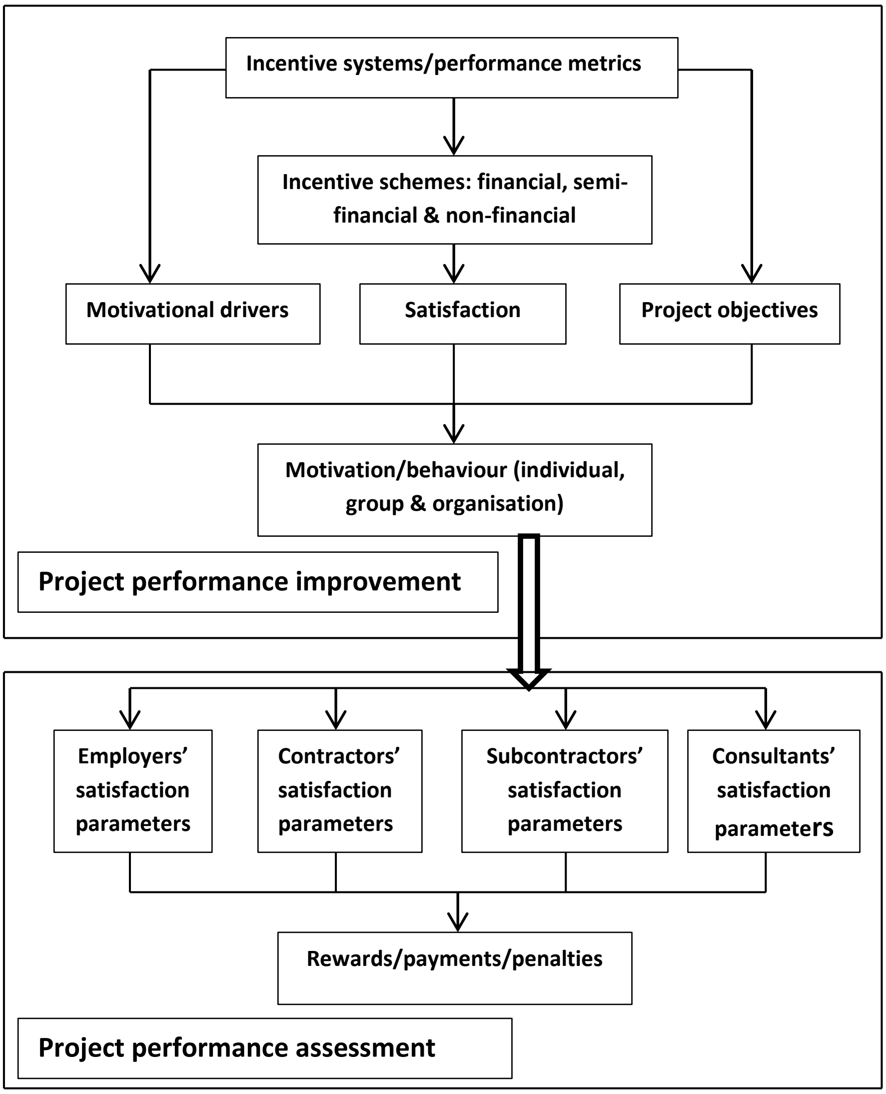


Figure 6.2: Conceptual framework for this study

6.4 Chapter summary

As previously noted, the theoretical framework for this research lies at the intermediate of motivation theories and workforce behaviour/project performance. The underlying objective is project performance and other issues relating to the two fields of research which are motivation theories and workforce behaviour. This theoretical framework plays an important role in understanding the concept of incentives. Theories of motivation are focused on how to effectively motivate employees and organisations to achieve project goals or clients' objectives. Founding theories of motivation have been criticised by academics, giving rise to the development of contemporary theories to succeed the founding theories but most of them are still interlinked to the early founding theories.

For the purpose of this study, the contemporary theories are classified into: (a) content theories and (b) process/cognitive theories. Content theories are further divided into need theories and job content theories. Need theories focus on the individual's needs and they explain why it is important to consider the individual's needs with regards to work motivation but job content theories retain that all aspects related to job content can satisfy and motivate people to work better. Process or cognitive theories try to explain how and why people are motivated using a rational cognitive process which focuses on behaviour as a result of the conscious decision making process. The theoretical aspect comprises the study of organisational behaviour in social science and related disciplines. There are basically three theoretical frameworks in organisational behaviour which are cognitive framework, behaviouristic framework and social learning framework (see section 6.2 for details).

The project management concept has shifted from "managing projects through completion" to "more appropriate way to achieve project success by integrating organisation strategy with project requirements". Incentive mechanisms can be used as tools or techniques to achieve this purpose. The elements of the theoretical framework under investigation have been applied in different disciplines but they are not well-researched in context of incentive mechanisms in construction projects. The conceptual framework for this study identified the parameters under investigation and relationships that exist among them. This creates an insight for the logical reasoning behind this study which aids in developing a best-suited framework for incentive mechanisms in construction projects.

The next chapter introduces the research methodology for this thesis and further elaborates the research approaches adopted for data collection and analysis.

CHAPTER SEVEN

RESEARCH METHODOLOGY

7.1 Introduction

This chapter discusses the philosophical and methodological reasoning that underlie the context for this study. The scientific philosophy behind any research should have a logical effect on all stages of the research process which addresses the key issues under investigation. Section 7.2 highlights the research problem, aim and objectives of this study while section 7.3 explains the philosophical positions underpinning this research by examining different assumptions, paradigms and reasoning for research, this provides a guide in selecting a research approach for the study in section 7.4. The research approach and design adopted for this research were discussed followed a detailed explanation of research methods and techniques that fit the research design. It provides a detailed explanation of statistical analysis techniques as well as data validity/reliability checks used for this data analysis. Lastly, this chapter further describes the research modeling process and a brief overview of the proposed framework for incentive mechanisms.

7.2 Research problem, aim and objectives

The research problem for this study was discussed critically in section 1.3, the sub-problems were stated in section 1.4 and each of these sub-problems was linked to a hypothesis in section 1.5. As previously noted in chapter one, the major aim of this research is to evaluate the use of incentive mechanisms in improving project performance in construction projects in South Africa and Nigeria and the research objectives are used to achieve this aim (see section 1.6). The research plan adopted for this study is illustrated in figure 7.1.

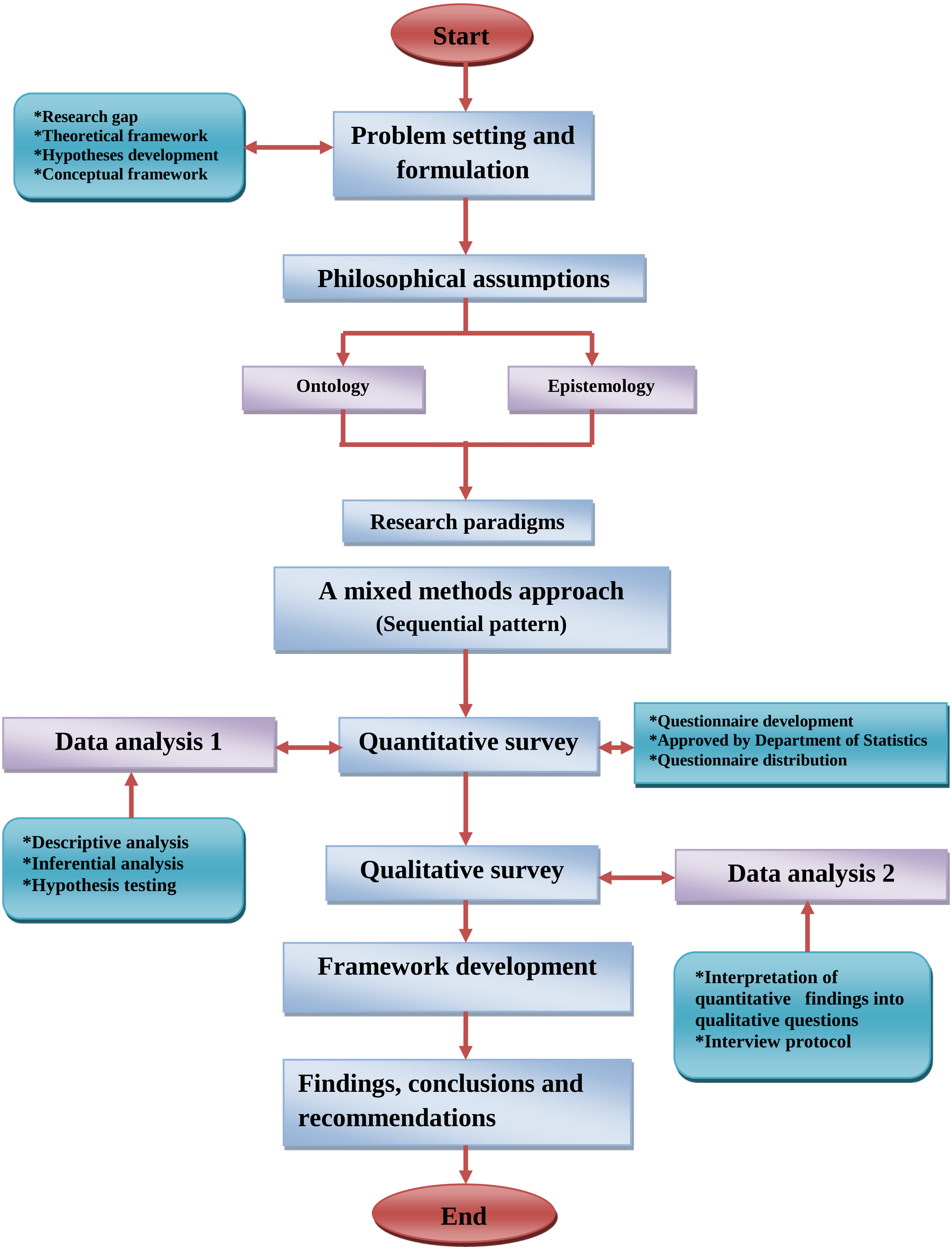


Figure 7.1: Research plan

7.3 Philosophy underpinning this study

The research methodology cannot be referred to as a method applied to research but 'the principles and procedures of logical processes adopted in a scientific investigation' (Fellows and Liu, 1997). Philosophical foundations in a research methodology provide a guide to the selection of research methods used in gathering and analysing the research data. The process of selecting a research approach involves making decisions on plans and procedures to adopt for a particular research. These decisions are based on philosophical assumptions, inquiry of paradigms and specific research methods of data collection, analysis and interpretation (Creswell, 2014: 3). Core assumptions are based on philosophical perspectives revolve around the nature of society and science.

Research in construction economics and management has a strong affiliation with the study of social science and the environment. Therefore the use of assumptions and paradigms are considered appropriate for this research. There are basically four philosophical assumptions which influence the choice of a research approach which are ontology, epistemology, axiology and methodological (Creswell, 2013:21). This research is restricted to the two major schools of thought that define ways of thinking about research philosophy, namely: a) ontological and b) epistemological. Thomas (2004) advocates that the ontological and epistemological philosophical assumptions provide a guide for any research to avoid making unsuitable and unsubstantiated claims for its results, overestimating what research can achieve by way of truth, certainty and universality.

Ontology involves 'the study of being that is the nature of existence' (Gray, 2009: 17). Similarly, Creswell (2014: 20) defines ontology as the nature of reality and its characteristics. The ontology assumption revolves around the understanding of what is the assumption of reality under investigation in the research. The assumption about the nature of the world or the belief on how social reality should be viewed influences the choice and design of a research. Tashakkori and Teddlie (2010) classify ontological views in the social and behavioural research as: a) mechanistic and b) social. Mechanistic ontology approaches the world in deterministic terms by focusing on the causes and effects of an action while social ontology sees the world as a world of meaning and interpretation by identifying the intentions and reasons behind an action. To the researcher, these assumptions underpin the collection of data to address the research problem while investigating the operational and sociological constructs in relation to incentive mechanisms.

Epistemology on the other hand involves the philosophical backdrop for deciding whether or not knowledge is justifiable and acceptable (Gray, 2009: 17). It constitutes acceptable knowledge in a field of study (Saunders *et al.*, 2009) and the general set of assumptions about the best ways of inquiry into the nature of the world (Easterby-Smith *et al.*, 2008). Epistemology describes what the researcher knows about the reality, and assumptions about how knowledge should be acquired and accepted.

Paradigm thinking creates a dominant way to understand research methodology by providing valuable knowledge and insight on social life (Kelemen and Rumen, 2008: 21). It also provides a frame of reference for organising research observations and reasoning (Babbie, 2007: 31). Neuman (2012: 46) defines a paradigm as an integrated set of assumptions which are models for doing good research and techniques for gathering and analysing data. The paradigm gives an explanation as to why a researcher assumed that a particular set of research designs can address the purpose of a research. The use of paradigms is based on two different types of philosophical assumptions which were previously noted as ontology and epistemology. Ontology interprets the nature of reality while epistemological studies focus on the nature of science. Falqi (2011) identifies three types of paradigms in construction management research as: a) positivism, b) interpretivism and c) combined or pragmatic approach. Creswell (2014) further identifies the four research paradigms or worldviews as: a) post positivism, b) constructivism, c) transformative, and d) pragmatism (see table 6.1 for details).

Table 7.1: Four research paradigms or worldviews

Post positivism	Constructivism
• Determination • Reductionism • Empirical observation and measurement • Theory verification	• Understanding • Multiple participant meanings • Theory generation
Transformative	**Pragmatism**
• Political • Power and justice oriented • Collaborative • Change-oriented	• Consequences of actions • Problem-centered • Pluralist • Real-world practice oriented

Source: Creswell (2014: 6)

7.4 The selection of a research approach

Research is a combination of techniques which can be used to investigate a certain condition (Easterby-Smith *et al.*, 2008: 31). The philosophy behind a research involves the development of new knowledge. The application of a research study can be classified as either pure or applied where pure research refers to the development of new knowledge focused on contributing to the existing body of knowledge while applied research is used to tackle challenges contributing to knowledge applications with the contribution to knowledge as a secondary purpose (Fellows and Liu, 2003: 8). According to Creswell (2009), the choice of a research philosophy depends on the nature of the research problem and objectives of the study. For the purpose of this study, ontology and epistemology assumptions are used for the research process. These assumptions allow for the causes and effects of the research problem to be identified and also the intentions and reasons behind it. It enables the operational and sociological constructs in relation to incentive mechanisms to be explored.

Paradigms play important roles in understanding the nature of science and social behaviour (Kuhn, 1970; Babbie, 2007: 33). Any personal philosophy or belief held by a researcher will influence the research process which may be qualitative, quantitative or mixed methods. The research espouses mixed methods for data collection based on realist and pragmatist philosophies. With the need for a paradigm shift, this research deviates from 'mere problem solving' to 'the development of a framework' for incentive systems in the construction industry. De Vos *et al.* (2011: 46, citing Grinnell, 1993) define professional research as a scientific inquiry of a professional problem that provides an answer contributing to an increase in the body of generalised knowledge for professional concerns. As noted, the research topic is within the built environment discipline comprising of highly complex, technical and social systems centered in natural and social sciences. Paradigms or worldviews are combined in a complementary manner to reflect both the nature of science and social behaviour.

Positivism is considered for predetermined and highly structured data techniques and for interpretive philosophy. The use of positivism allows for both subjective and socially constructed meanings to be expressed in order to establish the truth and in-depth understanding of the subject (Saunders *et al*. 2012: 162). This study adopts post positivism and constructivism paradigms for the research. Post positivism has 'elements of being logical, empirical, cause-and-effect-oriented and deterministic-based on priori theories' (Creswell, 2013: 24). The use of post positivism approach aids to obtain multiple perspectives of respondents through the use of a questionnaire for data collection. Constructivism involves an investigation into a peculiar context in order to understand the historical and cultural settings of respondents (Creswell, 2013: 24). In constructivism, a theory is constructed to forge discussions with respondents thereby enabling researchers to make meaning of interpretations based on their own experiences and backgrounds (Creswell, 2013). Constructivism paradigm was used to generate case study questions from the questionnaire survey; this allowed for discussions with the case study interviewees thereby creating a proper understanding of organisational settings and culture. This also aids to facilitate a better interpretation of the research findings based on respondents' own experiences and backgrounds.

7.5 Research reasoning

Good research is logical, when it is directed by the rules of logical reasoning and process (Kothari, 2004: 20). Reasoning plays an important role in drawing conclusions or inferences for data analysis in research. Proper understanding of the reasoning behind this research provides a guide on how to analyse the research data in order to draw logical conclusions based on the existing body of knowledge in the literature and research findings.

There are basically two types of research logic: a) the deductive and b) the inductive research. Inductive research is defined as 'research in which theory is developed from the observation of an empirical reality' (Welman *et al*., 2005: 34). Inductive reasoning allows for observations from one or more cases, hypotheses might be formulated to interpret these observations and then generalised based on the conclusions and theories drawn. The research conducted using inductive reasoning deviates from the world of measurement (data) to the world of ideas (theory). In inductive reasoning, a new knowledge can be acquired through concepts and theories formulated from past experiences (Gill and Johnson, 2002). Deductive research involves the use of conceptual and theoretical structure to make predictions based on empirical observations (Welman *et al*., 2005: 28). This simply means moving from the general to the specific which allows for a specific conclusion to be made through generalisation. The deductive reasoning is usually adopted in hypothesis testing and it can be referred to as a 'top-down' approach. The logic behind deductive reasoning involves the use of a scientific theory to clarify the law relating to a certain field.

On the other hand, Dubois and Gadde (2002) developed what is described as abductive logic also termed systematic combining. It is important for a research process to assess old theories and develop new ones in order for better explanation through empirical investigation. Plutynski (2011: 3) supported the logic by emphasising that it involves the study of facts and devising a theory to explain these facts. The nature of this study encourages the use of abductive logic for research reasoning because it is neither entirely deductive nor entirely inductive but in between. This enables hypotheses to be deducted from the literature review, subject to empirical testing to get results and develop a framework to interpret the results.

7.6 Research design

Kirshenblatt-Gimblett (2006) describes a research design as 'the overall strategy that you choose to integrate different components of the study in a coherent and logical way in order to address the research problem. This can also be regarded as the blueprint for data collection, measurement and analysis'. Elements of a research design are considered to be the logical structure of the inquiry, purpose of the study, the type of investigation, the sampling method to be used, data collection method and the process of data analysis (De Vaus, 2001:9; Sekaran, 2003). The choice of research designs or methods are made based on the assumptions associated with the research and shaped by applying the inquiry of paradigms or worldviews (Creswell, 2007: 19). Research in the construction economics and management covers cognitive, affective and behavioural components which can be seen in both qualitative and quantitative research (Amaratunga *et al*., 2002: 324). As previously noted, research methodologies are classified into three major parts, namely: a) qualitative, b) quantitative and c) mixed methods.

Qualitative research is an approach which focuses on how to comprehend both social and cultural contexts of certain behavioural patterns and processes (Nieuwenhuis, 2007: 51). This research involves the study of people or situations and making observations based on their natural environment. This allows for the views and opinions of participants to be expressed through words and other symbols or metaphors and is gathered as textual data for analysis. Qualitative research is underpinned on three basic aspects which are conceptualisations, ontology and epistemology assumptions. (Nieuwenhuis, 2007: 71). Creswell (2014: 204) identifies five methods of using a qualitative strategy for inquiry, as follows: a) narrative; b) phenomenological; c) grounded; d) ethnography; e) case study.

Maree and Pietersen (2007) define quantitative research as a ‘process that is systematic and objective in its ways of using numerical data from only a selected subgroup of a universe to generalise the findings to the universe that is being studied’. Quantitative research consists of the collection of numeric data that can be quantified and examined through statistical testing to prove or disprove an alternate knowledge fact (Creswell, 2003: 153). There are three approaches to research design in quantitative research, namely: experimental, quasi-experimental and non-experimental research approaches (Welman *et al.*, 2005: 78**).**

A mixed methods approach is the combination of qualitative and quantitative methods for a comprehensive analysis of a specific research subject (Teddlie and Tashakkori, 2009: 7).

Ivankova *et al.* (2012: 269, citing Creswell, 2008) further defines mixed methods research as a 'procedure for collecting, analysing and mixing both quantitative and qualitative data at some stage of the research process within a single study to understand a research problem more completely'. The mixed methods approach uses both numeric and textual data for analysis operating within the pragmatic paradigm. The qualitative approach allows for the in-depth understanding of an individual's experiences through the inquiry process. Narrative inquiry and phenomenology inquiry study the individual's experience. Case study approach and ground theory explore processes, activities and events while ethnography enables us to learn about the broad culture sharing behaviour of individuals or groups (Creswell, 2014: 187). The quantitative approach involves the study of relationships between different variables and on how to generalise the results to a whole group.

In the mixed methods approach, the research design is based on concurrent and sequential methods of data collection. For the purpose of the study, an explanatory sequential approach of mixed methods research design was adopted to address the research questions starting with the collection and analysis of quantitative data and then followed up with the collection and analysis of qualitative data in order to provide a better interpretation for the study. The explanatory sequential approach is embedded in research paradigms of post positivist in phase 1 (quantitative data) and constructivist in phase 2 (qualitative data) which is designed to explain how the qualitative findings made possible to elaborate on or extend the quantitative results (Creswell and Clark, 2011).

As previously noted, the literature review reveals that there is little empirical study on the use of incentive mechanisms on motivation and performance in the context of construction projects but the operational and sociological constructs in relation to incentive mechanisms and project performance are practical terminologies used in project delivery in both countries. This implies that the project participants are familiar with the constructs surrounding the use of incentive mechanisms although the practice is still problematic. The pre-interviews conducted at the early stage of this study reveal that the majority of project stakeholders are not willing to explore and discuss incentive issues as it relates to construction projects because they are not familiar with the formal practice of incentive mechanisms; they commented that most incentives are usually given based on the discretion of managers. In order to achieve the objectives of this study, this thesis created a strong quantitative orientation by using important variables and quantitative instruments to measure the construct of primary interest.

7.7 The study area

The study plan involves target, accessible and sample populations. As previously noted, target population for this study comprises project participants in Gauteng, South Africa and Abuja, Nigeria. Gauteng is the smallest of the nine province of South Africa with the highest population of about 12.3million and the highest level of construction activities. It is also considered to be the economic center of the country, accounting for over 34.8 percent of the country's total GDP. Likewise, Abuja is the Federal capital territory of Nigeria and it consists of seven districts. Abuja was created in 1991 following the several drawbacks experienced by the former Federal capital, Lagos. These drawbacks included inadequate land for expansion, urban crises, lack of proper cosmopolitan orientation, lack of locational centrality and urban congestion (Danmole, 2004: 2). Since then, Abuja has the highest record of construction activities and most of the multinational companies have their headquarters in Abuja in construction associations and outfits.

Accessible population includes public and private sector clients, registered consultants and construction companies in the Gauteng province and the Abuja zone. For the selection of the accessible population, four major factors were considered which are relevance, flexibility, access and applicability. Based on flexibility and accessibility considerations, organisations and/or associations in the Gauteng province of South Africa and capital city of Abuja were selected as units of analysis. These organisations/associations are situated within the geographical regions of the researcher's home base and institution location. This facilitates appropriate managerial and logistic support and also the meaningful cooperation of the organisations/associations to be secured. In terms of relevance, these organisations/associations are familiar with the operational and sociological constructs in relation to incentive mechanisms. In relation to the applicability of this research and the extent to which the findings can be applied, the use of organisations/associations in this study enables facts to be gathered from different sources in order to draw reasonable conclusions.

7.8 Data collection

The process of data collection involved the use of several techniques to assess the perceptions of sampled units from the accessible population based on the study under investigation in order to address the research problem. Different methods of data collection have been identified from the literature (Corbetta, 2003; Fellows and Liu, 2008; Easterby-Smith *et al.*, 2008; Saunders *et al.*, 2009; Udofia, 2011). For the purpose of this study, a combination of questionnaire for field survey and interview for case studies were adopted. This is consistent with the paradigm view for this research which focuses on the use of an explanatory sequential approach of mixed methods research design for the collection of quantitative data first and then qualitative data. This section therefore outlines the population and sample units for this study as well as the sampling technique adopted to distribute copies of the questionnaire after determining the sample size. It also outlines the design of the questionnaire for the survey and how the questions were structured for the case study interviews.

78.1 Sample population

A sample denotes a subset of a larger population while population is the set of elements that is intended to make inferences (Blair *et al.*, 2014: 106). Therefore, a study population is referred to as the aggregation of elements from which a sample is actually selected. The selection of a sample is essential since it is impractical and uneconomical to involve all members of the study population in a research project (Welman *et al.*, 2005: 55). The sampling frame consists of all project participants drawn randomly from the accessible population and also from the selected sample group for case study interviews.

The purpose of the survey was to use the sample size to derive results which can be generalised for the whole population. The sample population of the survey for Gauteng South Africa is not limited to organisations but also construction employees who are categorised in at least one of these groups:

i. **Group A:** general contractor members of the South African Federation of Civil Engineering Contractors (SAFCEC), registered in the database of CIDB in the civil engineering category (grades 6 to 9);

ii. **Group B:** general contractors and employers who operate in the building and construction sector, registered in the database of Master Builders South Africa (MBSA);

iii. **Group C:** Consultants/advisors/designers such as consulting engineers, resident engineers, quantity surveyors and project and/or construction managers that are members of Consulting Engineers South Africa (CESA), Association of South African Quantity Surveyors (ASAQS) and South African Council for Project and Construction Management Professionals (SACPCMP); and

iv. **Group D:** Public sector clients such as Department of Public works including the Expanded Public Works Programme (EPWP).

The sample population of the survey for Abuja Nigeria is not limited to organisations but also construction employees who are categorised in at least one of these groups:

i. **Group A:** public sector clients such as Federal Ministry of Works and Housing (FMW&H), Abuja; and

ii. **Group B**: consultants/advisors/designers that are registered members of Council of Registered Builders of Nigeria (CORBON), Architects Registration Council of Nigeria (ARCON), Quantity Surveyors Registration Council of Nigeria (QSRCON) and Council of Registered Engineers of Nigeria (COREN).

iii. **Group C:** registered construction companies who operate in building and civil engineering sector (grades A to C with FMW&H).

7.8.2 Sampling technique

There are two major types of sampling techniques: (a) the random or probability sampling technique and (b) the non-probability sampling technique. Probability sampling refers to all forms of sampling in which the items sampled are selected according to some known laws of chance such that every item in the population has a known chance (equal or unequal) of being selected (Saunders *et al.*, 2009). Examples are simple random sampling, stratified random sampling, cluster sampling and systematic sampling. Non-probability sampling however, is non-random and involves sample methods that do not make use of chance in the selection of items (Udofia, 2011).

Examples include quota sampling, purposive or judgemental sampling, snowball, self-selection and convenience sampling.

The research adopts a probability sampling method based on principles of randomness and probability theory and also a purposive sampling technique for the selection. For quantitative data collection, the numerous and unclassified databases prompted the use of non-probability (purposive) sampling first to identify the sample population (sample frame) and second, the stratified probability (random) was adopted to select the respondents of sample size from the sample frame. The choice of stratified random sampling method over probability random sampling allows for comparison across strata where differential response rates may necessitate re-weighting (Welman *et al.*, 2005: 67). Maree and Pietersen (2007: 175) further state that the 'use of a stratified random sampling method will address the problem of non-homogeneous populations in the sense that it attempts to represent the population much better than what can be achieved with simple random sampling'. This enables large heterogeneous populations to be grouped into strata or blocks with each stratum or block classified to be homogeneous as possible (Eze *et al.*, 2005: 15). This sampling technique is used to capture the key population characteristics in the study areas which can be categorised as the accessible population.

According to Saunders *et al.* (2009), purposive sampling technique enables a researcher to use judgement in selecting cases that can best answer research questions and meet research objectives. A purposive sampling technique was used to collect qualitative data for analysis by selecting the case study interviewees based on their designations and work experience. The total number of eight interviewees (four from South Africa and four from

Nigeria) were selected for interviews representing eight case study organisations. The interviews were conducted using semi-structured questions derived from the results of the quantitative survey.

7.8.3 Sample size

Sample size represents the number of observations to be used as statistical probability. It is an important feature used in any empirical study to make inference about a population from a sample. Neuman (2006) emphasises that choosing a large sample size alone does not guarantee a representative sample. Saunders *et al.* (2009) stipulate that in choosing a sample size, there are three factors to be considered which are: a) the level of certainty that the characteristics of data collected will represent the characteristics of the total population; b) the margin of error that can be tolerated; c) the type of analysis to be used; and d) the size of the population. In order to identify the number of respondents required for the sample size, this study adopted the formula stipulated by Yamane (1967) to generate the sample size. This formula is stated as:

$$n = \frac{N}{1 + N\,(e)^2}$$

Where n = sample size, N = population size, e = level precision (0.05 at 95% confidence level).

Based on this formula, the sample sizes for the four groups using the sample frame were calculated for South Africa and for Nigeria, the sample frame representing the three groups were used to calculate the sample sizes. Table 6.2 and 6.3 present the sample frames which were selected using non-probability sampling technique and the calculated sample sizes using Yamane’s formula. This method enabled the actual number of respondents required for quantitative survey to be identified. The stratified random sampling technique was used to select respondents from the whole population (sample frame), this allowed for estimates to be made with equal accuracy.

Table 7.2: The sample size distribution for South Africa

Groups	**Sample frame**	**Sample size**
Group A	186	126
Group B	103	81
Group C	88	72
Group D	52	46
Total	**429**	**325**

Table 7.3: The sample size distribution for Nigeria

Groups	**Sample frame**	**Sample size**
Group A	95	76
Group B	188	127
Group C	205	135
Total	**488**	**338**

7.8.4 Questionnaire design

The use of questionnaires provides a broad spectrum for data collection creating an opportunity for different options to be used in collecting data for analysis. The questionnaire approach for this study enabled responses to be gathered in a standardised way thereby facilitating easy analysis, bias errors are drastically reduced. It is relatively faster and convenient to collect potential information from a large group of respondents. There are two types of questionnaire designed for this research. The first questionnaire design was targeted towards exploring the practices of incentive mechanisms in construction projects and also to derive the opinions, beliefs, attitudes, experiences and convictions of respondents based on the guided options (including operational and sociological constructs in relation to incentive mechanisms). This provides a platform to test the research hypotheses and also to achieve the aim and objectives of the study. The first questionnaire used for this study was designed from the literature review. The second questionnaire was designed as a semi-structured interview questions, these questions are derived from the analysed quantitative data. The semi-structured questions are designed to allow interviewees to freely express their personal opinions without prejudice.

a. Measures

The first questionnaire is classified into four parts. Part one (section A) deals with the demographic information of respondents. Part two assesses the performance evaluation of construction projects. This section evaluates the management attributes that contribute to the assessment of projects; evaluates project indicators/parameters based on their level of importance in project performance; impact of risk elements in projects; assesses the effect of organisational justice to motivate workforce towards improved work productivity; identifies factors influencing organisational performance; assesses the impact of performance variables on incentive payoffs; and identifies motivational drivers that contribute to employee motivation. It also provides a platform to derive data for the research hypothesis testing.

Part three deals with organisational behaviours and competency where practices and situations affecting organisational behaviour and competencies were evaluated. Part four relates to the incentive performance evaluation. This section assesses practices and situations that create economic benefits and challenges for incentive schemes. The impact of incentives on workforce motivation and payment strategies for performance compensation were examined. The respondents were asked to rank these measures using the 5-Likert scale of 1 (hardly) to 5 (absolutely), 1 (not important) to 5 (very important), 1 (not significant) to 5 (very significant), 1 (strongly disagree) to 5 (strongly agree), 1 (least motivating) to 5 (highly motivating), 1 (very low) to 5 (extremely high), 1 (no effect) to 5 (major effect), 1 (no challenge) to 5 (major challenge) and 1 (not efficient) to 5 (extremely efficient). It is important to indicate that the neutral response category was used in the 5-Likert scale.

The second questionnaire was designed using semi-structured questions, this allowed for the researcher to remain firmly in control of the interview process. The questions were structured from the quantitative data analysis focusing on in-depth examination of how incentive mechanisms are practiced and also assessing management attributes, risk allocation, organisational competencies and performance indicators in construction projects.

7.8.5 Questionnaire administration

After the design of the questionnaire and approval by the ethics committee, the questionnaire was sent to the Department of Statistics for further examination. A research consultant and a statistician were assigned to evaluate the questionnaire design, amendments were made based on their recommendations and re-submitted back to them. Upon approval by the Department of Statistics, the next stage was questionnaire administration. Easterby-Smith *et al.* (2008) identified four ways of administering questionnaires as: a) postal questionnaire survey, in which the questionnaires accompanied by self-addressed envelopes are mailed to anonymous respondents; b) structured interview in which an interviewer is present and his/her answers are recorded; c) web-based survey in which each respondent is sent a web address containing the online questionnaire, and asked to complete the survey online; and d) face-to-face administration, in which the questionnaires are administered personally by the researcher or his/her field assistants to respondents.

The study adopted web-based survey and face-to-face contact for questionnaire administration. The use of postal surveys seems unrealistic due to ongoing strike actions during the period of data collection in South Africa and poor delivery system in Nigeria. The researcher opted for face-to-face contact in questionnaire distribution initially in order to have a personal interaction with the respondents. Most of the respondents in South Africa insisted on responding through online survey media, the online survey link was then forwarded to them through their email addresses. The use of internet is gaining popularity in Nigeria; like other developing countries but face-to-face contact was adopted in questionnaire administration due to some limitations such as epileptic power supply and high charges by the internet providers. Three field assistants were mobilised in South Africa while eight field assistants were mobilised in Nigeria. It was not deemed necessary to train these field assistants because all of them were academic researchers in their various institutions. A copy of questionnaire is attached in appendix 1.

7.8.6 Interviews

As previously noted, the concept of incentive mechanisms is a field which most clients in both countries are not willing to explore although they use incentives in many ways. The study searched for ways to uncover stakeholders' opinions and experiences on the research topic. The use of sequential approach allows for a larger population to be studied and then the use of a smaller sample size to clarify their responses. The use of questionnaire administration did not allow for the researcher to interact deeply with the respondents therefore an interview process was used to gain more insight and understanding of the underlying principles of incentive mechanisms in the construction industry. The use of interview process provides an opportunity to learn and to have a clear understanding of the key aspects of incentives in construction practice which will create a positive contribution to the existing body of knowledge.

Generally, qualitative interviews are broadly divided into structured, semi-structured and unstructured interviews. The structured interview is the use of predetermined or identical set of questions to obtain data while the unstructured interview allows for an informal setting whereby there is no predetermined set of questions to work through (Corbetta, 2003; Saunders *et al.* 2009). Structured interview is rigid where the respondents are asked the same set of questions, in the same order and using the same words while unstructured interview is an open-ended interview where the respondents are allowed to talk freely about events, behaviours and beliefs in relation to the topic area. The study adopted semi-structured interview which lies at the extremes of both structured and unstructured interviews. This is to overcome the rigidity of structured interview and guide the respondents in order to achieve the research objectives.

Semi-structured questions provide a description of the interviewees' experience and real life situations based on the research problem. The use of this approach is to enable the interviewer to remain firmly in control of the interview situation. An interview guide was used for the semi-structured interviews to explore the practices of incentives, the role of stakeholders and the key issues relating to incentives and project performance. This allows the interviewer to uncover personal opinions relating to incentive issues, to clear up vague responses and also ask questions to clarify and elaborate on uncompleted responses. A copy of the interview guide for South Africa and Nigeria is attached in appendix 2.

7.9 Data analysis

The process of data analysis involves the coding of responses, cleaning, screening the data and the selection of an appropriate strategy for data analysis. This section provides a detailed explanation of how the collected data for this study was analysed. The sub-section 6.9.1

describes how quantitative data was treated while sub-section 6.9.2 gives an explanation of how qualitative data was analysed.

7.9.1 Quantitative data analysis

The first step adopted in this study for the collection of quantitative data was the coding of questionnaire. Wong (1999) defines the coding of questionnaire as the process of identifying, classifying and assigning a numeric or character symbol to data through either pre-coded or post-coded methods. Forcheh (2003) emphasises the need to use a well-coded questionnaire during the survey so as to avoid excess expense and time-wasting in data coding after the survey. In this study, the survey questionnaire was pre-coded during the questionnaire design in order to ensure that the variables can be analysed. After the data collection, cleaning and screening of the returned questionnaires was conducted to eliminate invalid responses. The valid responses were retained for data analysis.

Malhotra (1999) emphasises that in selecting the appropriate statistical data analysis tools factors such as: (a) the research objectives, (b) characteristics of data and (c) underlying properties of the statistical techniques should be considered. Statistical data analysis is generally used in social science and management research to establish the plausibility of a theoretical model and to determine the extent to which the various explanatory factors are seen to influence the dependent variable (Coorley, 1978). The purpose of this research is to develop a model for incentive payoffs, best-suited framework for incentive mechanisms and to achieve the research objectives. The quantitative data was analysed using statistical tools derived from SAS version 9.3 and SPSS version 22. The justification for the use of these statistical tools is described below.

7.9.1.1. Principal component analysis

Principal component analysis was adopted in this study to assess the management attributes that contribute to project improvement, the performance indicators/parameters based on their level of importance in project performance and factors that influence organisational competencies in project delivery. Principal component analysis (PCA) is used to reduce the number of variables comprising a dataset while retaining the variability in the data, to identify the hidden patterns in the data, and also to classify them according to how much of the information stored in the data and what they account for (Pournara and Wernisch, 2007). The selection of PCA over factor analysis is because it allows for factors underlying a set of variables to be extracted or reduced and to explain the variance in each variable while factor analysis is used to analyse only the shared variance.

PCA further was used in this study to assess variables classified as sociological and operational constructs of performance which are aimed at achieving part of objective two. This statistical tool is used to evaluate which components account for the most variance, how well the component structure fits a given theory, what is the score of each subject measured directly on the components, and what percentage of variance in the data that accounts for the components? The raw coded data were inputted into SAS log to verify that no error was made, to determine the number of records read/used and to analyse the means and standard deviations for the variables. The first step was to compute the initial extraction of the components in order to determine the number of components to be extracted and then, the second step is to determine the number of meaningful components to retain for rotation and interpretation. The following four criteria was adopted in decision making which are the eigenvalue-one criterion, the Scree test, the proportion of variance accounted for, and the interpretability criterion (SAS tutorials, 2014).

The third step is the rotation to a final solution where an unrotated pattern matrix is created showing the factor loadings. It is ideal to review the correlations between the variables and components and use the information to interpret the components but it is quite difficult to interpret an unrotated pattern matrix. Therefore, a rotated factor pattern was performed to form a linear transformation for better interpretation. Step four involves the interpretation of the rotated solution and then, the fifth step encompasses creating factor scores or component scores (this is explained in th data analysis).

7.9.1.2 Correlation analysis

Correlation analysis was used to measure the linear association between two variables. In this study, the Pearson's correlation coefficient was adopted to measure the dependence between the variables analysed using PCA. This was essential to determine whether the variables classified within a component are significant in predicting each other. Pearson's correlation coefficient takes a range of values from +1 to -1 while a value of 0 indicates that there is no association between the two variables. A value greater than 0 indicates positive associations between variables while a value less than 0 indicates negative associations between variables. Laerd Statistics (2013: online) stipulated a guideline for interpreting results of correlation analysis, this was adopted for this study as follows: 0.1 to 0.3 or -0.1 to -0.3 (weak strength of association); 0.3 to 0.5 or -0.3 to -0.5 (medium strength of association) and 0.5 to 1.0 or -0.5 to -1.0 (high strength of association). The significant level is deemed acceptable when it is less than 0.05 (5% level of significant difference).

7.9.1.3 Descriptive statistics

Descriptive statistics was used to describe samples of subjects in terms of variables or combination of variables by estimating measures of central tendency, dispersion and variability (Tabachnick and Fidell, 2007). They represent quantitative descriptions of data in manageable summaries so as to be more comprehensible. Descriptive statistical tools used in this study are mean, frequency, standard deviation, standard errors, graphs and percentages and they are analysed using SPSS version 22.

7.9.2 Qualitative data analysis

As previously noted, the semi-structured questions were used to collect qualitative data from selected project stakeholders in different organisations. Creswell (2009) affirms that qualitative data analysis involves preparing data for analysis, conducting different analyses, moving deeper and deeper into understanding the data, representing the data and making an interpretation of the larger meaning of the data. He further suggested six steps involved in analysing qualitative data as follows:

- Organise and prepare the raw data by transcribing interviews and type up field notes;
- Study the data sets to understand the actual interpretation and obtain a general sense of information to reflect on its overall meaning;
- Compile and process all information by reducing them into manageable and understandable texts;
- Use narrative analysis to convey the findings of analysis by discussing the themes, sub-themes and interconnecting themes in order of events;
- Lastly, interpret the meaning of themes and description, and then drive a comparison of findings with information from literature, theories or other means of data analysis.

Based on the explanatory sequential approach adopted for this study, it is ideal to compare the outcomes of the case study interviews with literature and theories. This study adopted the six steps as stipulated by Creswell (2009) to analyse the qualitative data.

7.10 Data validity, reliability and ethical issues

The credibility of techniques used for data collection and analysis can be demonstrated through validity and reliability tests. Validity is the 'extent to which the research findings accurately represent what is really happening in the situation' (Welman *et al.*, 2005: 142). Validity of an instrument is a measure of what it is supposed to measure or claims to measure (Fellows and Liu, 2003: 157; Pietersen and Maree, 2007: 216). Creswell (2014: 201, citing Gibbs, 2007) further defines qualitative validity as the use of specific procedures to check the accuracy of research findings. In line with Fellows and Liu (2003: 157) as well as Pietersen and Maree (2007: 216), the following types of validity are considered for this study:

- <u>Face validity</u> is the magnitude to which the survey technique appears valid. To achieve this, the survey techniques for this research were examined by experts in the research field including University of Pretoria statisticians, to ensure validity;
- <u>Content validity</u> includes the degree to which a survey technique covers the complete content of a particular construct to be measured. A critical examination of the survey instruments by experts in the related field was deemed appropriate before proceeding with data collection;
- <u>Construct validity</u> is required to explain the degree to which the construct or concept is measured. It is used to ensure that the related items are well-represented in the measurement. The literature survey reviews different practices, situations, factors and parameters, adopted in different countries for the phenomena under investigation. This represents a medium to determine the extent to which the study measures the intended construct; and
- <u>Criterion validity</u> represents the degree to which measuring instruments or selected tests can correctly predict the variable to be measured and to draw conclusions. The concurrent validity was considered appropriate for this study since it allows for a test

or a measure of the sample size of the entire population at a specified period of the survey taking into consideration the present situations in the construction industry in both countries.

Reliability is concerned with the credibility of the research findings. It determines whether the results of the research findings are reliable. Erikkson (2002) stipulates that the reliability of an investigation is acceptable when there is consistency in the results. It is the extent to which the obtained result can be generalised for different circumstances. Reliability signifies the consistency in the researcher's procedures with other researchers in the related fields (Creswell, 2014: 201, citing Gibbs, 2007). There are different types of reliability which are test-retest, equivalent form, split-half and internal. Welman *et al.* (2005: 147) emphasise that 'a high internal consistency implies a high degree of generalisability across the items within the measurement'. For this study, the internal consistency (or reliability) is used to measure the degree of credibility of the research findings. Cronbach's coefficient alpha is used as a measure to determine the internal consistency of a measuring instrument based on inter-item correlations. A strong correlation will occur when the internal consistency is high and the alpha coefficient is close to one (1) but if the items are poorly formulated then the alpha coefficient is close to zero (0).

Ethical issues in research are concerned with the appropriateness of the researcher's behaviour in relation to the rights of the research subjects or those who are affected by the research (Saunders *et al.*, 2000). In this study, ethical issues were considered to ensure that case study interviewees are given the opportunity to freely participate in the survey and provide integrity of the research work. An invitation letter was sent to each of selected case study interviewees with a detailed explanation of what is expected from them in order to seek their consent to participate before an appointment was scheduled. In the invitation letter (Appendix 2), the case study interviewees were assured of absolute anonymity and confidentiality of any information supplied to the researcher. In order to maintain confidentiality and privacy of interviewees, the identities of these participants and their organisations remain anonymous. The data collected was not used for any other purpose other than as stated in the study objectives aimed at fulfilling the requirements for a PhD thesis.

7.11 Chapter summary

This chapter discussed the philosophical assumptions and paradigms behind the selection of the research approach adopted for this study. The research problem and objectives necessitated the need for ontology and epistemology assumptions to identify the causes and effects of the research problem and intentions behind it. This enabled the evaluation of the operational and sociological constructs in relation to incentive mechanisms. This study further adopted post positivism and constructivism paradigms for this research. Post positivism guided the process of obtaining multiple perspectives of respondents through the use of questionnaire for data collection while constructivism aided in developing a theory and questions to forge discussions with the case study interviewees for better interpretation of the research findings.

Based on the selected philosophical assumptions and research paradigms, an explanatory sequential approach of mixed methods research design was used to address the research questions starting with the collection and analysis of quantitative data (post positivism) followed up with the collection and analysis of qualitative data (constructivism) in order to provide a better interpretation for this study. The quality of data collected through the pre-interviews conducted by the researcher reveals that there is lack of insufficient resources to draw reasonable conclusions. This prompted the need of a strong quantitative orientation by using important variables and quantitative instruments to measure the construct of primary interest; this type of investigation is within the context of explanatory sequential approach of mixed methods approach.

The nature of this research allowed for abductive logic to be used to explain the research reasoning because it is neither entirely deductive nor entirely inductive but rather in between. This enabled the hypothesis to be deducted from general theories subject to empirical testing to get facts and develop a theory to explain the facts. The study targeted project participants in Gauteng, South Africa and Abuja, Nigeria while the accessible population includes public and private sector clients, registered consultants and construction companies in the study areas. The selection of accessible population was based on four factors namely relevance, flexibility, accessibility and applicability. Section 7.8 described the sample population, sampling technique and sample size used for the distribution of questionnaires and conducting case study interviews. It further explained the approaches adopted in the questionnaire design and data collection.

Section 7.9 provided a detailed explanation of the techniques used in analysing both quantitative and qualitative data for this study. The credibility of the techniques used in data collection and analysis was discussed in section 7.10 showing the ethical considerations, validity and reliability tests conducted to ensure the credibility of the research results.

CHAPTER EIGHT

DATA ANALYSIS AND DISCUSSION (SOUTH AFRICA)

8.1 Introduction

The previous chapter provided an explanation on how the choice of research approach was made, the design of survey tools and the statistical techniques adopted for data analysis.

This chapter presents the data analysis and discussion of the results from the questionnaire survey administered in South Africa. As previously stated, the field survey was conducted from mid-June to October 2014 and the results were presented using both descriptive and inferential statistics. Tables, diagrams and charts are extensively used for data presentations, analysis and interpretation of results in this chapter.

The chapter is structured as follows: section 8.2 identifies the demographic information of respondents showing the sample characteristics of the questionnaire survey as well as the non-response bias estimation. Section 8.3 assesses the management attributes that contribute to project improvement; the construction motivational drivers that bridge the gap in project performance were evaluated in section 8.4. Impact of incentives on workforce motivation was measured in section 8.5; section 8.6 evaluates performance indicators/parameters in construction projects. Section 8.7 assesses the impact of risk elements in incentive compensation plans while section 8.8 evaluates the effect of organisational justice in motivating construction workforce towards improved productivity. Factors influencing organisational performance were evaluated in section 8.9 while section 8.10 assesses the variables that influence employee/organisational behaviour during project implementation. Section 8.11 assesses the organisational competency measures in project delivery, section 8.12 evaluates the economic benefits of incentives in projects and section 8.13 assesses the economic challenges of incentives in projects. Payment strategies in performance compensation plans were identified in section 8.14 and section 8.15 evaluates the use of incentives in achieving project performance. Lastly, the summary of the key findings are presented in 8.16.

8.2 Demographic information

This section identifies the characteristics of respondents in the field survey carried out using questionnaires. A total number of 325 questionnaires were distributed among the sampled population in South Africa. Out of that number, 97 valid responses were computed for the data analysis with a response rate of 30 percent. The study conducted by Maritz (2003: 115 citing Hussey and Hussey, 1997) stipulates that a response rate ranging from 15 to 20 percent is generally acceptable in this type of survey. No specific reason was given by respondents for the uncompleted questionnaires and invalid responses. Table 8.1 reveals the response rate for the questionnaire survey in South Africa. It shows that each group has a percentage contribution ranging from 18.6 to 30.9 which implies that all groups are well represented.

Table 8.1: Response rate for questionnaire survey (South Africa)

Groups	**Administered questionnaire**	**Returned**	**Usable**	**Percentage contribution to total response**
Group A	126	24	18	18.6
Group B	81	31	22	22.7
Group C	72	34	30	30.9
Group D	46	35	27	27.8
Total	**325**	**121**	**97**	**100**

8.2.1 Non-response bias estimation of questionnaire survey

Non-response bias estimation is used to identify any possible source of non-response bias in a set of data. It is usually important to estimate for potential non-response bias in a data set where the response rate is less than 80 percent (Montaquila and Olson, 2012). There are different ways of estimating for non-response bias. According to TRC (2009), non-response bias can be determined by comparing initial with late respondents using their demographic statistics. In this study, the mean scores of descriptive statistics for the four selected demographic data were evaluated and t-test was conducted to examine if there is any significant difference between their means. The result reveals that the p-value for each demographic information is more than 0.05 which implies there is no significant difference between the first 15 responses and the last 15 responses (p-value is significant at $p<0.05$). Therefore, their responses are considered free from bias.

Table 8.2: Non-response bias estimation for questionnaire survey (South Africa)

Descriptive statistics	**Mean of first 15 responses**	**Mean of last 15 responses**	**t-test result (p-value)**
Organisation type	2.53	2.87	0.44
Job description	1.67	1.27	0.14
Work experience	19.00	11.83	0.88
Academic qualification	3.27	2.67	0.08

8.2.2 Sample characteristics of questionnaire survey

This section presents the characteristics of respondents used for data analysis and the result is presented using descriptive statistics of frequency and percentage. For the purpose of this analysis, organisation types are further classified into three groups, namely: clients/employers, consulting firms and construction companies. Subcontracting firms and suppliers are grouped into construction companies. Table 8.3 reveals the profile of respondents from the questionnaire survey.

Table 8.3 Profile of respondents from questionnaire survey in South Africa

Demographic information	Frequency	Percentage	Cumulative Percentage
Organisation type			
Clients/employers	27	27.8	27.8
Consulting firms	30	30.9	58.7
Construction companies	40	41.3	100
Job description			
Managerial position	58	59.8	59.8
Middle management position	27	27.8	87.6
Operational (skilled/unskilled)	12	12.4	100
Work experience			
1 to 10 years	45	46.3	46.3
11 to 20 years	34	35.1	81.4
21 to 30 years	9	9.3	90.7
Above 30	9	9.3	100
Number of participated projects			
None	1	1.0	1.0
1 to 5	13	13.4	14.4
6 to 10	15	15.5	29.9
11 to 20	26	26.8	56.7
21 to 30	11	11.3	68
Above 30	31	32.0	100
Academic qualification			
Matric/Waec	5	5.2	5.2
N.Diploma/H.Diploma	16	16.5	21.7
B.Tech/B.Sc. (honours)	50	51.5	73.2
M.Sc./M.Tech	17	17.5	90.7
PhD/D.Tech.	9	9.3	100

The analysis confirms as previously noted, that the three major aspects of contracting parties are well represented, 27.8 percent represents the clients/employers, 30.9 percent of respondents work in consulting firms while 41.3 percent of respondents are employed in construction companies. The analysis of job description reveals that a high percentage of respondents cut across the top echelon of management position having a score of 59.8 percent. A total of 27.8 percent of respondents are engaged in middle management positions and 12.4 percent of respondents are operational workers which are either skilled or unskilled.

The research problem for this study can be regarded as a managerial problem in relation to incentive mechanisms in construction projects. Although it is equally essential to seek the opinions of informal workers the percentage of respondents represented from different designations are adequate to draw reasonable conclusions based on the study objectives.

The result shows that 46.3 percent of respondents have between 1 to 10 years of work experience, 35.1 percent of respondents have between 11 to 20 years of work experience and 9.3 percent of respondents have between 21 to 30 years and above 30 years respectively. From the analysis for the respondents' work experience, it shows that 81.4 percent of the total respondents have between 1 to 20 years of work experience. The analysis of projects participated by respondents reveals that 32 percent of respondents had participated in over 30 projects; this implies the majority of them have ample experience that are relevant to achieve the objectives of this study. In terms of academic qualifications, over 50 percent of respondents have obtained formal education in various Bachelor degrees while a combination of more than 70 percent of respondents has either Bachelor, Masters or PhD/D.Tech degrees in various disciplines.

8.3 Assessing the management attributes that contribute to project improvement

This section assesses the effect of management attributes to achieve project improvement; this is focused on evaluating the hidden relationships between the sets of data and identifying the most representative attributes for each component. As previously noted, objective two for this study evaluates the relationships among the constructs of project improvement wherefore these management attributes represent the operational constructs used to measure and evaluate the performance outcomes of any organisation based on its' commitment and productivity. From the literature review, 20 management attributes were identified and grouped into five parts. Principal component analysis (PCA) is used to reduce these attributes into fewer 'artificial' components in order to determine the linear combinations of the underlying original attributes. The analysis of management attributes were performed using the following steps:

i. *Step one:* Initial extraction of the components and determining the number of meaningful components to retain for rotation and interpretation. The decision to retain any component is made based on four criteria which are eigenvalue-one criterion, the Scree test, the proportion of variance accounted for and the interpretability criterion.

ii. *Step two:* Varimax rotation is computed to determine what is measured by each of the retained components. This is used to identify the attributes that have significant loadings for a given component and also examine what they have in common. According to Pallant (2010), factor solution should explain at least half of each original variable's variance. Factor loadings of communality estimates below 0.5 are discarded in this study.

iii. *Step three:* Pearson correlation coefficient is adopted to measure the dependence between the variables analysed and reliability test is performed using Cronbach coefficient alpha to measure internal consistency for each component. Pietersen and Maree (2007) stipulate that alpha values greater than 0.7 are considered acceptable in research.

Table 8.4 reveals the result of the PCA conducted using 20 identified management attributes that contribute to project improvement. The analysis shows the components and cumulative percentage of variance explained. The use of eigenvalue-one criterion to make decisions of which components to retain, emphasises that components with eigenvalues less than 1.00 are viewed as trivial therefore should not be retained. Based on eigenvalue-one criterion, component 5 has an eigenvalue of 1.097 which is the benchmark with 74 percentage of total variance accounting for 5 components. The scree test plot displays components 1 to 5 with relatively large breaks in between the components; this allows for the component with last big break before the eigenvalues begin to level off to be retained. In this study, the decision is to retain any component that account for at least 5 to 10 percent proportion of the total variance. From the correlation matrix, 5 components were retained for rotation and interpretation.

The result of the Varimax rotation is displayed in Table 8.5, the next decision is to retain variables with high loadings for any given component. Stevens (1986) stipulates that for a factor loading to be high then its absolute value must exceed 0.40. Table 8.5 shows the rotated pattern of management attributes with high loadings only. The table reveals the factors accounting for each component, the criterion states that a component can only be retained if it has at least three variables with significant loadings. Component 5 has a high loading of one attribute which is "value derived by end users/customers", this criterion is not met by this component therefore it is discarded. Components 1, 2, 3 and 4 were retained for interpretation.

Table 8.4: Eigenvalues of the correlation matrix for management attributes

Components	Eigenvalue	Difference	Proportion	Cumulative
1	7.764	5.104	0.388	0.388
2	2.660	0.583	0.133	0.521
3	2.077	0.829	0.104	0.625
4	1.248	0.151	0.062	0.687
5	1.097	0.149	0.054	0.742
6	0.948	0.294	0.047	0.790
7	0.653	0.084	0.033	0.822
8	0.569	0.081	0.029	0.851
9	0.488	0.029	0.024	0.875
10	0.460	0.080	0.023	0.898
11	0.379	0.054	0.019	0.917
12	0.325	0.048	0.016	0.933
13	0.276	0.040	0.014	0.947
14	0.236	0.018	0.012	0.959
15	0.218	0.021	0.011	0.970

16	0.197	0.058	0.010	0.980
17	0.138	0.028	0.007	0.987
18	0.110	0.029	0.006	0.992
19	0.081	0.006	0.004	0.996
20	0.075	0.000	0.004	1.000

Initial factor method: Principal component analysis (SAS)

Table 8.5: Rotated factor pattern from PCA of management attributes

Attributes	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
V7_1b	0.873				
V7_2c	0.799				
V7_1d	0.787				
V7_1a	0.778				
V7_5b		0.857			
V7_5c		0.839			
V7_5a		0.755			
V7_4d		0.669			
V7_5d		0.598			
V7_1c		0.412			
V7_4a			0.856		
V7_3c			0.771		
V7_3b			0.735		
V7_4b			0.629		
V7_3a				0.749	
V7_2b				0.739	
V7_2d				0.680	
V7_2a				0.571	
V7_3d				0.560	
V7_4c					0.751

Rotation method: Varimax

8.3.1 Human resource management

There are four management attributes retained in Component 1, these attributes can be grouped as human resource management. Table 8.6 reveals the final communality estimates for the four attributes ranging from 0.846 to 0.735, which is above 0.5 thresholds indicating that the criterion in step two is met therefore the result is deemed acceptable. From Table 8.5, the attribute with the highest loading is “knowledge/skill transfer process”.

Table 8.6: Final communality estimates for human resource management

Attributes	h^2
Knowledge/skill transfer process	0.846
Organisational culture/commitment	0.761
Learning process	0.821
Employee satisfaction	0.735

h^2 = final communality estimates

Reliability analysis reveals the overall Cronbach's alpha for component 1 is 0.909 (N of items = 4) which also indicates a high level of internal consistency for the scale with this specific sample. Pearson correlation coefficients for component 1 show that the four attributes are highly correlated to each other at significant level of 0.01. This implies that these four attributes can be significantly measured as human resource management for project improvement.

Table 8.7: Pearson correlation coefficients for human resource management

Attributes	Knowledge/skill transfer process	Organisation culture/commitment	Employee satisfaction	Learning process
Knowledge/skill transfer process	1.000	-	-	-
Organisational culture/commitment	0.691 0.000	1.000	-	-
Learning process	0.777 0.000	0.619 0.000	1.000	-
Employee satisfaction	0.812 0.000	0.614 0.000	0.691 0.000	1.000

Correlation is significant at the 0.01 level (2-tailed)

8.3.2 Project sustainability

Table 8.8 presents the six attributes retained in component 2, these attributes are categorised under project sustainability. Final communality estimates reveal the values of these six attributes ranging from 0.833 to 0.632, this indicates that the threshold of 0.5 was met therefore the result is accepted. The attribute with highest loading of 0.857 from the rotated factor matrix (Table 8.5) is "environmental influence".

Table 8.8: Final communality estimates for project sustainability

Attributes	h^2
Environmental influence	0.833
Socio-economic impact	0.775
Contract policy	0.780
Social responsibility	0.688
Government policy	0.655
Organisation competence	0.632

h^2 = final communality estimates

Reliability analysis reveals the overall Cronbach's alpha for component 2 is 0.87 (N of items = 6) which also indicates a high level of internal consistency for the scale with this specific sample. The result of Pearson correlation coefficients shows that these six attributes have either high or medium correlation with each other at significant level of 0.01 (see table 8.9). This implies that the five attributes can significantly and moderately predict and measure project sustainability except "organisation competence" which has weak correlation with "social responsibility".

Table 8.9: Pearson correlation coefficients for project sustainability

Attributes	Environmental influence	Socio-economic impact	Contract policy	Social responsibility	Government policy	Organisation competence
Environmental influence	1.000	-	-	-	-	-
Socio-economic impact	0.781 0.000	1.000	-	-	-	-
Contract policy	0.679 0.000	0.580 0.000	1.000	-	-	-
Social responsibility	0.598 0.000	0.652 0.000	0.627 0.000	1.000	-	-
Government policy	0.470 0.000	0.470 0.000	0.504 0.000	0.501 0.000	1.000	-
Organisation competence	0.440 0.000	0.440 0.000	0.523 0.000	0.270 0.008	0.384 0.000	1.000

Correlation is significant at the 0.01 level (2-tailed)

8.3.3 Strategy-related factors

Component 3 retains four attributes with high loadings of more than 0.5; these attributes have similar conceptual meanings which can be used to measure strategy-related factors in projects. Table 8.10 reveals the final communality estimates ranging from 0.790 to 0.746, their values exceed the threshold of 0.5 therefore the result is accepted. Table 8.5 reveals the attribute with the highest loading of 0.856 in component 5 to be “competitive advantage”.

Table 8.10: Final communality estimates for strategy-related factors

Attributes	**h^2**
Competitive advantage	0.790
Innovation	0.751
Technological capability	0.746
Organisation reputation	0.761

h^2 = final communality estimates

Table 8.11 reveals the Pearson correlations of the four attributes measuring strategy-related factors. They have either high or medium correlation with each other at p-value of 0.1 therefore it is assumed that these attributes can significantly and moderately predict strategy-related factors in organisational management. The reliability test for component 3 is 0.85 (N of items = 4), this indicates a high level of internal consistency for the scale with this specific sample.

Table 8.11: Pearson correlation coefficients for strategy-related factors

Attributes	**Competitive advantage**	**Innovation**	**Technological capability**	**Organisation reputation**
Competitive advantage	1.000	-	-	-
Innovation	0.618 0.000	1.000	-	-
Technological capability	0.512 0.000	0.746 0.000	1.000	-
Organisation reputation	0.620 0.000	0.497 0.000	0.483 0.000	1.000

** Correlation is significant at the 0.01 level (2-tailed)

8.3.4 Project efficiency

In component 4, there are five attributes retained and they can be used to measure project efficiency in construction projects. Table 8.12 reveals the final communality estimates for project efficiency ranging from 0.748 to 0.609, this indicates that the threshold of 0.5 is met.

"Achieving specified project goals" has the highest loading among five attributes from the rotated factor matrix (table 8.5).

Table 8.12: Final communality estimates for project efficiency

Attributes	h^2
Achieving specified project goals	0.711
Cost saving	0.700
Business efficiency	0.748
Revenue and sales growth	0.609
Work productivity	0.658

h^2 = final communality estimates

The overall reliability test for component 4 is 0.79 (N of items = 5), it indicates a high level of internal consistency for the scale with this specific sample. Table 8.13 reveals that the p-values range from 0.001 to 0.009 which is less than 0.05 therefore it is assumed that these five attributes can moderately and weakly predict project efficiency except "work productivity" which has high correlation with "achieving specified project goals" and weak correlation with other attributes.

Table 8.13: Pearson correlation coefficients for project efficiency

Attributes	Achieving specified project goals	Cost saving	Business efficiency	Revenue and sales growth	Work productivity
Achieving specified project goals	1.000	-	-	-	-
Cost saving	0.491 0.000	1.000	-	-	-
Business efficiency	0.381 0.000	0.667 0.000	1.000	-	-
Revenue and sales growth	0.289 0.004	0.510 0.000	0.531 0.009	1.000	-
Work productivity	0.653 0.000	0.263 0.004	0.284 0.000	0.202 0.000	1.000

Correlation is significant at the 0.01 level (2-tailed)

8.3.5 Measurement model for management attributes

For this study, the highest loading for each component in the rotated factor matrix of management attributes is used as a representative factor. There are four components retained in this analysis which are human resource management (HRM), project sustainability (PS), strategy-related factors (SRFs) and project efficiency (PE). This is illustrated in Figure 8.1 showing the representative factor for each component. The result of this analysis is adopted for qualitative survey (see chapter 10).

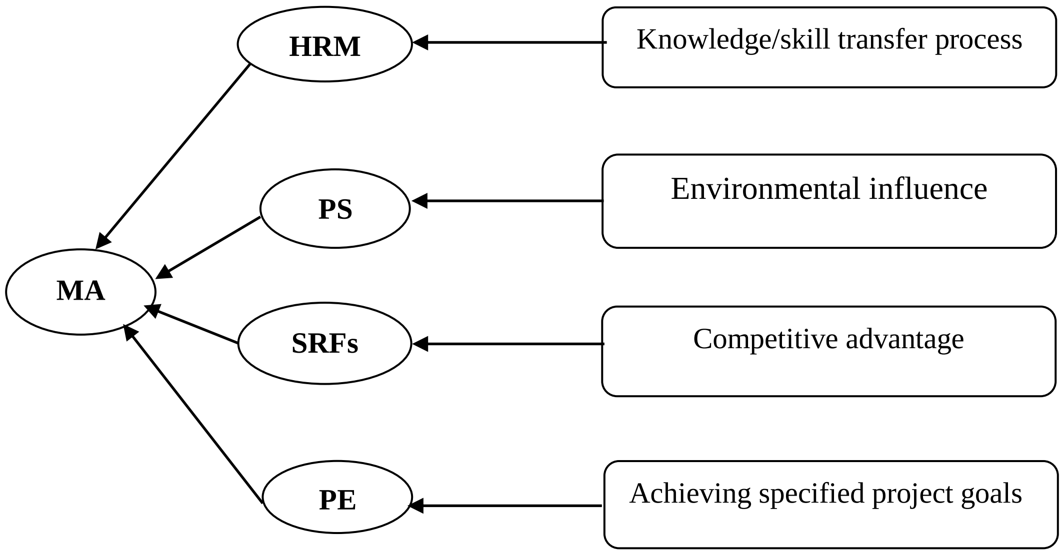


Figure 8.1: Measurement model for management attributes

8.4 Construction motivational drivers that bridge the gap in project performance

This study highlighted the improper alignment to contractors' objectives with clients' expectations as a research problem. In order to address this, objective one focuses on the identification of positive motivational drivers that can bridge the gap between contractors' objectives and clients' expectations. From the literature review, a total number of 27 motivational drivers was identified and adopted for quantitative survey. It was deemed necessary to classify the ranking based on the profession of respondents which is categorised as clients, consultants and contractors for this data analysis. This enables the researcher to identity the positive motivational drivers that are peculiar to each group and draw reasonable conclusion.

Table 8.14 reveals the reliability test result for employee motivational drivers; it shows internal consistency of above 0.7 for each dimension therefore the result is considered acceptable. The reliability test for overall motivational drivers is 0.949 (N of items = 27), this indicates a high level internal consistency for the scale with this specific sample. Table 8.15 reveals the motivational drivers that contribute to employee motivation showing the result of rankings for each group (clients, consultants and contractors). Their scores are categorised into three parts in which + = high influence (mean value > 3.5), 0 = medium influence (2.5 < mean value < 3.5) and - = low influence (mean value < 2.5). The p-value for each driver is less than 0.5 which implies that these motivational drivers can significantly predict employee motivation in construction projects. The analysis reveals the three highest overall ranked positive motivational drivers as “timeous payment”, “prospect for promotion” and “good supervision” with average means of 4.50, 4.44 and 4.42 respectively. The standard deviations for the three highest positive drivers are 0.71, 0.68 and 0.64 respectively.

Table 8.14: Reliability test result for employee motivational drivers

Dimensions of motivational drivers	**α for each dimension**	**α for overall drivers**
Leadership style	0.817	0.949
Reward system	0.896	
Organisational culture	0.885	
Structure of the work	0.912	

α = Cronbach’s alpha

Table 8.15: Motivational drivers influencing employee motivation in construction projects

Motivational drivers	Clients	R	Consultants	R	Contractors	R	Av. mean	R	SD	p-value
Leadership style										
Work leadership	4.26 (+)	6	4.27 (+)	7	4.20 (+)	9	4.23 (+)	11	0.81	<0.05
Participation in decision making	4.40 (+)	3	4.33 (+)	5	4.22 (+)	8	4.31 (+)	7	0.83	<0.05
Respect for people	4.52 (+)	1	4.20 (+)	9	4.40 (+)	3	4.37 (+)	4	0.78	<0.05
Commitment	4.52 (+)	1	4.13 (+)	11	4.35 (+)	4	4.33 (+)	5	0.66	<0.05
Recognition, credit & acclaim	4.26 (+)	6	4.23 (+)	8	4.03 (+)	14	4.17 (+)	14	0.96	<0.05
Management theories	3.70 (+)	14	3.23 (0)	18	3.05 (0)	22	3.23 (0)	22	1.30	<0.05
Reward system										
Income increment	4.15 (+)	8	4.30 (+)	6	4.05 (+)	13	4.15 (+)	14	0.80	<0.05
Fairness of pay/salary	4.33 (+)	5	4.47 (+)	2	4.20 (+)	9	4.32 (+)	6	0.93	<0.05
Timeous payment	4.37 (+)	4	4.67 (+)	1	4.45 (+)	2	4.50 (+)	1	0.71	<0.05
Overtime allowance	3.96 (+)	12	4.30 (+)	6	4.03 (+)	14	4.09 (+)	15	1.03	<0.05
Benefits/bonus reimbursement incentive	4.07 (+)	10	4.40 (+)	4	4.30 (+)	5	4.26 (+)	9	1.01	<0.05
Organisational culture										
Flexibility of working hours	3.70 (+)	14	3.67 (+)	16	3.97 (+)	16	3.78 (+)	20	0.95	<0.05
Prospect for promotion	4.26 (+)	6	4.43 (+)	3	4.63 (+)	1	4.44 (+)	2	0.68	<0.05
Job security	4.15 (+)	8	4.47 (+)	2	4.28 (+)	6	4.30 (+)	8	0.86	<0.05
Company’s prestige (financial stability)	4.11 (+)	9	4.23 (+)	8	4.15 (+)	10	4.16 (+)	13	0.92	<0.05
Consumerism (workers’ right)	3.93 (+)	13	3.70 (+)	15	3.95 (+)	17	3.87 (+)	19	0.95	<0.05
Training of staff	4.25 (+)	7	4.17 (+)	10	4.15 (+)	10	4.19 (+)	12	0.89	<0.05
Creativity	4.03 (+)	11	3.87 (+)	14	3.90 (+)	18	3.93 (+)	18	0.89	<0.05
Structure of the work										
Working conditions (availability of materials and tools)	4.37 (+)	4	4.17 (+)	10	4.28 (+)	6	4.27 (+)	9	0.72	<0.05
Design process efficacy	4.07 (+)	10	3.60 (+)	17	3.63 (+)	19	3.74 (+)		1.03	<0.05
Working facilities (provision of rest areas and transport)	4.11 (+)	9	3.93 (+)	13	4.10 (+)	11	4.05 (+)	17	0.98	<0.05
Good supervision	4.44 (+)	2	4.43 (+)	3	4.40 (+)	3	4.42 (+)	3	0.64	<0.05
Completing of challenging tasks	4.33 (+)	5	4.17 (+)	10	4.25 (+)	7	4.25 (+)	10	0.85	<0.05
Gaining proficiency	4.37 (+)	4	4.17 (+)	10	4.08 (+)	12	4.19 (+)	12	0.98	<0.05
Timeous response to request & inspection	4.26 (+)	6	4.07 (+)	12	3.98 (+)	15	4.08 (+)	16	1.00	<0.05
Unrealistic scheduling/performance expectation	3.48 (0)	15	3.03 (0)	19	3.23 (0)	21	3.25 (0)	23	1.47	<0.05
Extent of change orders during execution	3.48 (0)	15	3.23 (0)	18	3.55 (+)	20	3.42 (0)	21	1.28	<0.05

S.D. = Standard deviation; R = Rank; Av. mean = Average mean; + = high influence; 0 = medium influence; - = low influence

8.5 Impact of incentives on workforce motivation

The previous section identified the positive motivational drivers that influence employee motivation in the construction industry. To further achieve the second part of objective one which assesses the impact of incentives on workforce motivation, the respondents were asked to rank the twenty (20) incentive schemes identified from the literature review using a Likert scale of 1 (not efficient) to 5 (extremely efficient). The aim of this analysis is to identify the most efficient incentive schemes that can rightly motivate the construction workforce. Table 8.16 presents the mean, standard deviation, skewness and kurtosis of each incentive scheme.

Table 8.16: Descriptive statistics for incentive schemes

Incentive schemes	Mean	R	SD	SKN	KTS	G/Mean
Financial						3.52
Premium bonus	3.81	8	0.98	-0.90	0.97	
Profit sharing	3.82	7	1.10	-0.80	0.03	
Schedule incentive	3.68	10	1.07	-0.70	-0.02	
Measured day work	3.30	15	1.10	0.14	-1.16	
Technical performance bonuses	3.72	9	1.04	-0.73	0.01	
Simple piece work	3.26	17	0.99	-0.44	-0.29	
Geared incentive	3.28	16	0.98	-0.52	0.11	
Group incentive	3.24	19	1.27	-0.68	-0.14	
Semi-financial						**3.47**
Health scheme	3.41	14	1.20	-0.40	-0.64	
Saving scheme	3.20	20	1.34	-0.16	-1.15	
Housing scheme	3.59	12	1.21	-0.62	-0.55	
Site welfare provision	3.25	18	1.28	-0.14	-0.93	
Pension scheme	3.91	6	1.22	-1.02	0.18	
Non-financial						**3.93**
Recognition	4.11	3	0.90	-1.37	2.20	
Praise of good work	4.14	2	0.89	-1.11	1.20	
Communication	3.97	4	1.02	-0.67	-0.40	
Empowerment	4.18	1	0.89	-0.72	-0.09	
Job autonomy	3.93	5	0.99	-0.83	0.31	
Enlargement	3.64	11	1.17	-0.72	-0.07	
Rotation	3.52	13	1.17	-0.43	-0.62	

R = rank; SD = standard deviation; SKN = skewness; KTS = kurtosis; G/Mean = Group mean

The result reveals that financial and non-financial schemes have high impact (+) with group means of 3.52 and 3.93 while semi-financial schemes can be categorised as moderate impact (0) with group mean of 3.47. The overall mean scores of the incentive schemes range from

4.18 to 3.20, this indicates that there is need for incentive schemes to improve work productivity of construction employees. The coefficients of skewness and kurtosis are satisfactory with their values close to zero, this shows a good normal distribution except in one instance where recognition has a score of 2.20 in kurtosis which is slightly above +/-2 of acceptable level. The result reveals the three most efficient incentive schemes as “empowerment”, “praise of good work” and “recognition”.

8.6 Evaluating performance indicators/parameters in construction projects

The objective four for this study is focused on modeling for incentive payoffs and developing a framework for incentive mechanisms. In order to achieve this, there is a need to evaluate performance indicators based on their level of importance in project performance. As previously discussed, the use of a single incentive plan will lead to over-investment of one’s effort in one area at the expense of other areas. This study adopts multiple incentives which are targeted towards achieving the key performance metrics (cost, time, quality and safety/health). A total number of 19 performance variables measuring the key performance metrics were identified from the literature review and used for the quantitative survey.

The collected data was analysed using principal component analysis (PCA) to select the representative factors from the data set, and not to uncover the hidden relationships. Pournara and Wernisch (2007) emphasise that PCA can be used for data reduction by evaluating for the smallest possible set of principal components that can explain most of the variances in the data set. The analysis of performance variables is not about data grouping because these variables are already grouped based on the stipulated standards. It is therefore important to identify the possible key variables that can measure overall project performance. The analysis of these performance variables was performed using the three steps of PCA as described in section 8.3. Table 8.17 reveals the result of the eigenvalues of the correlation matrix conducted using 19 performance variables. The steps of making decisions in PCA allow for eigenvalue-one criterion to be used first. Based on the eigenvalue-one criterion, the component 6 is selected as a benchmark having a value of 1.070 and accounting for cumulative variance of 75 percent. From the scree plot, there is a large break between component 5 and component 6 therefore component 6 is retained. The component 6 accounts for 22 percent of the proportion of total variance therefore they are within the threshold and it is a good decision to retain them. A total number of 6 components are retained for rotation and interpretation.

Table 8.18 shows the result of Varimax rotation and the scores of variables with high loadings (>0.40). The decision to retain any component after rotation is based on the criterion that there must be at least three variables with significant loadings for a component to be retained. Based on this criterion, components 2 and 6 have less than three variables of significant loadings therefore they are withdrawn. The retained components for interpretation are components 1, 3, 4 and 5.

Table 8.17: Eigenvalues of the correlation matrix for performance variables

Components	Eigenvalue	Difference	Proportion	Cumulative
1	6.959	4.979	0.366	0.366
2	1.980	0.322	0.104	0.471
3	1.658	0.263	0.087	0.558
4	1.395	0.210	0.073	0.631
5	1.185	0.115	0.062	0.694
6	1.070	0.216	0.056	0.750
7	0.854	0.130	0.045	0.795
8	0.724	0.140	0.038	0.833
9	0.584	0.063	0.031	0.864
10	0.521	0.072	0.027	0.891
11	0.449	0.091	0.023	0.914
12	0.357	0.032	0.018	0.933
13	0.325	0.049	0.017	0.950
14	0.276	0.082	0.014	0.965
15	0.194	0.042	0.010	0.975

16	0.152	0.017	0.008	0.983
17	0.134	0.029	0.007	0.990
18	0.104	0.039	0.005	0.996
19	0.074		0.003	1.000

Initial factor method: Principal component analysis (SAS)

Table 8.18: Rotated factor pattern from PCA of performance variables

Variables	Component 1	Component 2	Component 3	Component 4	Component 5	Component 6
V9_3c	0.813					
V9_4a	0.768					
V9_3b	0.736					
V9_4b	0.735					
V9_1e		0.862				
V9_1d		0.801				
V9_4d			0.854			
V9_4c			0.694			
V9_1c			0.476			
V9_2d			0.427			
V9_2b				0.848		
V9_2f				0.612		
V9_2e				0.594		
V9_3d				0.569		
V9_1a					0.782	
V9_2a					0.591	
V9_3a					0.480	
V9_1b						0.687
V9_2c						0.544

Rotation method: Varimax

8.6.1 Component 1 of performance variables

Component 1 has four performance variables retained; these variables are grouped under quality and safety/health performances. Table 8.19 reveals the final communality estimates for these four performance variables ranging from 0.874 to 0.722 which is above 0.5 threshold indicating that the criterion is met. From the rotated factor pattern (table 8.18), the "quality of materials used" has the highest loading of 0.813 in component 1.

Table 8.19: Final communality estimates for component 1

Variables	**h^2**
Quality of materials used	0.780
Safety/health training programs	0.819
Satisfactory quality of work	0.722
Safety/health control measures	0.874

h^2 = final communality estimates

Reliability analysis reveals the overall Cronbach's alpha for component 1 is 0.84 (N of items = 4) which also indicates a high level of internal consistency for the scale with this specific sample. The result of Pearson correlations for component 1 (table 8.20) reveals that these four variables have either high or medium correlation with each other at significant level of 0.01. Therefore, the result of this analysis signifies a good measure of these variables.

Table 8.20: Pearson correlation coefficients for component 1

Variables	**Quality of materials used**	**Safety/health training programs**	**Satisfactory quality of work**	**Safety/health control measures**
Quality of materials used	1.000	-	-	-
Safety/health training programs	0.504 0.000	1.000	-	-
Satisfactory quality of work	0.709 0.000	0.504 0.000	1.000	-
Safety/health control measures	0.419 0.000	0.878 0.000	0.485 0.000	1.000

Correlation is significant at the 0.01 level (2-tailed)

8.6.2 Component 3 of performance variables

Table 8.21 reveals the final communality estimates for component 3 with four performance variables retained for interpretation. The values of the final communality estimates range from 0.874 to 0.580, this signifies that the threshold of 0.5 is met. "Minimise safety incident rates" has the highest loading of 0.854 in component 3 (see table 8.18).

Table 8.21: Final communality estimates for component 3

Variables	h^2
Minimise safety incident rates	0.874
Response to incidents	0.801
Efficient cost control	0.613
Reasonable claims for extension of time	0.580

h^2 = final communality estimates

The overall Cronbach's alpha for component 3 is 0.70 (N of items = 4). Table 8.22 reveals the Pearson correlation coefficients for component 3 where three performance variables have either high or medium correlation with each other at significant level of 0.01 except "reasonable claims for extension of time" that has weak correlation with other attributes. This indicates that the first three variables can predict each other while the fourth variable is not significant to this group of data set, the interpretation is not necessary for this analysis because it is focused on data reduction, not grouping the data set.

Table 8.22: Pearson correlation coefficients for component 3

Variables	Minimise incident rates	Response to incidents	Efficient cost control	Reasonable claims for extension of time
Minimise incident rates	1.000	-	-	-
Response to incidents	0.721 0.000	1.000	-	-
Efficient cost control	0.461 0.000	0.426 0.000	1.000	-
Reasonable claims for extension of time	0.245 0.015	0.117 0.254	0.097 0.344	1.000

8.6.3 Component 4 of performance variables

Table 8.23 reveals the final communality estimates for component 4 where four performance variables were retained for interpretation. The final communality estimates range from 0.823 to 0.743 which indicates the threshold of 0.5 is met. Table 8.18 reveals the variable with the highest loading for rotated factor pattern as "timely completion".

Table 8.23: Final communality estimates for component 4

Variables	h^2
Timely completion	0.804
Schedule change control	0.822
Adequate schedule process	0.743
Effective quality management plan	0.823

h^2 = final communality estimates

Reliability analysis reveals the overall Cronbach's alpha for component 4 is 0.78 (N of items = 4) which also indicates a high level of internal consistency for the scale with this specific sample. The result of Pearson correlations for component shows that these four performance variables have either high or medium correlation with each other at significant level of 0.01 (see table 8.24). Therefore, the result of this analysis signifies a good measure of these variables.

Table 8.24: Pearson correlation coefficients for component 4

Attributes	Timely completion	Schedule control	Adequate schedule process	Effective quality management plan
Timely completion	1.000	-	-	-
Schedule control	0.385 0.000	1.000	-	-
Adequate schedule process	0.369 0.000	0.750 0.000	1.000	-
Effective quality management plan	0.501 0.000	0.375 0.000	0.465 0.000	1.000

Correlation is significant at the 0.01 level (2-tailed)

8.6.4 Component 5 of performance variables

There are three performance variables retained in component 5 and they measure three different types of performance objectives, namely: cost, time and quality. The final communality estimates range from 0.751 to 0.641, this indicates the retained variables met the threshold of 0.5 (see table 8.25). "Efficient cash flow system" has the highest loading of 0.782 in component 5 under the rotated factor pattern (table 8.18).

Table 8.25: Final communality estimates for component 5

Variables	h^2
Efficient cash flow system	0.658
Adequate supervision	0.751
Minimise defects	0.641

h^2 = final communality estimates

The overall Cronbach's alpha for component 5 is 0.70 (N of items = 4). Table 8.26 reveals the Pearson correlation coefficients for component 5 where all the three performance variables have medium correlations with each other at significant level of less than 0.01. This indicates that they can moderately predict each other, the interpretation is not necessary for this analysis because it is focused on data reduction, not grouping the data set.

Table 8.26: Pearson correlation coefficients of component 5

Attributes	Efficient cash flow system	Adequate supervision	Minimise defects
Efficient cash flow system	1.000	-	-
Adequate supervision	0.392 0.000	1.000	-
Minimise defects	0.365 0.000	0.518 0.000	1.000

Correlation is significant at the 0.01 level (2-tailed)

8.6.5 Measurement model for performance variables in construction projects

For the purpose of measuring performance variables, the highest loading for each retained component is adopted. There are four retained components and they are represented as component 1 (CMP1), component 3 (CMP3), component 4 (CMP4) and component 5 (CMP5). This is illustrated in Figure 8.2 showing the highest variable for each component. The result of this analysis is adopted for qualitative survey.

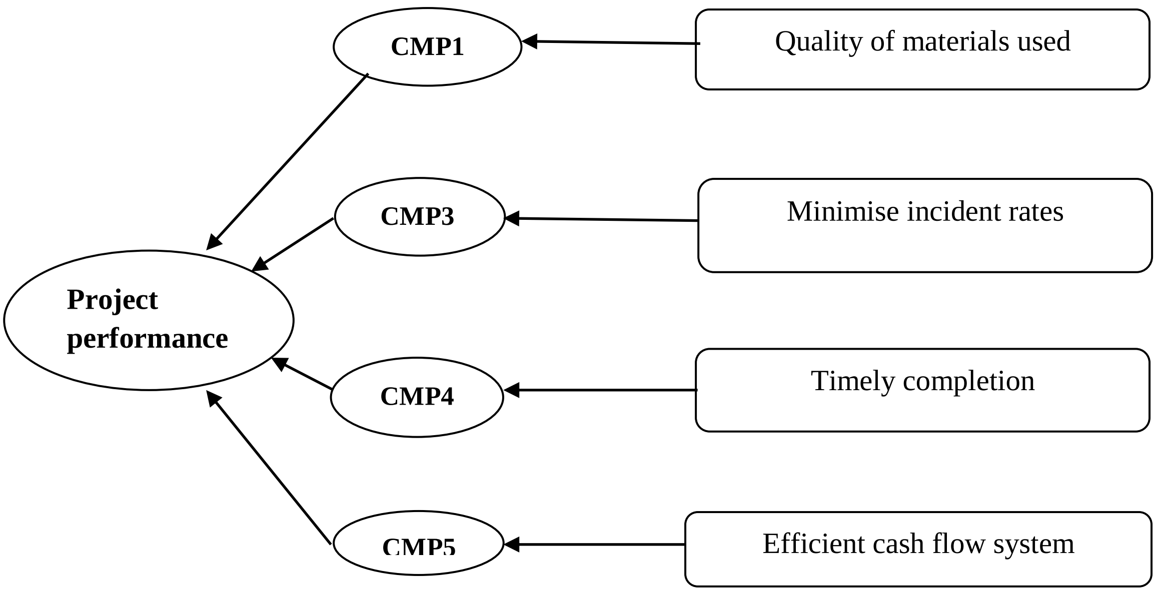


Figure 8.2: Measurement model for performance variables

8.7 Assessing the impact of risk elements in incentive compensation plans

Objective two evaluates the sociological and operational constructs of project performance in relation to incentive mechanisms. As earlier emphasised, incentive compensation plans are tools used to induce risk-adjusted measures and appropriate risk allocation among the contracting parties. Project risk elements are grouped under operational construct (see section 3.11) and they influence the success and profitability of any construction project. To identify the critical project risk factors that influence project performance in incentive compensation plans, a total number of 29 risk factors were identified from the literature review and further categorised into four parts (see table 8.27). The respondents were asked to rank these factors using a Likert's scale of 1 (not significant) to 5 (significant).

Table 7.27 reveals the reliability test result of the four groups of risk elements having their alpha's scores above 0.7 and the alpha score for overall risk elements is 0.94 which is acceptable, this shows high level of internal consistency for scale with this specific sample.

Table 8.28 shows the descriptive statistics of the risk elements in incentive compensation plans. The result of this analysis is presented using mean scores, standard deviations and p-values. It was deemed necessary to classify their responses based on the professions of respondents because project risks are shared among contracting parties therefore they might be diversity in their responses. The result of the mean scores were categorised into three parts where + = high influence (mean value > 3.5), 0 = medium influence (2.5 < mean value < 3.5) and - = low influence (mean value < 2.5). The average mean scores reveal that “improper design” to be the highest ranked with mean score of 4.46 and standard deviation of 0.79, the second ranked factors are ”contract conditions” and “contractual risks” with mean scores of 4.34 and standard deviations of 0.68 and 0.69 respectively. The third ranked factor is “labour disputes and strikes” with an average mean score of 4.32 and standard deviation of 0.81.

Table 8.27: Reliability test result for risk elements in incentive compensation plan

Project risk factors	**α for each group**	**α for overall risk elements**
Technical/operational	0.80	0.94
Project design	0.88	
Firm management factors	0.83	
External factors	0.89	

α = Cronbach’s alpha

Table 8.28: Impact of risk elements in incentive compensation plans

Project risk factors	Clients	R	Consultants	R	Contractors	R	Av. mean	R	SD	p-value
Technical/operational										
Contract conditions	4.48 (+)	3	4.13 (+)	3	4.40 (+)	2	4.34 (+)	2	0.69	<0.05
Controllability of risk	4.48 (+)	3	4.10 (+)	4	4.18 (+)	6	4.25 (+)	6	0.64	<0.05
Cash flow process	4.59 (+)	1	4.03 (+)	5	4.25 (+)	5	4.28 (+)	5	0.86	<0.05
Improper design	4.56 (+)	2	4.40 (+)	1	4.42 (+)	1	4.46 (+)	1	0.79	<0.05
Availability of labour/materials	4.48 (+)	3	4.00 (+)	6	3.98 (+)	9	4.12 (+)	8	0.92	<0.05
Project location	4.22 (+)	6	3.47 (0)	18	3.70 (+)	13	3.77 (+)	17	0.97	<0.05
Construction default	4.33 (+)	4	3.63 (+)	13	3.55 (+)	15	3.79 (+)	16	1.09	<0.05
Incompetence of supplier	4.56 (+)	2	4.03 (+)	5	3.88 (+)	12	4.16 (+)	9	0.89	<0.05
Project design										
Technology transfer process	3.93 (+)	12	3.47 (0)	18	3.43 (0)	19	3.61 (+)	22	0.99	<0.05
Design changes by client	4.07 (+)	10	4.10 (+)	4	4.40 (+)	2	4.19 (+)	7	0.82	<0.05
Unproven engineering techniques	4.22 (+)	7	3.93 (+)	8	4.13 (+)	7	4.09 (+)	10	1.04	<0.05
Job security	3.74 (+)	15	3.27 (0)	21	3.38 (0)	20	3.46 (0)	24	1.11	<0.05
Risk management procedure	4.26 (+)	6	3.77 (+)	11	3.93 (+)	10	3.98 (+)	12	1.00	<0.05
Payment sharing ratio	3.81 (+)	14	3.43 (0)	19	3.22 (0)	22	3.45 (0)	23	1.07	<0.05
Supporting utilities risk	3.85 (+)	13	3.37 (0)	20	3.48 (0)	18	3.55 (+)	23	0.97	<0.05
Protection of historical objects	3.74 (+)	15	2.77 (0)	22	3.30 (0)	21	3.27 (0)	26	1.34	<0.05
Firm management factors										
Financial stability	4.59 (+)	1	4.10 (+)	4	4.25 (+)	5	4.31 (+)	4	0.75	<0.05
Corporate culture	4.18 (+)	8	3.50 (+)	16	3.70 (+)	13	3.77 (+)	17	0.98	<0.05
Labour disputes and strikes	4.29 (+)	5	4.40 (+)	1	4.28 (+)	4	4.32 (+)	3	0.81	<0.05
Contractual risks	4.33 (+)	4	4.30 (+)	2	4.38 (+)	3	4.34 (+)	2	0.68	<0.05
Company liability	4.04 (+)	11	3.70 (+)	12	3.90 (+)	11	3.88 (+)	13	0.92	<0.05
Ownership assets	3.81 (+)	14	3.57 (+)	15	3.53 (+)	16	3.62 (+)	21	1.05	<0.05
Insolvency of the company	4.07 (+)	10	4.10 (+)	4	4.02 (+)	8	4.06 (+)	11	1.04	<0.05
External factors										
Influential economic events	3.67 (+)	16	3.97 (+)	7	3.53 (+)	16	3.72 (+)	18	1.04	<0.05
Environmental factors	3.81 (+)	14	3.50 (+)	17	3.68 (+)	14	3.66 (+)	19	0.99	<0.05
Import restrictions	3.59 (+)	17	3.50 (+)	17	3.10 (0)	23	3.36 (0)	25	1.22	<0.05
Force majeure (forceful events)	3.74 (+)	15	3.80 (+)	10	3.98 (+)	9	3.86 (+)	15	1.22	<0.05
Government regulations	4.14 (+)	9	3.83 (+)	9	3.70 (+)	13	3.87 (+)	14	0.86	<0.05
Bank interest rate	3.85 (+)	13	3.60 (+)	14	3.50 (+)	17	3.65 (+)	20	1.10	<0.05

S.D. = Standard deviation; R = Rank; Av. mean = Average mean; + = high influence; 0 = medium influence; - = low influence

8.8 Evaluating the effect of organisational justice in motivating construction workforce towards improved productivity

Behaviour is categorised as a sociological construct of performance in relation to incentive mechanisms. Employee's behaviour is naturally responsive to the perception of justice in any organisation. As previously noted, the perception of injustice can undermine the morale of employees which might reduce their spirit of effort and activity. There is a need to evaluate the effect of organisational justice on workforce motivation in order to identify the critical parameters that have a major effect on construction workforce. A total number of 24 parameters were identified from the literature review and grouped into three dimensions to evaluate their effects (see table 8.30). Respondents were asked to rank their parameters using a Likert's scale of 1 (no effect) to 5 (major effect) and the mean scores are calculated for clients, consultants and contractors.

Table 8.29 reveals the descriptive statistics for the effect of organisation justice in employee motivation. The mean scores are categorised into three parts in which + = high influence (mean value > 3.5), 0 = medium influence (2.5 < mean value < 3.5) and - = low influence (mean value < 2.5). The average mean scores range from 4.46 to 3.89 which reveals that all variables do have high influence on employee motivation. The highest ranked variable is "rewarding employee's effort" with an average mean score of 4.46 and standard deviation of 0.61; followed by "respect for people" which is the second ranked with an average mean score of 4.43 and standard deviation of 0.79. "Fairness in pay to staff" is ranked third with an average mean score of 4.41 and standard deviation of 0.66.

Table 8.29: Effect of organisational justice on workforce motivation

Organisational practices	Clients	R	Consultants	R	Contractors	R	Av. mean	R	SD	p-value
Distributive justice										
Basic needs	4.04 (+)	12	4.00 (+)	8	3.85 (+)	18	3.95 (+)	17	0.92	<0.05
Fairness in pay to staff	4.59 (+)	2	4.30 (+)	1	4.35 (+)	6	4.41 (+)	3	0.66	<0.05
Recognition of merit performance	4.33 (+)	6	4.20 (+)	4	4.45 (+)	2	4.34 (+)	5	0.79	<0.05
Appropriate rewards/compensation based on productivity	4.33 (+)	6	4.27 (+)	2	4.42 (+)	4	4.35 (+)	4	0.75	<0.05
Rewarding employee's effort	4.63 (+)	1	4.27 (+)	2	4.48 (+)	1	4.46 (+)	1	0.61	<0.05
Proportional equity in reward distribution	4.26 (+)		3.93 (+)	10	4.13 (+)	10	4.10 (+)	10	0.77	<0.05
Maximise the employee contributions	4.37 (+)	5	3.97 (+)	9	3.98 (+)	14	4.08 (+)	11	0.79	<0.05
Rewards/compensate for voluntary services	3.96 (+)	14	3.73 (+)	14	3.55 (+)	20	3.75 (+)	19	1.11	<0.05
Procedural justice										
Involvement of employee's opinion before decisions are taken	4.00 (+)	13	4.00 (+)	8	3.90 (+)	17	3.96 (+)	16	1.07	<0.05
Standard criteria for measuring employee performance	4.41 (+)	4	4.07 (+)	6	3.90 (+)	17	4.09 (+)	12	0.97	<0.05
Logical decision making	4.07 (+)	11	3.90 (+)	11	3.90 (+)	17	3.95 (+)	17	0.97	<0.05
Use of appropriate information	4.22 (+)	8	3.87 (+)	12	3.95 (+)	15	4.00 (+)	15	1.01	<0.05
Appropriate correctability procedure	4.30 (+)	7	4.00 (+)	8	3.98 (+)	14	4.07 (+)	13	0.97	<0.05
Considering employee's concern in decisions	4.30 (+)	7	3.97 (+)	9	3.93 (+)	16	4.04 (+)	14	0.88	<0.05
Morality and ethicality	4.19 (+)	9	4.30 (+)	1	4.03 (+)	13	4.07 (+)	13	0.92	<0.05
Interactional justice										
Truthfulness	4.37 (+)	5	4.30 (+)	1	4.18 (+)	8	4.28 (+)	5	1.03	<0.05
Respect for people	4.56 (+)	3	4.30 (+)	1	4.43 (+)	3	4.43 (+)	2	0.79	<0.05
Socially appropriate behaviour	4.33 (+)	6	4.03 (+)	7	4.10 (+)	11	4.14 (+)	9	0.74	<0.05
Taking justifiable actions	4.26 (+)	8	4.13 (+)	5	4.33 (+)	7	4.24 (+)	6	0.72	<0.05
Effective feedback process	4.33 (+)	6	4.13 (+)	5	4.33 (+)	7	4.27 (+)	5	0.74	<0.05
Effective communication values	4.37 (+)	5	4.27 (+)	2	4.40 (+)	5	4.35 (+)	4	0.75	<0.05
Timeous response to feedback	4.30 (+)	7	4.23 (+)	3	4.17 (+)	9	4.23 (+)	7	0.76	<0.05
Good interactive environment	4.37 (+)	5	4.13 (+)	5	4.05 (+)	12	4.18 (+)	8	0.93	<0.05
Psychological firmness of employees	4.11 (+)	10	3.83 (+)	13	3.78 (+)	19	3.91 (+)	18	0.98	<0.05

S.D. = Standard deviation; R = Rank; Av. mean = Average mean; + = high influence; 0 = medium influence; - = low influence

Table 8.30: Reliability test result for organisational justice

Dimensions of organisational justice	α for each dimension	α for overall organisational justice
Distributive justice	0.84	0.95
Procedural justice	0.91	
Interactional justice	0.93	

α = Cronbach's alpha

The reliability result (table 8.30) shows that the alpha scores of the three dimensions of organisational justice are more than 0.7 and also the overall Cronbach's alpha score for organisation justice is 0.95 which indicates a high level of internal consistency for the scale with this specific sample therefore it is deemed acceptable.

8.9 Evaluating factors influencing organisational performance

As part of objective two, there is a need to identify the factors influencing organisational performance in order to re-structure the organisational culture and commitment to achieve project efficiency. The previous section assessed the organisation justice as a sociological construct of performance which is affected by decisions taken in an organisation. Apart from decision making, there are other functions performed by an organisation towards project delivery. From the literature review, a total number of 24 factors were identified that influence organisational performance and they are further grouped into three parts. The respondents were asked to rank these factors using a Likert scale of 1 (not important) to 5 (very important) and the descriptive statistics are presented in Table 8.31.

The table reveals the mean scores, standard deviations, skewness and kurtosis of factors influencing organisational performance. The result shows that the mean scores range from 4.39 to 3.55 and the group mean scores range from 4.12 to 4.02, this indicates that these factors have positive impact on organisation performance. "Training" has the highest mean score of 4.39 and standard deviation of 0.70, followed by "professional competence of boss" with a mean score of 4.38 and standard deviation of 0.65 and third ranked "profitability of company" which has a mean score of 4.37 and standard deviation of 0.68. The result indicates a satisfactory level of skewness and kurtosis which is within the range of -/+ 2 except in two instances where "management flexibility" and "organisational culture" are scored 2.13 and 2.75 respectively.

Table 8.31: Descriptive statistics for organisational performance factors

Factors	Mean	R	SD	SKN	KTS	G/Mean
Learning strategy						**4.12**
Individual motivation	4.31	5	0.64	-0.88	1.96	
Corporate motivation	4.04	11	0.72	-0.06	-1.04	
Learning environment	3.88	18	0.74	0.04	-0.79	
Innovativeness	3.93	17	0.89	-0.57	0.10	
Management flexibility	4.13	9	0.76	-0.96	2.13	
Training	4.39	1	0.70	-0.90	0.31	
Recognition of knowledge acquisition	4.12	10	0.70	-0.36	-0.19	
Organisation culture	4.15	7	0.71	-0.94	2.75	
Structure and design						**4.04**
Project structure	4.14	8	0.76	-0.25	-1.23	
Organisation policy	3.96	15	0.82	-0.03	-1.28	
Size of organisation	3.65	21	1.04	-0.49	-0.26	
Project goals	4.14	8	0.79	-0.65	-0.03	
Firm's technology	4.03	12	0.82	-0.63	-0.02	
Availability of efficient projects	3.99	14	0.96	-0.76	0.34	
Profitability of company	4.37	3	0.68	-0.82	0.38	
Corporate framework						**4.02**
Individual competence	4.32	4	0.59	-0.23	-0.62	
Transparency	3.94	16	1.05	-1.14	0.95	
Security mechanism	3.74	20	1.11	-0.91	0.33	
Uniformity in job order	3.55	22	1.02	-0.45	-0.02	
Integrity	4.15	7	0.84	-1.04	0.84	
Communication process	4.29	6	0.69	-0.45	-0.83	
Stability of system	4.02	13	0.85	-0.65	-0.06	
Personal values	3.79	19	0.91	-0.83	0.78	
Professional competence of boss	4.38	2	0.65	-0.58	-0.62	

R = rank; SD = standard deviation; SKN = skewness; KTS = kurtosis; G/Mean = Group mean

8.10: Assessing the variables that influence employee/organisational behaviour during project implementation

As previously noted in section 3.11, employee behaviour is grouped as a sociological construct that influence performance. Section 8.4 addressed the drivers of employee motivation while this section assesses the variables that influence employee/organisational behaviour during project implementation. It is essential to emphasise that the study on employee motivation focused on the psychological forces used to influence employees to improve performance while the study on employee/organisational behaviour assesses the variables that are used to encourage and inspire employees. Employee motivation can be regarded as a key element in organisational behaviour; the section advances the body of knowledge by studying other elements that influence organisational behaviour. A total of 23 variables that influence employee/organisational behaviour were identified from the literature review and grouped into four categories, namely: individual personality; organisation values/beliefs; work characteristics; and work environment. Respondents were asked to rank these variables using a Likert scale of 1(no effect) to 5 (major effect).

Table 8.32 reveals the descriptive statistics for employee/organisational behaviour showing mean scores, standard deviations, skewness and kurtosis. The groups mean scores range from 4.37 to 4.18 and also the mean scores of variables range 4.50 to 3.86, this reveals that all the variables have positive impact on employee/organisational behaviour. The highest ranked is “communication process” with a mean score of 4.50 and standard deviation of 0.63, followed by “learning process” which is the second highest ranked and then “respect for co-workers” is the third ranked. The skewness and kurtosis scores show an acceptable distribution but “performance evaluation process”, “employer’s involvement” and “effective conflict management strategy” were rated above the acceptable level of -/+2.

Table 8.32: Descriptive statistics for employee/organisational behaviour

Variables	Mean	R	SD	SKN	KTS	G/Mean
Individual personality						**4.18**
Personal attitudes	4.41	5	0.66	-0.67	-0.55	
Perceived alternative employment opportunities	4.03	19	0.68	-0.43	0.47	
Individual competence	4.30	11	0.75	-1.02	0.97	
Perceptions	3.95	21	0.99	-1.00	1.12	
Organisation values/beliefs						**4.22**
Decision making process	4.18	16	0.67	-0.22	-0.80	
Reward system	4.44	4	0.59	-0.83	1.39	
Opportunity for advancement	4.31	10	0.65	-0.89	1.68	
Respect for people	4.36	8	0.61	-0.40	-0.63	
Learning process	4.48	2	0.69	-1.18	0.85	
Performance evaluation process	4.01	20	0.96	-1.37	2.29	
Organisational policy	4.08	17	0.77	-0.55	0.00	
Work characteristics						**4.19**
Working conditions	3.90	22	0.96	-1.14	1.60	
Competition	4.29	12	0.66	-0.63	0.35	
Appropriate supervision & inspection	3.86	23	0.79	-0.50	0.70	
Proper management of design changes and variations	4.39	6	0.63	-0.56	-0.60	
Lack of materials, tools and variations	4.19	15	0.81	-1.33	3.25	
Lack of construction materials, tools and equipment	4.32	9	0.80	-0.79	-0.57	
Technology capability	4.05	18	0.76	-0.51	-0.03	
Work environment						**4.37**
Communication process	4.50	1	0.63	-0.90	-0.19	
Work relationship	4.28	13	0.69	-0.64	0.08	
Respect for co-workers	4.46	3	0.67	-1.09	0.84	
Employer's involvement	4.37	7	0.66	-1.45	5.38	
Effective conflict management strategy	4.22	14	0.94	-1.54	2.74	

R = rank; SD = standard deviation; SKN = skewness; KTS = kurtosis; G/Mean = Group mean

8.11: Assessing the organisational competency measures in project delivery

Organisational competency is identified as a form of operational construct of performance; the objective two is focused on evaluating this construct. In order to achieve this, a total number of 20 variables were identified from the literature review and analysed using PCA. The use of PCA was considered adequate because of the need to reduce the data set and also identify the similarities in data grouping. The steps used in conducting PCA and interpreting the result are described in section 8.3.

Table 8.33 reveals the result of eigenvalues of the correlation matrix for organisational competency measures. Based on eigenvalue-one criterion, 5 components were selected with benchmark of eigenvalue of 1.289 accounting for cumulative variance of 76. The decision to retain the 5 components is supported by the scree plot and percent proportion of the total variance therefore they are retained for rotation and interpretation. Table 8.34 shows the result of the rotated variables with more than 0.40 loadings, the decision to retain any component is based on the criterion that there must be at least three variables with significant loadings for a component to be retained. Based on this criterion, components 1, 2, 3 and 5 were retained for interpretation.

Table 8.33: Eigenvalues of the correlation matrix for organisational competency measures

Components	**Eigenvalue**	**Difference**	**Proportion**	**Cumulative**
1	7.606	4.924	0.380	0.380
2	2.682	0.416	0.134	0.514
3	2.266	0.927	0.113	0.628
4	1.338	0.049	0.067	0.695
5	1.289	0.480	0.065	0.759
6	0.810	0.187	0.041	0.799
7	0.622	0.036	0.031	0.830
8	0.585	0.045	0.029	0.860
9	0.541	0.081	0.027	0.887
10	0.460	0.074	0.023	0.910
11	0.386	0.062	0.019	0.929
12	0.324	0.054	0.016	0.945
13	0.270	0.061	0.014	0.959
14	0.209	0.052	0.010	0.69
15	0.157	0.019	0.008	0.977
16	0.137	0.040	0.007	0.984
17	0.096	0.001	0.005	0.989
18	0.094	0.021	0.005	0.993
19	0.073	0.024	0.004	0.997
20	0.049		0.003	1.000

Initial factor method: Principal component analysis (SAS)

Table 8.34: Rotated factor pattern from PCA of organisational competency measures

Variables	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
V16_2c	0.857				
V16_2a	0.822				
V16_2e	0.822				
V16_2f	0.817				
V16_2d	0.775				
V16_2g	0.752				
V16_4c		0.790			
V16_3a		0.777			
V16_3b		0.680			
V16_3c		0.595			
V16_1b			0.842		
V16_1a			0.812		
V16_1c			0.644		
V16_1d			0.614		
V16_4a				0.880	
V16_4b				0.847	
V16_1e					0.437
V16_2b					0.739
V16_3e					0.667
V16_3d					0.542

Rotation method: Varimax

8.11.1 Adaptability strategy

Component 1 has six organisational competency measures retained; these variables are grouped under adaptability strategy. Table 8.35 reveals the final communality estimates for the six measures ranging 0.863 to 0.778 which is above 0.5 threshold indicating that the criterion is met. From the rotated factor pattern (table 8.34), the variable with the highest loading of 0.857 is "willingness to transfer technology".

Table 8.35: Final communality estimates for adaptability strategy

Measures	h^2
Willingness to transfer technology	0.835
Technology transfer method	0.843
Cultural traits of transferor/transferee	0.778
Transfer environment	0.842
Intent to learn new technology	0.863
Level of involvement of transferor/transferee	0.826

h^2 = final communality estimates

Reliability analysis reveals the overall Cronbach's alpha for component 1 is 0.92 (N of items = 6) which also indicates a high level of internal consistency for the scale with this specific sample. Pearson correlation coefficients for adaptability strategy (table 8.36) show that these six measures have either high or medium correlation with each other at significant level of 0.01. Therefore, the result of this analysis reveals a good measure.

Table 8.36: Pearson correlation coefficients for adaptability strategy

Measures	Willingness to transfer technology	Technology transfer method	Cultural traits of transferor/ transferee	Transfer environment	Intent to learn new technology	Level of involvement of transferor/ transferee
Willingness to transfer technology	1.000	-	-	-	-	-
Technology transfer method	0.673 0.000	1.000	-	-	-	-
Cultural traits of transferor/transferee	0.670 0.000	0.623 0.000	1.000	-	-	-
Transfer environment	0.612 0.000	0.686 0.000	0.869 0.000	1.000	-	-
Intent to learn new technology	0.757 0.000	0.678 0.000	0.539 0.000	0.519 0.000	1.000	-
Level of involvement of transferor/transferee	0.647 0.000	0.602 0.000	0.825 0.000	0.844 0.000	0.412 0.000	1.000

Correlation is significant at the 0.01 level (2-tailed)

8.11.2 Work structure

Four organisational competency measures were retained in component 2; the similarities between the variables can be grouped within work structure. Table 8.37 reveals the final communality estimates for the four measures ranging 0.751 to 0.711 which is above 0.5 threshold indicating that the criterion is met. "Educational background" has the highest loading of 0.790 in component 2 (see table 8.34).

Table 8.37: Final communality estimates for work structure

Measures	h^2
Educational background	0.711
Feedback process	0.751
Job mismatch	0.730
Clarity in technology process	0.736

h^2 = final communality estimates

Reliability analysis reveals the overall Cronbach's alpha for component 1 is 0.82 (N of items = 4) which also indicates a high level of internal consistency for the scale with this specific sample. Table 8.38 reveals the Pearson correlation coefficients for these four measures which show that they have either high or medium correlation with each other at significant level of 0.01. Therefore, the result of this analysis signifies a good measure of these variables.

Table 8.38: Pearson correlation coefficients for work structure

Measures	**Educational background**	**Feedback process**	**Job mismatch**	**Clarity in technological process**
Educational background	1.000	-	-	-
Feedback process	0.608 0.000	1.000	-	-
Job mismatch	0.469 0.000	0.591 0.000	1.000	-
Clarity in technological process	0.463 0.000	0.543 0.000	0.636 0.000	1.000

Correlation is significant at the 0.01 level (2-tailed)

8.11.3 Work relationship

Table 8.39 reveals the final communality estimates for work relationship where four competency measures were retained for interpretation in component 3. The final communality estimates range from 0.760 to 0.685 which indicates the threshold of 0.5 is met. From Table 8.34, "competence of team members" has the highest loading among the retained variables in component 3.

Table 8.39: Final communality for work relationship

Measures	h^2
Competence of team members	0.760
Commitment of decision makers	0.730
Interaction within the team members	0.696
Integrative concept of sharing	0.685

h^2 = final communality estimates

Reliability analysis reveals the overall Cronbach's alpha for component 4 is 0.82 (N of items = 4) which also indicates a high level of internal consistency for the scale with this specific sample. Pearson correlation coefficients for work relationship measures have either high or medium correlation with each other at significant level of 0.01 (see table 8.40). Therefore, the result of this analysis signifies a good measure of these variables.

Table 8.40: Pearson correlation coefficients for work relationship

Measures	**Competence of team members**	**Commitment of decision makers**	**Interaction within the team members**	**Interaction within the team members**
Competence of team members	1.000	-	-	-
Commitment of decision makers	0.542 0.000	1.000	-	-
Interaction within the team members	0.553 0.000	0.455 0.000	1.000	-
Integrative concept of sharing	0.462 0.000	0.524 0.000	0.680 0.000	1.000

Correlation is significant at the 0.01 level (2-tailed)

8.11.4 Company characteristics

Component 5 retained four organisational competency measures which can grouped under company characteristics. The final communality estimates range from 0.757 to 0.651, this indicates the threshold of 0.5 is met by the retained variables (table 8.41). The rotated factor pattern as shown in Table 8.34 reveals that "easy access to knowledge" has the highest loading of 0.739.

Table 8.41: Final communality estimates for company characteristics

Measures	**h^2**
Easy access to knowledge	0.651
Work ethic	0.599
Poor reward system	0.686
Unrealistic policies and procedures	0.757

h^2 = final communality estimates

The overall Cronbach's alpha for component 5 is 0.70 (N of items = 4). Table 8.42 reveals the Pearson correlation coefficients for component 5 where all the four competency measures have medium correlation with each other at significant level of 0.01. This indicates that they can predict each other.

Table 8.42: Pearson correlation coefficients for company characteristics

Measures	**Easy access to knowledge**	**Work ethic**	**Poor reward system**	**Unrealistic policies and procedures**
Easy access to knowledge	1.000	-	-	-
Work ethic	0.311 0.000	1.000	-	-
Poor reward system	0.244 0.016	0.343 0.000	1.000	-
Unrealistic policies and procedures	0.310 0.002	0.448 0.000	0.527 0.000	1.000

Correlation is significant at the 0.01 level (2-tailed)

8.11.5 Measurement model for organisational competencies in project delivery

For the purpose of measuring organisational competencies, the highest loading for each retained component is adopted. There are four retained components and they are represented as component 1 (CMP1), component 2 (CMP2), component 3 (CMP3) and component 5 (CMP5). This is presented in Figure 8.3 showing the highest variable for each component. The result of this analysis is adopted for the qualitative survey (see chapter 10).

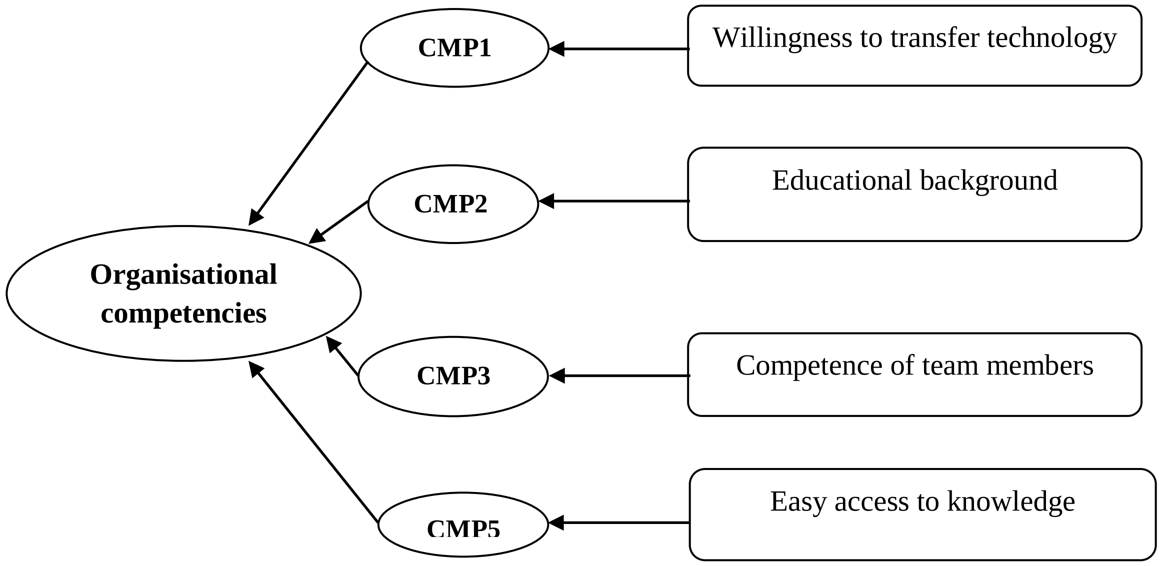
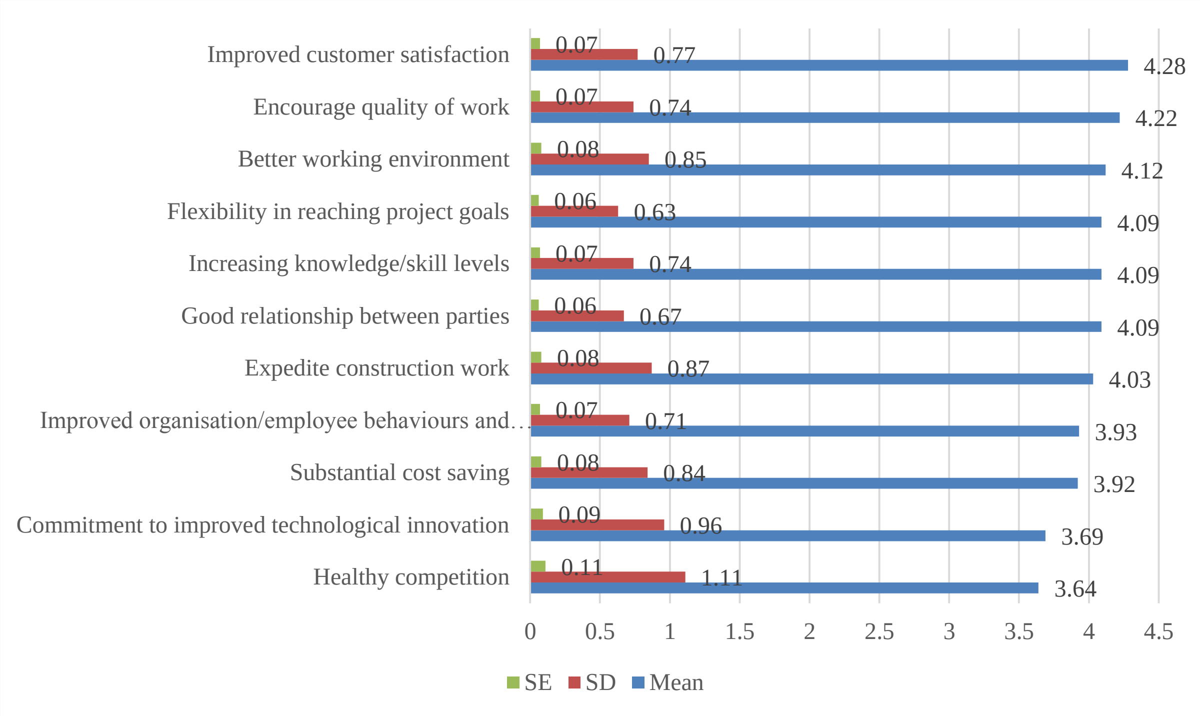


Figure 8.3: Measurement model for organisational competencies

8.12 Economic benefits of incentive schemes in projects

Objective three evaluates the economic impact of incentive mechanisms in the construction industry. In order to achieve the objective, this section focuses on identifying the economic benefits of incentive schemes in projects. From the literature review, 11 practices were identified and adopted to measure the economic benefits of incentives. Respondents were asked to rank these practices using a Likert scale of 1 (not significant) to 5 (very significant) and the result of this analysis is presented in Figure 8.4. “Improved customer satisfaction” has the highest ranked with a mean score of 4.28 (SD=0.77; SE=0.07), the second ranked is “encourage quality of work” with a mean score of 4.22 (SD=0.74; SE=0.07) and the third ranked is “better working environment” with a mean score of 4.12 (SD=0.85; SE=0.08). The scores of standard deviation reveal that the distributions of their responses to the mean are normal while standard errors are relatively small thereby indicating the reliability of this specific sample.

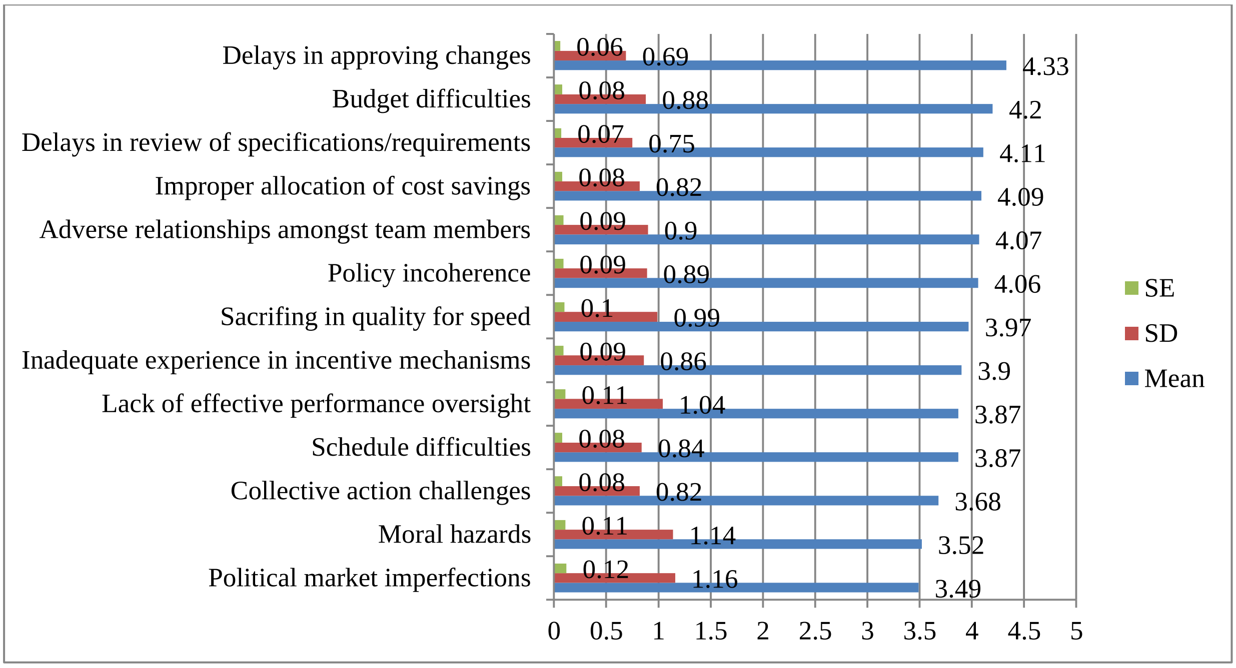


SD=standard deviation; SE=standard error

Figure 8.4: Economic benefits of incentive schemes in projects

8.13 Economic challenges of incentive schemes in projects

In order to achieve the second part of objective three, this section assesses the economic challenges confronting the use of incentive schemes in projects. A total number of 13 economic challenges in relation to the use of incentives were identified from the literature review and the respondents were asked to rank their impact using a 5-point Likert scale ranging from 0 (no challenge) to 5 (major challenge). Figure 8.5 reveals the mean scores, standard deviations and standard errors of the economic challenges of incentives. The highest ranked is "delays in approving changes" with a mean score of 4.33 (SD=0.69; SE=0.06), the second ranked is "budget difficulties" with a mean score of 4.20 (SD=0.88; SE=0.08) and the third ranked is "delay in review of specifications/requirements" with a mean score of 4.22 (SD=0.75; SE=0.07). The result shows a normal distribution of their responses to mean with standard deviations scattered around 1.0 and less while standard errors are relatively small, indicating the reliability of this sample.



SD=standard deviation; SE=standard error

Figure 8.5: Economic challenges confronting the use of incentives in projects

8.14 Payment strategies in performance compensation plans

This section evaluates the payment strategies adopted in compensating for performance in construction projects. From the literature review, 17 payment strategies were identified and the respondents were asked to select the type(s) of strategies used in their various organisations to compensate for performance. The result of the analysis is presented in Figure 8.6; the most frequently used payment strategy is “annual bonuses” with a percentage score of 25.2. “Merit pay” as a payment strategy is ranked second with a percentage score of 14 while “awards” is ranked as the third with a percentage score of 10.

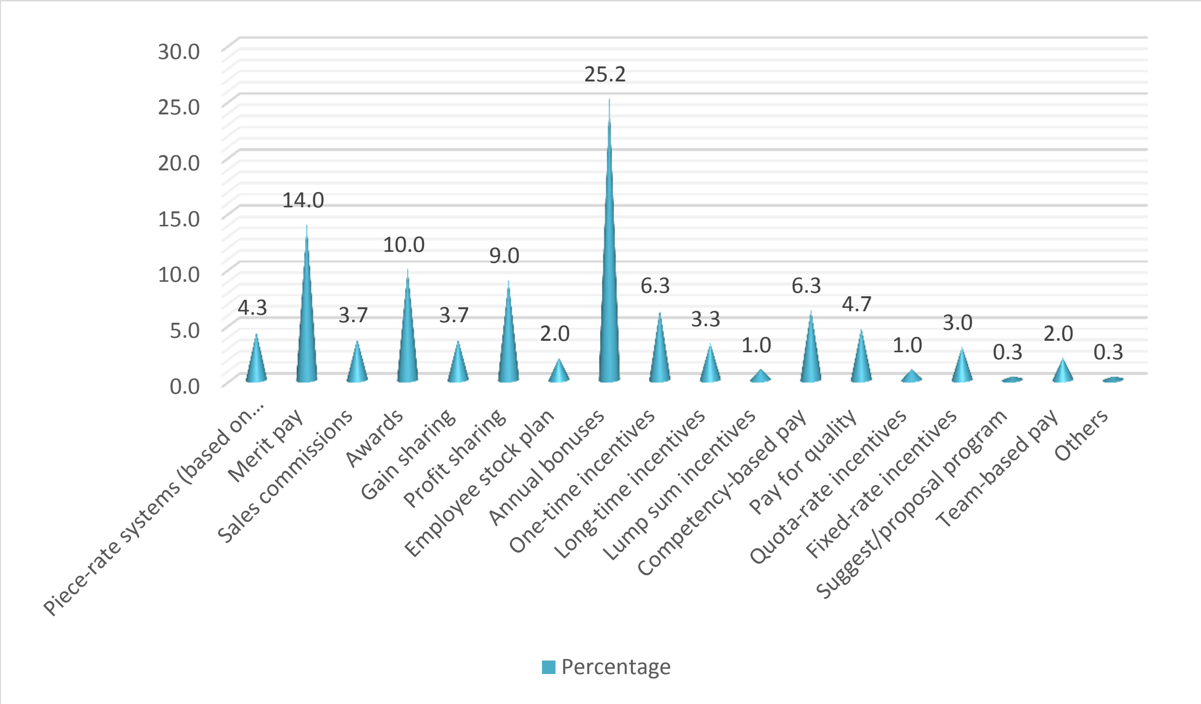


Figure 8.6: Payment strategies in performance compensation plans

8.15 The use of incentives in achieving project performance

The study identified five sub-problems relating to the problem statement and they are translated into hypothetical statements. Respondents were asked to rank these statements using a 5-point Likert scale of 0 (strongly disagree) to 5 (strongly agree). The result of this analysis is presented using mean scores, standard deviations and p-values (Table 8.43). It was deemed necessary to classify their responses based on organisation type namely: clients, consultants and contractors. To assess their rankings, the result is divided into three categories in which + = high acceptance (mean value > 3.50), 0 = neutral (2.5 < mean value < 3.5) and - = rejected (mean value < 2.5). The table reveals that all the hypothetical statements were accepted with average mean scores ranging from 4.55 to 3.50. The standard deviation reveals a normal distribution to mean while p-values for these statements are less than 0.05; therefore the result is accepted as a good measure of the data set.

Table 8.43: Hypothetical statements for evaluating incentive mechanisms in projects

Statements	A	B	C	Av. Mean	SD	p-value
1. The behaviour pattern of project participants can influence the project outcomes	4.59 (+)	4.47 (+)	4.58 (+)	4.55 (+)	0.56	<0.05
2. The weights of various critical project performance measures are fundamental tools to assess performance deliverables in projects	4.40 (+)	3.80 (+)	3.98 (+)	4.04 (+)	0.82	<0.05
3. Lack of fairness in organisational justice will have negative impact on project outcomes	4.22 (+)	4.17 (+)	4.05 (+)	4.13 (+)	0.76	<0.05
4. The use of incentives that do not incorporate project risks will impact negatively on project participants and performance objectives	4.04 (+)	3.73 (+)	3.85 (+)	3.87 (+)	0.86	<0.05
5. The level of perception on the use of multiple incentives is low which has significantly contributed to poor working relationship among contracting parties	3.74 (+)	3.37 (+)	3.45 (+)	3.50 (+)	0.90	<0.05

A=clients; B=consultants; C=contractors; Av. Mean=Average mean; SD=standard deviations

8.16 Performance variables influencing compensation/incentive payoffs in projects

This section is focused on identifying the most influential variables required to measure employee performance in an organisation. This will form the parameters for measuring employees' efforts in construction projects. There are eight employee performance variables identified in the literature review and the respondents were asked to rank these variables on a scale of 1 = very low and 5 = extremely high. The result of the analysis is presented in Figure 8.7 where the threshold is 3.50. Based on the threshold, "technical efforts", "work output" and "job requirement" are considered highly significant in assessing the performance of operational staff while "technical efforts", "work output" and "managerial skills" are considered highly significant in assessing the performance of management staff.

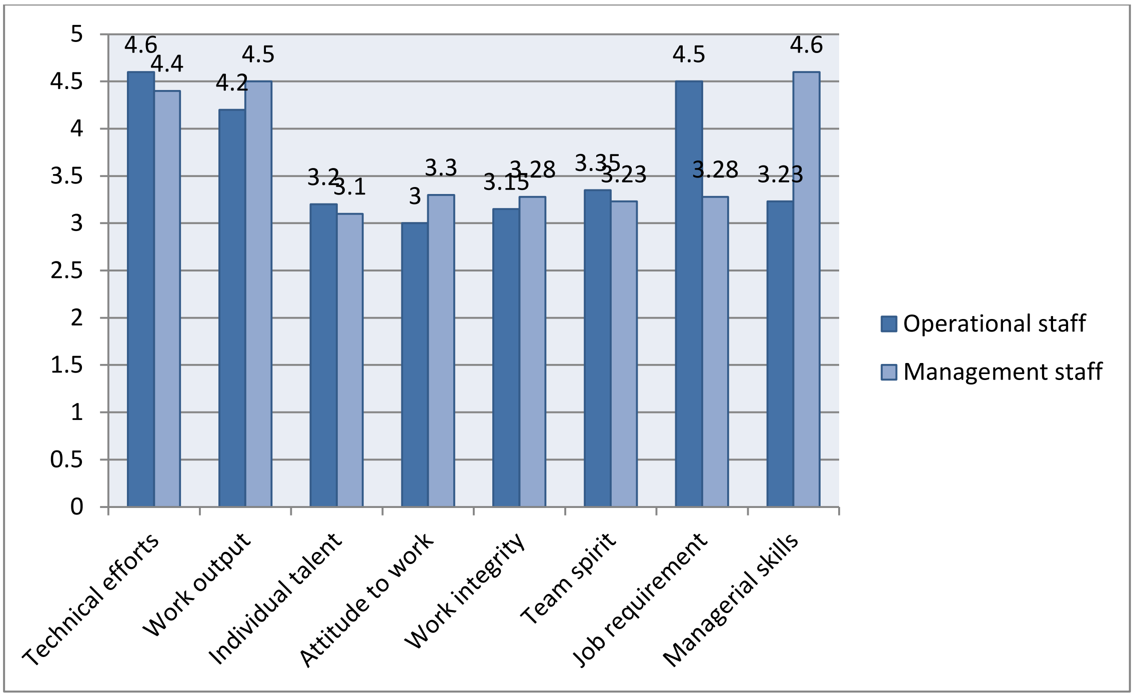


Figure 8.7: Performance variables for employee compensation/incentive payoffs

8.17 Chapter summary

This chapter presented a detailed analysis and discussion of findings gathered through questionnaire survey in South Africa. The assessment of the management attributes reveals four attributes that significantly contribute to project improvement as (1) knowledge/skill transfer process, (2) environmental influence, (3) competitive advantage and (4) achieving specified project goals. Most organisations are concerned about how to be creative but in most cases, useful ideas already exist in the environment. Therefore, knowledge can be effectively transferred if it is integrated into a set of policies for knowledge generation and capture. Most respondents believed that the need for a skilled workforce in the South African construction industry necessitates an effective knowledge/skill transfer process to bridge the gap.

Organisational policy and strategy is influenced directly by the environment within or outside the organisation while business environment plays an important role influencing both the structure and decision making in an organisation. This has generated competitive pressures where most players in the construction industry are devising various means to remain in business and also gain competitive advantage over others. The findings show consistency in their responses where environmental influence will automatically create the demand for competitiveness among organisations. The ability to achieve specified project goals is paramount not only to achieve project success but also to evaluate an organisation's capability which is regarded as significant in assessing management attributes in an organisation.

The evaluation of positive motivational drivers that bridge the gap between contractors' objectives and clients' expectations identified five highest ranked drivers as (1) timeous payment, (2) prospect for promotion, (3) good supervision, (4) respect for people and (5) commitment. The respondents emphasise the need for timeous payments although it is regarded as the most challenging aspect in construction project delivery system but it can motivate both employees and organisations. Promotion in the construction industry is a high priority that requires tapping into all potential sources of labour supply to meet growing needs. The global demand for increase in construction activities necessitates training and retraining workers, as well as providing for long-term needs. Good supervision is not only significant in improving project performance but also create good relationship between supervisors and subordinate workers. Respect for people is regarded as a significant driver of employee motivation, organisations who fail to improve their attitude and commitment towards respect for people will fail to recruit and retain the best talent and professional partners. The findings reveal that most respondents prefer financial and non-financial incentive schemes to a semi-financial incentive scheme (section 8.5).

The use of PCA to reduce data sets for performance indicators identified four performance parameters that influence construction projects as: (1) quality of materials used, (2) minimise incident rates, (3) timely completion and (4) efficient cash flow system (see section 7.6.5). Most respondents agreed that quality of materials used in construction will significant impact on improving quality performance. It is essential to note that a good quality management will not only improve quality performance but also influence other performance indicators, for example, reduction in time overruns through fewer errors and less rework.

The ability to minimise incident rates is identified as a significant variable to achieve improved safety/health performance. The need for a zero accident culture on construction sites has remained predominant which will not only improve safety/health performance but contribute significantly to profit margins. Most construction projects are faced with time overruns, a high percentage of respondents agreed that timely completion will significantly influence time performance in projects. Efficient cash flow is measured against successful cash inflows and outflows from an operating system which will directly impact on the company's liquidity. Most respondents agreed that an efficient cash flow system is essential to improve performance because it is a primary financial indicator for any organisation.

The assessment of possible risk elements in incentive compensation plans reveals "improper design" as the most critical element influencing risk allocation in projects. Project design is an important stage in construction where the project is initiated and designed for execution which requires proper management of project design to ensure compliance with the required specifications and standards. Disputes might arise in risk allocation when the contractor refuses to take responsibility for design failure.

“Contractual risks” and “contract conditions” are identified as second ranked elements influencing risk allocation where inappropriate allocation of uncontrollable risks might foster an adversarial relationship among contracting parties likewise the contract conditions. The third ranked critical element is “labour disputes and strikes”, most respondents believed that this element is unpredictable therefore it may be difficult to mitigate during project delivery and in most cases; the contractor bears the risk alone.

Evaluating the effect of organisational justice in motivating construction workforce towards improved productivity reveals “rewarding employee’s effort”, “respect for people” and “fairness in pay to staff” as the most influential factors. As previously stated, rewarding for employee’s effort might not be through cash only but also through non-monetary ways. The analysis in section 7.5 presented a detailed result on the most effective schemes adopted in compensating employees. Respect for people is the second ranked influential factor of organisational justice. People are naturally responsive to the treatment given to them and that will influence their levels of job satisfaction. Most respondents believed that there should be fairness in pay to staff for their genuine contributions in accordance to organisations’ policies and that will have a significant effect on organisational justice.

“Training”, “professional competence of boss” and “profitability of company” were identified as the most essential factors influencing organisational performance. Trained workers will significantly contribute to the performance of any organisation likewise the professional competence of any boss. The company’s ability to remain profitable in project delivery will secure the survival of such company. Assessing the variables that influence employee/organisational behaviour during project implementation reveals “communication process”, “learning process” and “respect for co-workers “ as the three effective variables.

Organisational behaviour is influenced by the interaction within an organisation; this can increase the competitive ability and market value of the organisation. Communication process is identified as a highly influential factor where the level of employees' communication satisfactions in an organisational setting will affect their loyalties to the company. Learning process and respect for co-workers are considered as highly influential factors. Learning process provides an avenue for new behaviours to be acquired while respect for co-workers will create an enabling environment to transfer such behaviour if positive.

The use of PCA to assess the organisational competency measures in project delivery reveals four critical measures affecting organisational competencies as: (1) willingness to transfer technology, (2) educational background, (3) competence of team members and (4) work ethic (see section 8.11). Willingness to transfer technology is identified as a required critical measure of organisational competencies. It is in line with findings from the literature review where governments have sought for ways to encourage small construction companies to improve their capability thereby creating skill acquisitions to bridge the gap of the skilled workforce. Educational background is regarded as a critical measure where most respondents believed that formal skill transfer through education is necessary to assess competencies. The majority of the respondents agreed that it is necessary to assess an organisation based on the availability of the required skills for a particular project among its workforce. Work ethic in this study refers to the principles adopted in a particular organisation towards contract procurement and implementation. This is regarded as significant in assessing organisational competencies.

The appraisal of the economic impact of incentive mechanisms identified the most critical economic benefits as: (1) improved customer satisfaction, (2) encourage quality of work and

(3) better working environment. The most critical economic challenges are identified as (1) delays in approving changes, (2) budget difficulties and (3) delay in review of specification/requirements. Section 8.14 reveals the payment strategies adopted in performance compensation plans; the result shows that “annual bonuses”, “merit pay” and “awards” were the most frequency used payment strategies.

The result of the hypothetical statements reveals that most respondents agreed that there is a need to introduce multiple incentive mechanisms reflecting the critical performance measures and also that project risk is an essential factor to consider in the design of incentive mechanisms. The findings from the questionnaire survey as presented in this chapter were adopted to develop qualitative survey questions and also to construct the framework for incentive mechanisms.

CHAPTER NINE

DATA ANALYSIS AND DISCUSSION (NIGERIA)

9.1 Introduction

The previous chapter presented the data analysis and discussion of the results from the questionnaire survey administered in South Africa. This study also evaluates the practice of incentive mechanisms in Nigeria where the data analysis and discussion of the findings are presented in this chapter. The field survey was conducted from August to October 2014; the results are interpreted using descriptive and inferential statistics. Tables, diagrams and charts are extensively used for data presentations, analysis and interpretation of results in this chapter.

This chapter is structured as follows: section 9.2 identifies demographic information of respondents showing the sample characteristics of the questionnaire survey as well as the non-response bias estimation. Section 9.3 assesses the management attributes that contribute to project improvement; construction motivational drivers that bridge the gap in project performance were evaluated in section 9.4. Impact of incentives on workforce motivation was measured in section 9.5; section 9.6 evaluates performance indicators/parameters in construction projects. Section 9.7 assesses the impact of risk elements in incentive compensation plans while section 9.8 evaluates the effect of organisational justice in motivating construction workforce towards improved productivity.

Factors influencing organisational performance were evaluated in section 9.9 while section 9.10 assesses the variables that influence employee/organisational behaviour during project implementation. Section 9.11 assesses the organisation competency measures in project delivery, section 9.12 evaluates the economic benefits of incentives in projects and section

9.13 assesses the economic challenges of incentives in projects. Payment strategies in performance compensation plans were identified in section 9.14 and section 9.15 evaluates the use of incentives in achieving project performance. Finally, the summary of the key findings is presented in section 9.16.

9.2 Demographic information

This section introduces the characteristics of respondents in the field survey carried out using questionnaires. A total number of 338 questionnaires were distributed among the sampled population in Nigeria. Out of that number, 101 valid responses were computed for the data analysis with a response rate of 30 percent. As previously noted in section 8.2, this is considered acceptable in the field of organisational research. No specific reason was given by respondents for the uncompleted questionnaires and invalid responses. Table 9.1 reveals the response rate for the questionnaire survey in Nigeria.

Table 9.1: Response rate for questionnaire survey (Nigeria)

Groups	**Administered questionnaire**	**Returned**	**Usable**	**Percentage contribution to total response**
Group A	76	21	16	16
Group B	127	52	43	43
Group C	135	49	42	41
Total	**338**	**122**	**101**	**100**

9.2.1 Non-response bias estimation for questionnaire survey

As previously noted, non-response bias estimation is used to identify any possible source of non-response bias in a set of data. In this study, the mean scores of descriptive statistics for the four selected demographic data were evaluated and t-test was conducted to examine if there is any significant difference between their means (see table 9.2). The result reveals that the p-value for each demographic information is more than 0.05 which implies there is no significant difference between the first 15 responses and the last 15 responses (p-value is significant at $p<0.05$).

Table 9.2: Non-response bias estimation for questionnaire survey (Nigeria)

Descriptive statistics	Mean of first 15 responses	Mean of last 15 responses	t-test result (p-value)
Organisation type	2.26	2.53	0.95
Job description	2.07	1.733	0.92
Work experience	10.13	12.83	0.31
Academic qualification	2.80	3.20	0.07

9.2.2 Sample characteristics of questionnaire survey

This section presents the characteristics of respondents used for data analysis and the result is presented using descriptive statistics of frequency and percentage. As previously noted, organisation types are further classified into three groups, namely: clients/employers, consulting firms and construction companies. Subcontracting firms and suppliers are grouped as construction companies. Table 9.3 reveals the profile of respondents from the questionnaire survey. The analysis shows that the three major aspects of contracting parties are well represented, 15.8 percent represents the clients/employers, and 42.6 percent of respondents are engaged in consulting firms while 41.6 percent of respondents are employed in construction companies. The analysis of job description reveals also that each designation is well represented with a percentage of 36.6 for managerial position, a percentage of 38.6 for middle management position and a percentage of 24.8 for operational staff. Although the research problem is related to managerial problems, it is equally essential to seek the opinions of other workers, this enables reasonable conclusions to be drawn based on the research objectives.

Table 9.3: Profile of respondents from questionnaire survey in Nigeria

Demographic information	Frequency	Percentage	Cumulative Percentage
Organisation type			
Clients/employers	16	15.8	15.8
Consulting firms	43	42.6	58.4
Construction companies	42	41.6	100
Job description			
Managerial position	37	36.6	36.6
Middle management position	39	38.6	75.2
Operational (skilled/unskilled)	25	24.8	100
Work experience			
1 to 10 years	48	47.5	47.5
11 to 20 years	33	32.7	80.2
21 to 30 years	16	15.8	96
Above 30	4	4.0	100
Number of participated projects			
1 to 5	31	30.7	30.7
6 to 10	21	20.8	51.5
11 to 20	20	19.8	71.3
21 to 30	10	9.9	81.2
Above 30	19	18.8	100
Academic qualification			
WAEC	6	5.9	5.9
N.Diploma/H.Diploma	13	12.9	18.8
B.Tech/B.Sc. (honours)	47	46.5	65.3
M.Sc./M.Tech	31	30.7	96
PhD/D.Tech.	4	4.0	100

The result shows that 47.5 percent of respondents have between 1 to 10 years of work experience, 32.7 percent of respondents have between 11 to 20 years of work experience and 15.8 percent of respondents have between 21 to 30 years and 4 percent of respondents have above 30 years of work experience. From the analysis of respondents' work experience, it shows that 80.2 percent of the total respondents have between 1 to 20 years of work experience. The analysis of projects participated by respondents reveals that 81.2 percent of respondents had participated in numbers of projects ranging from 1 to 20, this implies the majority of them have ample experience that are relevant to achieve the objectives of this study. In terms of academic qualifications, 46.5 percent of respondents have obtained formal education in various Bachelor degrees while a combination of more than 80 percent of respondents has either Bachelor, Masters or PhD/D.Tech degrees in various disciplines.

9.3 Assessing the management attributes that contribute to project improvement

Section 8.3 assessed the management attributes and their influence on project improvement in South Africa and this section assesses their influence on project improvement in Nigeria. This is part of the objective two of this study which evaluates the relationships among the constructs of project improvement. PCA was adopted to reduce the 20 management attributes identified in the literature review and group them into fewer components. The steps adopted to assess these attributes using PCA are discussed in section 8.3. Eigenvalues of the correlation matrix for management attributes are shown in Table 9.4. Based on eigenvalue-one criterion, component 6 has an eigenvalue of 1.080 which is the benchmark with 75 percentage of total variance accounting for the 6 components.

The decision to retain any component that accounts for at least 5 or 10 percent proportion of the total variance shows that component 6 is still within the limit, therefore it is considered as acceptable. The Scree test plot also confirms 6 components with relatively large breaks. Therefore, 6 components were retained for rotation and interpretation. The result of the Varimax rotation is displayed in Table 9.5 showing the retained variables with high loadings of more than 0.40 for each component and the next step is to check for similarities among factors in the same component.

Table 9.4: Eigenvalues of the correlation matrix for management attributes

Components	Eigenvalue	Difference	Proportion	Cumulative
1	8.234	6.536	0.411	0.411
2	1.697	0.160	0.084	0.496
3	1.537	0.184	0.076	0.573
4	1.352	0.203	0.067	0.641
5	1.149	0.068	0.057	0.698
6	1.080	0.296	0.054	0.753
7	0.784	0.104	0.039	0.792
8	0.679	0.089	0.034	0.825
9	0.590	0.098	0.029	0.855
10	0.492	0.087	0.024	0.879
11	0.405	0.041	0.020	0.900
12	0.363	0.024	0.018	0.918
13	0.338	0.072	0.016	0.935
14	0.266	0.006	0.013	0.948
15	0.259	0.028	0.013	0.961
16	0.231	0.049	0.012	0.973
17	0.182	0.035	0.009	0.982
18	0.147	0.028	0.007	0.989
19	0.119	0.033	0.006	0.995
20	0.085		0.004	1.000

Initial factor method: Principal component analysis (SAS)

Table 9.5: Rotated factor pattern from PCA of management attributes

Attributes	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
V7_5a	0.778					
V7_5d	0.763					
V7_5c	0.749					
V7_5b	0.672					
V7_2c		0.749				
V7_2b		0.710				
V7_2a		0.667				
V7_2d		0.575				
V7_1a		0.503				
V7_4c			0.841			
V7_4b			0.755			
V7_4a			0.516			
V7_3b				0.836		
V7_3a				0.642		
V7_1c				0.586		
V7_3c					0.712	
V7_1d					0.674	
V7_4d					0.594	
V7_3d						0.667
V7_1b						0.620

Rotation method: Varimax

9.3.1 Project sustainability

There are four management attributes retained in Component 1, these attributes can be grouped as project sustainability. Table 9.6 reveals the final communality estimates for these four attributes ranging from 0.749 to 0.716, which is above 0.5 threshold indicating that the criterion is met. From the rotated factor pattern (table 9.5), “contract policy” has the highest loading of 0.778 in component 1.

Table 9.6: Final communality estimates for project sustainability

Attributes	**h^2**
Environmental influence	0.743
Socio-economic impact	0.722
Contract policy	0.716
Government policy	0.749

h^2 = final communality estimates

Reliability analysis reveals the overall Cronbach’s alpha for component 1 is 0.83 (N of items = 4) which also indicates a high level of internal consistency for the scale with this specific sample. Pearson correlation coefficients for all attributes under project sustainability (table 9.7) show that these attributes have either high or medium correlation with each other at p-value of 0.01. This implies that these four attributes can significantly and moderately measure project sustainability of management attributes.

Table 9.7: Pearson correlation coefficients of project sustainability

Attributes	**Environmental influence**	**Socio-economic impact**	**Contract policy**	**Government policy**
Environmental influence	1.000	-	-	-
Socio-economic impact	0.608 0.000	1.000	-	-
Contract policy	0.546 0.000	0.611 0.000	1.000	-
Government policy	0.631 0.000	0.436 0.000	0.534 0.000	1.000

Correlation is significant at the 0.01 level (2-tailed)

9.3.2 Project efficiency

Table 8.5 reveals that five attributes were retained in component 2; these attributes can be grouped as project efficiency. Final communality estimates show the values of these five attributes ranging from 0.847 to 0.677, this indicates that the threshold is 0.5 was met (table 9.8). "Organisational culture/commitment" has the highest loading of all attributes in component 2 from rotated factor matrix.

Table 9.8: Final communality estimates for project efficiency

Attributes	**h^2**
Organisational culture/commitment	0.720
Cost saving	0.722
Revenue and sales growth	0.665
Business efficiency	0.847
Employee satisfaction	0.677

h^2 = final communality estimates

Reliability analysis reveals the overall Cronbach's alpha for component 2 is 0.84 (N of items = 5) which also indicates a high level of internal consistency for the scale with this specific sample. Pearson correlation coefficients reveal that these attributes have either high or medium correlation with each other at p-value of 0.01 (table 9.9). This implies that they can significantly and moderately predict and measure project efficiency.

Table 9.9: Pearson correlation coefficients for project efficiency

Attributes	**Organisational culture/commitment**	**Cost saving**	**Revenue and sales growth**	**Business efficiency**	**Employee satisfaction**
Organisational culture/commitment	1.000	-	-	-	-
Cost saving	0.527 0.000	1.000	-	-	-
Revenue and sales growth	0.409 0.000	0.698 0.000	1.000	-	-
Business efficiency	0.571 0.000	0.571 0.000	0.581 0.000	1.000	-
Employee satisfaction	0.500 0.000	0.458 0.000	0.391 0.000	0.487 0.000	1.000

Correlation is significant at the 0.01 level (2-tailed)

9.3.3 Company proficiency

Component 3 retained three attributes with high loadings of more than 0.4; these attributes have similar conceptual meanings which can be used to measure company proficiency. Table 9.10 reveals the final communality estimates ranging from 0.804 to 0.751, their values exceed the threshold of 0.5, therefore the result is acceptable. “Value derived by end users/customers” has the highest loading of all variables in component 3 as indicated in Table 9.5.

Table 9.10: Final communality estimates for company proficiency

Attributes	h^2
Value derived by end users/customers	0.793
Organisation reputation	0.751
Competitive advantage	0.804

h^2 = final communality estimates

Table 9.11 presents the Pearson correlation coefficients for three attributes measuring company proficiency. The p-values of these attributes are less than 0.1 having either high or medium correlation with each other. Therefore, these attributes can significantly and moderately predict company proficiency in organisational management. The reliability test for component 3 is 0.79 (N of items =3), this indicates a high level of internal consistency for the scale with this specific sample.

Table 9.11: Pearson correlation coefficients for company proficiency

Attributes	**Value derived by end users/customers**	**Organisation reputation**	**Competitive advantage**
Value derived by end users/customers	1.000	-	-
Organisation reputation	0.564 0.000	1.000	-
Competitive advantage	0.491 0.000	0.645 0.000	1.00

Correlation is significant at the 0.01 level (2-tailed)

9.3.4 Organisational strategies

In component 4, there are three attributes retained and they can be used to measure organisational strategies in project delivery. Table 9.12 reveals the final communality estimates for organisational strategies ranging from 0.748 to 0.700, this indicates that the threshold of 0.5 is met. From the rotated factor matrix (table 9.5), "technological capability" has the highest loading of all variables in component 4.

Table 9.12: Final communality estimates for organisational strategies

Attributes	**h^2**
Technological capability	0.711
Achieving specified project goals	0.700
Organisation competence	0.748

h^2 = final communality estimates

The overall reliability test for component 4 is 0.72 (N of items = 3), it indicates a high level of internal consistency for the scale with this specific sample. The p-values are 0.01 and they have medium correlations among themselves therefore it is assumed that these three attributes can moderately predict and measure each other in project delivery (see table 9.13).

Table 9.13: Pearson correlation coefficients for organisational strategies

Attributes	**Technological capability**	**Achieving specified project goals**	**Organisation competence**
Technological capability	1.000	-	-
Achieving specified project goals	0.514 0.000	1.000	-
Organisation competence	0.510 0.000	0.386 0.000	1.000

Correlation is significant at the 0.01 level (2-tailed)

9.3.5 Research and development strategy (R&D)

Component 5 retains three attributes with high loadings of more than 0.5; these attributes have similar conceptual meanings which can be used to measure R&D strategy. Table 9.14 reveals the final communality estimates ranging from 0.825 to 0.748, their values exceed the threshold of 0.5, therefore the result is acceptable. “Innovation” has the highest loading of all variable in component 5 of rotated factor matrix (table 9.5).

Table 9.14: Final communality estimates for R&D strategy

Attributes	**h^2**
Innovation	0.825
Learning process	0.737
Social responsibility	0.748

h^2 = final communality estimates

Table 9.15 reveals the Pearson correlation coefficients for three attributes measuring R&D strategy. The overall reliability test for component 3 is 0.70 (N of items =3), this indicates a high level of internal consistency for the scale with this specific sample. The p-values of innovation and leaning process have medium correlation with each other at significant level of 0.01 but social responsibility has a weak correlation with them. This implies that innovation and learning process can moderately predict each other but social responsibility cannot significantly predict other attributes. “Innovation” and “learning process” are regarded as attributes for measuring R&D strategy.

Table 9.15: Pearson correlation coefficients for R&D strategy

Attributes	**Innovation**	**Learning process**	**Social responsibility**
Innovation	1.000	-	-
Learning process	0.404 0.000	1.000	-
Social responsibility	0.115 0.250	0.164 0.101	1.00

** Correlation is significant at the 0.01 level (2-tailed)

9.3.6 Measurement model for management attributes

For this study, the highest loading of each component in the rotated factor matrix is adopted as a representative factor. There are five components retained for this analysis which are project sustainability (PS), project efficiency (PE), company proficiency (CP), organisational strategies (OS), and R&D strategy (RD). This is illustrated in Figure 9.1 showing the highest attribute for each component. The result of this analysis is adopted for the qualitative survey (see chapter 10).

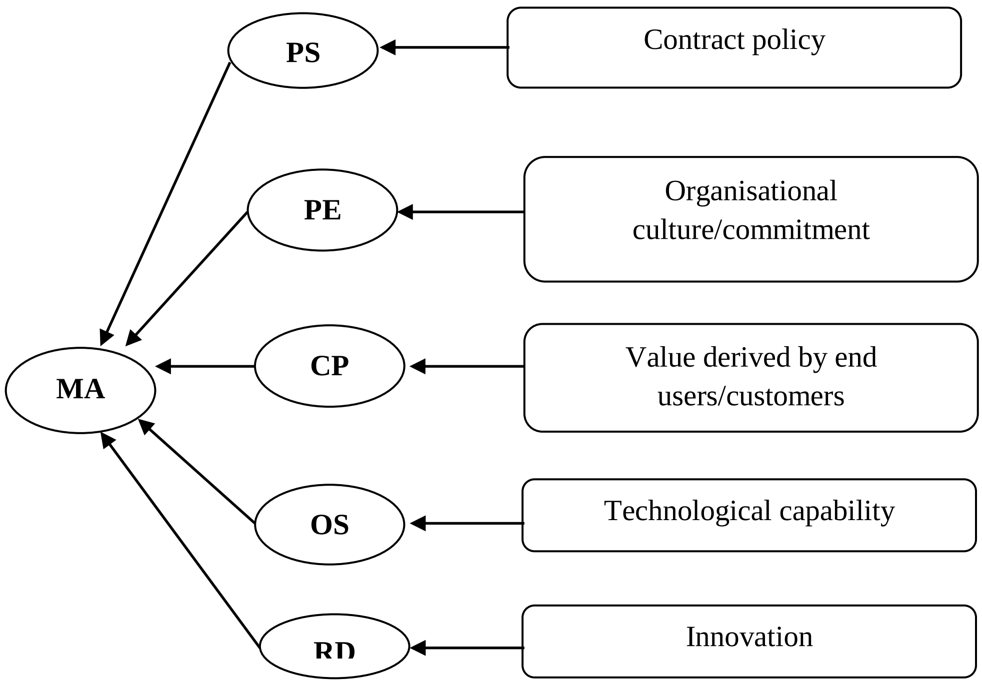


Figure 9.1: Measurement model for management attributes

9.4 Construction motivational drivers that bridge the gap in project performance

To assess objective one of this study, a total number of 27 motivational drivers was identified from the literature review and adopted for quantitative survey. As previously noted in section 8.4, it was deemed necessary to classify the ranking based on the organisation types of respondents which are grouped as clients, consultants and contractors for data analysis. Table 9.16 reveals the reliability test result for employee motivational drivers, it shows internal consistency of above 0.7 for each dimension since the criterion is met, and therefore the result is considered acceptable. The reliability test for the overall motivational drivers is 0.949 (N of items = 27), this indicates a high level internal consistency for the scale with this specific sample.

Table 9.17 reveals that motivational drivers that contribute to employee motivation showing the scores of ranking for each group (clients, consultants and contractors). The mean scores are categorised into three parts in which + = high influence (mean value > 3.5), 0 = medium influence (2.5 < mean value < 3.5) and - = low influence (mean value < 2.5). The p-value of each driver is less than 0.5 which implies that these motivational drivers can significantly predict employee motivation in construction projects. The analysis reveals the three highest ranked positive motivational drivers as "prospect for promotion", "working conditions (availability of materials and tools)" and "income increment" with average means of 4.47, 4.45 and 4.43 respectively. The standard deviations for the three highest positive drivers are 0.83, 0.74 and 0.85 respectively.

Table 9.16: Reliability test result for employee motivational drivers

Dimensions of motivational drivers	**α for each dimension**	**α for overall drivers**
Leadership style	0.935	0.976
Reward system	0.949	
Organisational culture	0.932	
Structure of the work	0.934	

α = Cronbach's alpha

Table 9.17: Motivational drivers that contribute to employee motivation

Motivational drivers	Clients	R	Consultants	R	Contractors	R	Av. mean	R	SD	p-value
Leadership style										
Work leadership	4.06 (+)	7	4.37 (+)	13	4.14 (+)	5	4.19 (+)	12	0.91	<0.05
Participation in decision making	4.13 (+)	6	4.19 (+)	15	4.00 (+)	10	4.11 (+)	17	0.84	<0.05
Respect for people	4.06 (+)	7	4.37 (+)	13	3.95 (+)	11	4.13 (+)	15	0.79	<0.05
Commitment	4.19 (+)	5	4.42 (+)	11	4.07 (+)	7	4.23 (+)	9	0.76	<0.05
Recognition, credit & acclaim	3.88 (+)	10	4.26 (+)	14	4.12 (+)	6	4.09 (+)	18	1.00	<0.05
Management theories	3.50 (+)	13	3.98 (+)	17	3.83 (+)	13	3.77 (+)	21	1.10	<0.05
Reward system										
Income increment	4.31 (+)	3	4.63 (+)	2	4.34 (+)	2	4.43 (+)	3	0.85	<0.05
Fairness of pay/salary	4.31 (+)	3	4.60 (+)	3	4.21 (+)	3	4.37 (+)	5	0.82	<0.05
Timeous payment	4.38 (+)	2	4.56 (+)	5	4.07 (+)	7	4.32 (+)	7	0.80	<0.05
Overtime allowance	4.38 (+)	2	4.49 (+)	8	4.02 (+)	9	4.27 (+)	8	0.91	<0.05
Benefits/bonus reimbursement incentive	4.25 (+)	4	4.67 (+)	1	4.12 (+)	6	4.35 (+)	6	0.97	<0.05
Organisational culture										
Flexibility of working hours	3.81 (+)	11	4.47 (+)	9	3.95 (+)	11	4.08 (+)	19	0.93	<0.05
Prospect for promotion	4.25 (+)	4	4.67 (+)	1	4.48 (+)	1	4.47 (+)	1	0.83	<0.05
Job security	4.50 (+)	1	4.58 (+)	4	4.15 (+)	4	4.41 (+)	4	0.98	<0.05
Company's prestige (financial stability)	3.94 (+)	9	4.53 (+)	6	4.00 (+)	10	4.21 (+)	10	0.87	<0.05
Consumerism (workers' right)	3.81 (+)	11	4.40 (+)	12	4.02 (+)	9	4.14 (+)	14	0.95	<0.05
Training of staff	4.19 (+)	5	4.42 (+)	11	3.81 (+)	14	4.12 (+)	16	0.98	<0.05
Creativity	4.00 (+)	8	4.44 (+)	10	3.90 (+)	12	4.14 (+)	14	0.87	<0.05
Structure of the work										
Working conditions (availability of materials and tools)	4.50 (+)	1	4.63 (+)	2	4.21 (+)	3	4.45 (+)	2	0.74	<0.05
Design process efficacy	3.88 (+)	10	4.51 (+)	7	4.02 (+)	9	4.14 (+)	14	0.85	<0.05
Working facilities (provision of rest areas and transport)	4.06 (+)	7	4.58 (+)	4	3.95 (+)	11	4.20 (+)	11	0.88	<0.05
Good supervision	4.25 (+)	4	4.56 (+)	5	4.14 (+)	5	4.32 (+)	7	0.83	<0.05
Completing of challenging tasks	4.31 (+)	3	4.44 (+)	10	4.05 (+)	8	4.21 (+)	10	0.75	<0.05
Gaining proficiency	4.13 (+)	6	4.49 (+)	8	3.83 (+)	13	4.15 (+)	13	0.84	<0.05
Timeous response to request & inspection	4.13 (+)	6	4.26 (+)	14	4.00 (+)	10	4.13 (+)	15	0.90	<0.05
Unrealistic scheduling/performance expectation	3.56 (+)	12	3.86 (+)	18	3.50 (+)	16	3.64 (+)	22	1.21	<0.05
Extent of change orders during execution	3.81 (+)	11	4.14 (+)	16	3.60 (+)	15	3.85 (+)	20	1.14	<0.05

S.D. = Standard deviation; R = Rank; Av. mean = Average mean; + = high influence; 0 = medium influence; - = low influence

9.5 Impact of incentives on workforce motivation

The second part of objective one is to assess the impact of incentives on workforce motivation, the respondents were asked to rank the twenty incentive schemes identified in the literature review using a Likert scale of 1 (not efficient) to 5 (extremely efficient). As previously noted, the aim of this section is to identify the most efficient incentive schemes that can rightly motivate the construction workforce. Table 9.18 presents the mean, standard deviation, skewness and kurtosis of each incentive scheme.

Table 9.18: Descriptive statistics for incentive schemes

Incentive schemes	Mean	R	SD	SKN	KTS	G/Mean
Financial						**3.69**
Premium bonus	3.98	4	1.07	-1.37	0.95	
Profit sharing	3.69	10	1.26	-0.67	-0.34	
Schedule incentive	3.68	11	1.16	-0.93	0.28	
Measured day work	3.59	14	1.10	-0.62	0.05	
Technical performance bonuses	3.96	5	1.08	-1.02	0.49	
Simple piece work	3.43	16	1.08	-1.04	0.14	
Geared incentive	3.59	14	1.00	-0.69	0.45	
Group incentive	3.60	13	1.02	-0.86	0.63	
Semi-financial						**3.81**
Health scheme	3.72	9	1.01	-0.71	0.62	
Saving scheme	3.72	9	1.05	-0.75	0.29	
Housing scheme	3.74	8	1.12	-0.88	0.46	
Site welfare provision	3.79	7	0.96	-0.80	0.94	
Pension scheme	4.06	1	0.81	-0.69	0.73	
Non-financial						**3.91**
Recognition	4.05	2	0.84	-0.82	0.84	
Praise of good work	4.04	3	0.89	-1.11	1.58	
Communication	4.04	3	0.85	-1.08	1.98	
Empowerment	4.05	2	0.97	-1.10	0.92	
e Job autonomy	3.94	6	0.88	-0.86	1.18	
Enlargement	3.67	12	0.97	-0.37	-0.50	
Rotation	3.54	15	1.06	-0.22	-0.78	

R = rank; SD = standard deviation; SKN = skewness; KTS = kurtosis; G/Mean = Group mean

The result shows high impact of the group means for incentive schemes with these scores more than the value of 3.50. The mean scores for the variables of incentive schemes range from 4.06 to 3.43; this indicates that there is a need for incentive schemes to improve work productivity of construction employees. The coefficients of skewness and kurtosis are satisfactory with their values close to zero which show good normal distribution and they are within the acceptable level of +/-2. The first highest ranked is "pension scheme", followed by "recognition" and "empowerment" as the second ranked and the third ranked schemes are "praise for good work" and "communication".

9.6 Evaluating performance indicators/parameters in construction projects

To achieve objective four for this study, which is focused on modeling for incentive payoffs and developing a framework for incentive mechanisms, it was deemed necessary to evaluate the possible variables that can measure overall project performance. A total number of 19 performance parameters were identified from the literature review and used for quantitative survey. The main purpose of this analysis is to reduce the number of variables; therefore PCA was used to conduct this analysis. The steps adopted to conduct this analysis are described in section 8.3. Table 9.19 reveals the result of the PCA conducted using 19 performance variables; the eigenvalues of the correlation matrix are displayed. Based on the stipulated criteria in section 8.3, a total number of 4 components are retained for rotation and interpretation. Table 9.20 presents the result of the rotated factor matrix with variables of high loadings (>0.40). The decision on which component to retain is made based on the criterion that there must be at least three variables with significant loadings for a component to be retained. Based on this criterion, all the components are retained for interpretation.

Table 9.19: Eigenvalues of the correlation matrix for performance variables

Components	Eigenvalue	Difference	Proportion	Cumulative
1	9.084	7.054	0.478	0.478
2	2.029	0.522	0.106	0.585
3	1.506	0.254	0.079	0.664
4	1.252	0.351	0.065	0.730
5	0.900	0.109	0.047	0.777
6	0.791	0.201	0.041	0.819
7	0.589	0.022	0.031	0.850
8	0.567	0.095	0.029	0.880
9	0.471	0.127	0.024	0.905
10	0.344	0.012	0.018	0.923
11	0.332	0.094	0.017	0.940
12	0.237	0.037	0.012	0.953
13	0.200	0.011	0.011	0.963
14	0.189	0.015	0.010	0.973
15	0.173	0.058	0.009	0.982
16	0.114	0.018	0.006	0.988
17	0.096	0.032	0.005	0.993
18	0.064	0.013	0.003	0.997
19	0.051		0.002	1.000

Initial factor method: Principal component analysis (SAS)

Table 9.20: Rotated factor pattern from PCA of performance variables

Variables	Factor 1	Factor 2	Factor 3	Factor 4
V9_4c	0.808			
V9_4a	0.806			
V9_4b	0.763			
V9_4d	0.757			
V9_2a	0.721			
V9_3b	0.610			
V9_1d		0.749		
V9_3d		0.706		
V9_1c		0.678		
V9_3c		0.671		
V9_1e		0.510		
V9_2e		0.509		
V9_3a			0.818	
V9_1a			0.817	
V9_2b			0.731	
V9_2d				0.839
V9_2f				0.776
V9_2c				0.626
V9_1b				0.492

Rotation method: Varimax

9.6.1 Component 1 of performance variables

Six performance variables were retained in component 1; these variables are grouped under quality, time and safety/health performances. Table 9.21 reveals the final communality estimates for these performance variables ranging from 0.810 to 0.626 which is above 0.5 threshold indicating that the criterion is met. The variable with the highest loading of 0.808 from the rotated factor matrix is "response to incidents".

Table 9.21: Final communality estimates for component 1

Variables	**h^2**
Response to incidents	0.810
Safety/health training programs	0.781
Safety/health control measures	0.775
Minimise incident rates	0.712
Adequate supervision	0.626
Satisfactory quality of work	0.722

h^2 = final communality estimates

Reliability analysis reveals the overall Cronbach's alpha for component 1 is 0.91 (N of items = 6) which also indicates a high level of internal consistency for the scale with this specific sample. Pearson correlation coefficients for component 1 show that these six performance variables have either high or medium correlation with each other at significant level of 0.01 (table 9.22). Therefore, the result of this analysis signifies a good measure of these variables.

Table 9.22: Pearson correlation coefficients for component 1

Variables	**Response to incidents**	**Safety/health training programs**	**Safety/health control measures**	**Minimise incident rates**	**Adequate supervision**	**Satisfactory quality of work**
Response to incidents	1.000	-	-	-	-	-
Safety/health training programs	0.684 0.000	1.000	-	-	-	-
Safety/health control measures	0.806 0.000	0.775 0.000	1.000	-	-	-
Minimise safety incident rates	0.685 0.000	0.659 0.000	0.598 0.000	1.000	-	-
Adequate supervision	0.621 0.000	0.693 0.000	0.581 0.000	0.477 0.000	1.000	-
Satisfactory quality of work	0.542 0.000	0.584 0.000	0.578 0.000	0.456 0.000	0.559 0.000	1.000

Correlation is significant at the 0.01 level (2-tailed)

9.6.2 Component 2 of performance variables

Table 9.23 reveals the final communality estimates for component 2 with six performance variables retained for interpretation. The values of the final communality estimates range from 0.755 to 0.635, this signifies that the threshold of 0.5 is met. From the rotated factor matrix, "measurement and correction of work" has the highest loading of 0.747 for all variables in component 2.

Table 9.23: Final communality estimates for component 2

Variables	**h^2**
Measurement and correction of work	0.734
Effective quality management plan	0.755
Efficient cost control	0.635
Quality of material used	0.740
Project cost outcome	0.684
Adequate schedule process	0.738

h^2 = final communality estimates

Table 9.24 reveals the Pearson correlation coefficients for variables in component 2 where all the six performance variables have either high or medium correlation with each other at significant level of 0.01 except "project cost outcome " that has weak correlation with "effective quality management plan". The overall Cronbach's alpha for component 2 is 0.84 (N of items = 6).

Table 9.24: Pearson correlation coefficients for component 2

Attributes	**Measurement and correction**	**Effective quality management plan**	**Efficient cost control**	**Quality of material used**	**Project cost outcome**	**Adequate schedule process**
Measurement and correction	1.000	-	-	-	-	-
Effective quality management plan	0.536 0.000	1.000	-	-	-	-
Efficient cost control	0.671 0.000	0.362 0.000	1.000	-	-	-
Quality of material used	0.482 0.000	0.776 0.000	0.494 0.000	1.000	-	-
Project cost outcome	0.443 0.000	0.260 0.008	0.467 0.000	0.388 0.000	1.000	-
Adequate schedule process	0.328 0.000	0.453 0.001	0.428 0.000	0.567 0.000	0.410 0.000	1.000

Correlation is significant at the 0.01 level (2-tailed)

9.6.3 Component 3 of performance variables

Table 9.25 reveals the final communality estimates for component 3 where three performance variables were retained for interpretation. The final communality estimates range from 0.854 to 0.651 which indicates the threshold of 0.5 is met. The variable with highest loading of 0.818 from the rotated factor matrix is "minimise defects".

Table 9.25: Final communality estimates for component 3

Variables	h^2
Minimise defects	0.854
Efficient cash flow system	0.827
Timely completion	0.651

h^2 = final communality estimates

Reliability analysis reveals the overall Cronbach's alpha for component 3 is 0.86 (N of items = 3) which also indicates a high level of internal consistency for the scale with this specific sample. Pearson correlation coefficients for component 3 shows that these performance variables are highly correlated to each other at significant level of 0.01 (see table 9.26). Therefore, the result of this analysis signifies a good measure of these variables.

Table 9.26: Pearson correlation coefficients of component 3

Variables	Minimise defects	Efficient cash flow system	Timely completion
Minimise defects	1.000	-	-
Efficient cash flow system	0.707 0.000	1.000	-
Timely completion	0.616 0.000	0.676 0.000	1.000

Correlation is significant at the 0.01 level (2-tailed)

9.6.4 Component 4 of performance variables

Four performance variables were retained in component 4; they measure two types of performance objectives, namely: cost and time. The final communality estimates (table 9.27) range from 0.792 to 0.570, this indicates the threshold of 0.5 is met by the retained variables.

"Reasonable claims for extension of time" has the highest loading of all variables in component 4 from the rotated factor matrix (table 9.20).

Table 9.27: Final communality estimates for component 4

Variables	h^2
Reasonable claims for extension of time	0.792
Schedule change control	0.796
Timeous communication process	0.668
Within budget	0.570

h^2 = final communality estimates

The overall Cronbach's alpha for component 4 is 0.79 (N of items = 4). Table 9.28 reveals the Pearson correlation coefficients for component 4 where all the four performance variables have either high or medium correlation to each other at significant level of 0.01. This indicates that they can significantly or moderately predict each other, the interpretation is not necessary for this analysis because it is focused on data reduction, not grouping the data set.

Table 9.28: Pearson correlation coefficients for component 4

Attributes	**Reasonable claims for extension of time**	**Schedule change control**	**Timeous communication process**	**Within budget**
Reasonable claims for extension of time	1.000	-	-	
Schedule change control	0.655 0.000	1.000	-	
Timeous communication process	0.519 0.000	0.533 0.000	1.000	
Within budget	0.392 0.000	0.516 0.000	0.322 0.000	1.000

Correlation is significant at the 0.01 level (2-tailed)

9.6.5 Measurement model for performance variables in construction projects

For the purpose of measuring performance variables, the highest loading for each retained component is adopted. There are four retained components and they are represented as component 1 (CMP1), component 2 (CMP2), component 3 (CMP3) and component 4

(CMP4). This is presented in Figure 9.2 showing the variable with highest loading for each component. The result of this analysis is adopted for the qualitative survey (see next chapter).

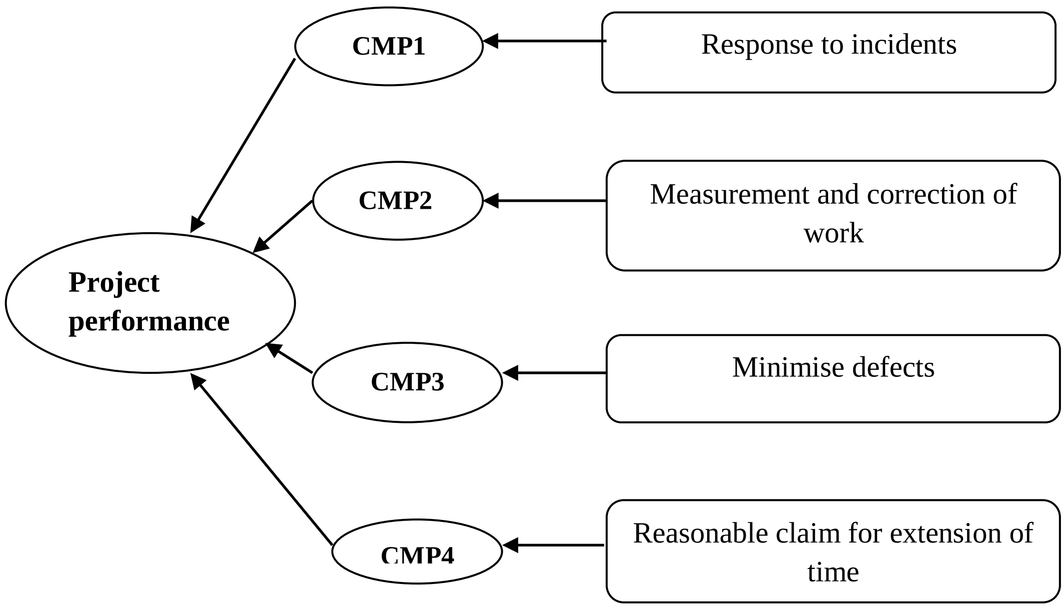


Figure 9.2: Measurement model for performance variables

9.7 Assessing the impact of risk elements in incentive compensation plans

This section evaluates the sociological and operational constructs of project performance in relation to incentive mechanisms. A total number of 29 risk factors were identified from the literature review and further categorised into four parts to assess the critical project risk factors that influence project performance in incentive compensation plans, The respondents were asked to rank these factors using a Likert's scale of 1 (not significant) to 5 (significant). The reliability test result (table 9.29) reveals that all the four groups of risk elements have their alpha's scores more than 0.7, therefore there is good internal consistency for measuring each factor and the alpha for overall risk elements is 0.96 which is acceptable, this shows high level of internal consistency for scale with this specific sample.

Table 9.30 shows the descriptive statistics for the risk elements in incentive compensation plans. The result is presented using mean scores, standard deviations and p-values. It was deemed necessary to classify the results based on professions of respondents because project risks are shared among contracting parties, therefore there may be diversity in their responses. The result of the mean scores is classified into three parts where + = high influence (mean value > 3.5), 0 = medium influence (2.5 < mean value < 3.5) and - = low influence (mean value < 2.5). The average mean scores reveal that "financial stability" to be the highest ranked with mean score of 4.41 and standard deviation of 0.79, the second ranked is "contract conditions" with mean score of 4.39 and standard deviation of 0.70. The third ranked is "environmental factors" with an average mean score of 4.28 and standard deviation of 0.67.

Table 9.29: Reliability test result for risk elements in incentive compensation plan

Project risk factors	**α for each group**	**α for overall risk elements**
Technical/operational	0.85	0.96
Project design	0.88	
Firm management factors	0.88	
External factors	0.84	

α = Cronbach's alpha

Table 9.30: Impact of risk elements in incentive compensation plans

Project risk factors	Clients	R	Consultants	R	Contractors	R	Av. mean	R	SD	p-value
Technical/operational										
Contract conditions	4.63 (+)	1	4.47 (+)	2	4.07 (+)	9	4.39 (+)	2	0.70	<0.05
Controllability of risk	4.00 (+)	7	4.09 (+)	13	3.90 (+)	15	4.00 (+)	16	0.98	<0.05
Cash flow process	4.13 (+)	5	4.26 (+)	8	4.12 (+)	7	4.17 (+)	7	0.87	<0.05
Improper design	3.94 (+)	7	4.00 (+)	14	3.98 (+)	12	3.98 (+)	18	1.05	<0.05
Availability of labour/materials	3.81 (+)	8	4.37 (+)	4	4.24 (+)	3	4.14 (+)	8	0.82	<0.05
Project location	3.56 (+)	11	4.53 (+)	1	4.26 (+)	2	4.12 (+)	9	0.84	<0.05
Construction default	3.44 (0)	13	4.23 (+)	9	4.02 (+)	10	4.01 (+)	15	0.86	<0.05
Incompetence of supplier	3.75 (+)	9	4.26 (+)	8	3.76 (+)	20	3.97 (+)	19	1.04	<0.05
Project design										
Technology transfer process	3.75 (+)	9	3.98 (+)	15	4.00 (+)	11	3.95 (+)	21	1.06	<0.05
Design changes by client	4.31 (+)	3	4.16 (+)	11	3.79 (+)	19	4.02 (+)	14	1.01	<0.05
Unproven engineering techniques	4.06 (+)	6	4.35 (+)	5	4.12 (+)	7	4.18 (+)	6	0.90	<0.05
Job security	3.13 (0)	15	4.14 (+)	12	4.10 (+)	8	3.96 (+)	20	0.97	<0.05
Risk management procedure	4.06 (+)	6	4.42 (+)	3	4.21 (+)	4	4.23 (+)	5	0.70	<0.05
Payment sharing ratio	3.31 (0)	14	4.16 (+)	11	3.98 (+)	12	3.95 (+)	21	0.95	<0.05
Supporting utilities risk	3.63 (+)	10	4.09 (+)	13	3.63 (+)	22	3.83 (+)	23	0.97	<0.05
Protection of historical objects	3.06 (0)	16	3.95 (+)	16	3.55 (+)	23	3.64 (+)	24	1.19	<0.05
Firm management factors										
Financial stability	4.63 (+)	1	4.28 (+)	7	4.33 (+)	1	4.41 (+)	1	0.79	<0.05
Corporate culture	3.81 (+)	8	4.33 (+)	6	3.93 (+)	14	4.02 (+)	14	0.87	<0.05
Labour disputes and strikes	3.50 (+)	12	4.47 (+)	2	3.76 (+)	20	4.01 (+)	15	1.03	<0.05
Contractual risks	3.44 (0)	13	4.35 (+)	5	3.83 (+)	18	3.99 (+)	17	0.84	<0.05
Company liability	3.75 (+)	9	4.19 (+)	10	3.86 (+)	17	3.98 (+)	18	0.89	<0.05
Ownership assets	3.63 (+)	10	3.98 (+)	15	4.14 (+)	6	3.99 (+)	17	0.96	<0.05
Insolvency of the company	3.94 (+)	7	4.35 (+)	5	3.88 (+)	16	4.06 (+)	13	0.76	<0.05
External factors										
Influential economic events	4.00 (+)	7	4.26 (+)	8	4.02 (+)	10	4.09 (+)	11	0.71	<0.05
Environmental factors	4.19 (+)	4	4.47 (+)	2	4.19 (+)	5	4.28 (+)	3	0.67	<0.05
Import restrictions	3.75 (+)	9	4.23 (+)	9	3.67 (+)	21	3.92 (+)	22	1.03	<0.05
Force majeure (forceful events)	3.94 (+)	7	4.42 (+)	3	3.98 (+)	12	4.11 (+)	10	0.79	<0.05
Government regulations	4.06 (+)	6	4.26 (+)	8	3.93 (+)	14	4.08 (+)	12	0.74	<0.05
Bank interest rate	4.50 (+)	2	4.35 (+)	5	3.95 (+)	13	4.27 (+)	4	0.81	<0.05

S.D. = Standard deviation; R = Rank; Av. mean = Average mean; + = high influence; 0 = medium influence; - = low influence

9.8 Evaluating the effect of organisational justice in motivating construction workforce towards improved productivity

As previously noted, there is a need to evaluate the effect of organisational justice on workforce motivation in order to identify the critical parameters that have a major effect on the construction workforce. A total number of 24 parameters were identified from the literature review and grouped into three dimensions to evaluate their effects. Respondents were asked to rank their parameters using a Likert scale of 1 (no effect) to 5 (major effect) and the mean scores were calculated for clients, consultants and contractors. Table 9.31 reveals the descriptive statistics of the effect of organisation justice in employee motivation. The results are divided into three categories in which + = high influence (mean value > 3.5), 0 = medium influence (2.5 < mean value < 3.5) and - = low influence (mean value < 2.5).

The result of average mean scores ranges from 4.47 to 3.84; this implies that all variables do have high influence on employee motivation. The first and highest ranked is “fairness in pay to staff” with an average mean score of 4.47 and standard deviation of 0.70, followed by “recognition of merit performance”, which is the second ranked with an average mean score of 4.37 and standard deviation of 0.80. “Basic needs” and “proportional equity in reward distribution” are ranked third with an average mean score of 4.32 and standard deviations of 0.80 and 0.79 respectively. The reliability result (table 9.32) shows that the alpha scores of the three dimensions of organisational justice are more than 0.7 and the overall Cronbach’s alpha score of organisation justice is 0.969 which indicates a high level of internal consistency for the scale with this specific sample, therefore it is deemed acceptable.

Table 9.31: Effect of organisational justice on workforce motivation

Organisational practices	Clients	R	Consultants	R	Contractors	R	Av. mean	R	SD	p-value
Distributive justice										
Basic needs	4.19	4	4.47	2	4.31	9	4.32	3	0.80	<0.05
Fairness in pay to staff	4.50	1	4.37	5	4.55	1	4.47	1	0.70	<0.05
Recognition of merit performance	4.13	5	4.44	3	4.55	1	4.37	2	0.80	<0.05
Appropriate rewards/compensation based on productivity	4.25	3	4.37	5	4.31	9	4.31	4	0.80	<0.05
Rewarding employee's effort	4.31	2	4.42	4	4.17	11	4.30	5	0.71	<0.05
Proportional equity in reward distribution	4.13	5	4.49	1	4.33	8	4.32	3	0.79	<0.05
Maximise the employee contributions	3.94	8	4.19	12	3.98	15	4.03	15	0.91	<0.05
Rewards/compensate for voluntary services	3.69	12	3.86	14	3.98	15	3.84	16	1.11	<0.05
Procedural justice										
Involvement of employee's opinion before decisions are taken	3.88	9	4.23	10	4.00	14	4.04	14	0.94	<0.05
Standard criteria for measuring employee performance	3.81	10	4.30	7	4.19	10	4.10	12	0.97	<0.05
Logical decision making	3.94	8	4.23	10	4.33	8	4.17	9	0.84	<0.05
Use of appropriate information	4.13	5	4.26	9	4.02	13	4.14	10	0.71	<0.05
Appropriate correctability procedure	4.00	7	4.30	7	4.07	12	4.12	11	0.82	<0.05
Considering employee's concern in decisions	4.06	6	4.23	10	3.83	16	4.04	14	0.87	<0.05
Morality and ethicality	3.88	9	4.00	13	4.38	7	4.09	13	1.08	<0.05
Interactional justice										
Truthfulness	4.13	5	4.30	7	4.47	3	4.30	5	0.92	<0.05
Respect for people	4.13	5	4.33	6	4.38	7	4.28	6	0.82	<0.05
Socially appropriate behaviour	4.00	7	4.37	5	4.07	12	4.22	8	0.77	<0.05
Taking justifiable actions	3.88	9	4.21	11	4.42	6	4.17	9	0.77	<0.05
Effective feedback process	4.06	6	4.28	8	4.44	5	4.26	7	0.74	<0.05
Effective communication values	4.19	4	4.28	8	4.31	9	4.26	7	0.79	<0.05
Timeous response to feedback	4.19	4	4.26	9	4.45	4	4.30	5	0.77	<0.05
Good interactive environment	4.00	7	4.26	9	4.52	2	4.26	7	0.74	<0.05
Psychological firmness of employees	**3.75**	**11**	**4.28**	**8**	**4.33**	**8**	**4.12**	**11**	**0.86**	**<0.05**

S.D. = Standard deviation; R = Rank; Av. mean = Average mean; + = high influence; 0 = medium influence; - = low influence

Table 9.32: Reliability test result for organisational justice

Dimensions of organisational justice	**α for each dimension**	**α for overall organisational justice**
Distributive justice	0.916	0.969
Procedural justice	0.922	
Interactional justice	0.939	

α = Cronbach's alpha

9.9 Evaluating factors influencing organisational performance

As previously noted, section 8.9 established the need for assessing other factors that influence organisational performance other than organisational justice. This section evaluates the factors influencing organisational performance in Nigeria. From the literature review, a total number of 24 factors were identified that influence organisational performance and they are further grouped into three parts. The respondents were asked to rank these factors using a Likert scale of 1 (not important) to 5 (very important) and the descriptive statistics are presented in Table 9.33. The table reveals the mean scores, standard deviations, skewness and kurtosis of factors influencing organisational performance.

The result shows the mean scores ranging from 4.35 to 3.82 and the groups mean scores ranging from 4.22 to 4.17, this indicates that these factors have a positive impact on organisation performance. "Training" and "communication process" have the highest mean scores of 4.35 and standard deviations of 0.80 and 0.68 respectively, followed by "profitability of company" with a mean score of 4.33 and standard deviation of 0.71 and third ranked factors are "integrity" and "individual motivation" with mean scores of 4.27 and standard deviations of 0.67 respectively. The result indicates a satisfactory level of skewness and kurtosis except in two instances where "management flexibility" and "training" scored 2.37 and 2.62 respectively.

Table 9.33: Descriptive statistics for organisational performance factors

Factors	Mean	R	SD	SKN	KTS	G/Mean
Learning strategy						**4.19**
Individual motivation	4.27	3	0.67	-0.38	-0.79	
Corporate motivation	4.16	13	0.77	-0.43	-0.80	
Learning environment	4.07	16	0.68	-0.47	0.46	
Innovativeness	4.22	8	0.76	-0.82	0.51	
Management flexibility	4.11	15	0.73	-0.95	2.37	
Training	4.35	1	0.80	-1.44	2.62	
Recognition of knowledge acquisition	4.26	4	0.67	-0.58	0.13	
Organisation culture	4.05	17	0.79	-0.34	-0.71	
Structure and design						**4.22**
Project structure	4.23	7	0.78	-0.95	0.68	
Organisation policy	4.20	10	0.71	-0.32	-0.97	
Size of organisation	4.13	14	0.83	-0.68	-0.19	
Project goals	4.24	6	0.69	-0.74	0.70	
Firm's technology	4.19	11	0.81	-0.83	0.24	
Availability of efficient projects	4.20	10	0.68	-0.28	-0.83	
Profitability of company	4.33	2	0.71	-0.93	0.84	
Corporate framework						**4.17**
Individual competence	4.25	5	0.71	-0.59	-0.22	
Transparency	4.21	9	0.64	-0.23	-0.63	
Security mechanism	4.14	13	0.63	-0.14	-0.56	
Uniformity in job order	4.02	18	0.74	-0.35	-0.26	
Integrity	4.27	3	0.67	-0.60	0.12	
Communication process	4.35	1	0.68	-0.60	-0.73	
Stability of system	4.17	12	0.71	-0.44	-0.32	
Personal values	3.82	19	0.77	-0.45	0.05	
Professional competence of boss	4.19	11	0.89	-1.09	0.97	

R = rank; SD = standard deviation; SKN = skewness; KTS = kurtosis; G/Mean = Group mean

9.10: Assessing the variables that influence employee/organisational behaviour during project implementation

As previously discussed in section 8.10, employee motivation is regarded as a key element in organisational behaviour which can be classified as a sociological construct of performance. The section advances the research scope by studying other elements that influence organisational behaviour. A total number of 23 variables that influence employee/organisational behaviour were identified in the literature review and grouped into four categories. Respondents were asked to rank these variables using a Likert scale of 1(no effect) to 5 (major effect). Table 9.34 reveals the descriptive statistics for employee/organisational behaviour showing mean scores, standard deviations, skewness and kurtosis. The groups mean scores range from 4.32 to 4.04 while mean scores range 4.45 to 3.94; this reveals that these variables have a positive impact on employee/organisational behaviour. The highest ranked is “competition” with a mean score of 4.45 and standard deviation of 0.59, followed by “technology capability” which is the second ranked and then “communication process” which is the third ranked. The skewness and kurtosis scores show an acceptable distribution except “lack of construction materials, tools and equipment” which are rated above the acceptable level of -/+2.

Table 9.34: Descriptive statistics for employee/organisational behaviour

Variables	**Mean**	**R**	**SD**	**SKN**	**KTS**	**G/Mean**
Individual personality						**4.04**
Personal attitudes	4.13	16	0.77	-0.50	-0.38	
Perceived alternative employment opportunities	4.03	18	0.77	-0.33	-0.54	
Individual competence	4.05	17	0.81	-0.34	-0.81	
Perceptions	3.94	19	0.83	-0.52	0.35	
Organisation values/beliefs						**4.20**
Decision making process	4.26	9	0.64	-0.32	-0.68	
Reward system	4.32	6	0.56	-0.12	-0.64	
Opportunity for advancement	4.14	15	0.79	-0.64	-0.09	
Respect for people	4.24	11	0.72	-0.58	-0.32	
Learning process	4.17	14	0.75	-0.73	0.43	
Performance evaluation process	4.17	14	0.68	-0.82	1.52	
Organisational policy	4.21	12	0.74	-1.27	3.33	
Work characteristics						**4.32**
Working conditions	4.03	18	0.81	-1.10	2.55	
Competition	4.45	1	0.59	-0.56	-0.59	
Appropriate supervision & inspection	4.14	15	0.69	-0.57	0.47	
Proper management of design changes and variations	4.33	5	0.63	-0.43	-0.65	
Lack of materials, tools and variations	4.25	10	0.68	-0.94	1.74	
Lack of construction materials, tools and equipment	4.31	7	0.82	-1.31	2.05	
Technology capability	4.38	2	0.63	-0.52	-0.61	
Work environment						**4.06**
Communication process	4.37	3	0.63	-0.49	-0.62	
Work relationship	4.35	4	0.64	-0.48	-0.65	
Respect for co-workers	4.31	7	0.70	-0.88	0.82	
Employer’s involvement	4.30	8	0.77	-0.86	0.08	
Effective conflict management strategy	4.20	13	0.95	-1.28	1.47	

R = rank; SD = standard deviation; SKN = skewness; KTS = kurtosis; G/Mean = Group mean

9.11: Assessing the organisational competency measures in project delivery

As previously noted in section 8.11, organisation competency is identified as a form of operational construct of performance. This section evaluates this construct using PCA to reduce 20 variables identified from the literature review and also identify similarities in data grouping. The steps for conducting PCA as described in section 8.3 were used for the interpretation of this analysis. Table 9.35 reveals the result of eigenvalues of the correlation matrix for organisational competency measures. Based on the criteria for selection, two components are retained for rotation and interpretation. Table 9.36 shows the result of the variables with more than 0.40 loadings, the decision on which component to retain for interpretation is based on the fact that a component must have at least three variables with significant loadings to be retained. Based on this criterion, components 1 and 2 are retained for interpretation.

Table 9.35: Eigenvalues of the correlation matrix for organisational competency measures

Components	Eigenvalue	Difference	Proportion	Cumulative
1	10.690	8.438	0.534	0.534
2	2.251	1.258	0.112	0.647
3	0.993	0.082	0.049	0.696
4	0.911	0.162	0.045	0.742
5	0.748	0.097	0.037	0.779
6	0.651	0.018	0.032	0.812
7	0.632	0.065	0.031	0.844
8	0.566	0.123	0.028	0.872
9	0.442	0.039	0.022	0.894
10	0.403	0.060	0.020	0.914
11	0.342	0.065	0.017	0.931
12	0.276	0.054	0.013	0.945
13	0.222	0.004	0.011	0.956
14	0.218	0.018	0.010	0.967
15	0.199	0048	0.010	0.977
16	0.151	0.052	0.007	0.985
17	0.098	0.010	0.004	0.990
18	0.087	0.023	0.004	0.994
19	0.064	0.017	0.003	0.997
20	0.046		0.002	1.000

Initial factor method: Principal component analysis (SAS)

Table 9.36: Rotated factor pattern from PCA of organisational competency measures

Measures	Factor 1	Factor 2
V16_1e	0.839	
V16_2b	0.833	
V16_2f	0.828	
V16_3c	0.824	
V16_2g	0.823	
V16_1b	0.818	
V16_2a	0.802	
V16_1d	0.801	
V16_2c	0.794	
V16_2e	0.791	
V16_3b	0.789	
V16_3d	0.758	
V16_1c	0.743	
V16_3a	0.713	
V16_3e	0.665	
V16_1a	0.638	
V16_4b		0.926
V16_4a		0.911
V16_4c		0.758

Rotation method: Varimax

9.11.1 Work-related factors

Component 1 has 17 organisational competency measures retained; these variables are grouped as work-related factors. Table 9.37 reveals the final communality estimates for the 17 measures ranging from 0.716 to 0.408 where all measures have a threshold of above 0.5 except two measures that have thresholds below 0.5; therefore these two measures, namely: poor reward system and commitment of decision makers are eliminated from component 1. The measure with the highest loading from the rotated factor matrix is “easy access to knowledge”. The overall Cronbach’s alpha for component 1 is 0.96 (N of items = 17) which also indicates a high level of internal consistency for the scale with this specific sample.

Table 9.37: Final communality estimates for work-related factors

Measures	**h^2**
Easy access to knowledge	0.714
Work ethic	0.699
Transfer environment	0.694
Intent to learn new technology	0.683
Clarity in technological process	0.716
Level of involvement of transferor/transferee	0.686
Competence of team members	0.686
Technology transfer method	0.645
Integrative concept for sharing	0.650
Willingness to transfer technology	0.631
Cultural traits of transferor/transferee	0.667
Job mismatch	0.648
Unrealistic policies and procedures	0.587
Interaction within team members	0.555
Feedback process	0.529
Poor reward system	0.457
Commitment of decision makers	0.408

h^2 = final communality estimates

9.11.2 Personal characteristics

Three organisational competency measures were retained in component 2; the similarities between the variables can be grouped as personal characteristics. Table 9.38 reveals the final communality estimates for these measures ranging from 0.864 to 0.583 which is above 0.5 threshold indicating that the criterion is met. “Historic events” has the highest loading of all variables in component 2 from the rotated factor matrix. The overall Cronbach’s alpha for component 2 is 0.84 (N of items = 3) which also indicates a high level of internal consistency for the scale with this specific sample.

Table 9.38: Final communality estimates for personal characteristics

Measures	**h^2**
Historic events	0.864
Lifestyle	0.838
Educational background	0.583

h^2 = final communality estimates

9.11.3 Measurement model for organisational competencies in project delivery

For the purpose of measuring organisational competencies, the highest loading for each retained component is adopted. There are two retained components and they are represented as component 1 (CMP1) and component 2 (CMP2). This is presented in Figure 9.3 showing the highest variable for each component. The result of this analysis is adopted for the qualitative survey (see next chapter).

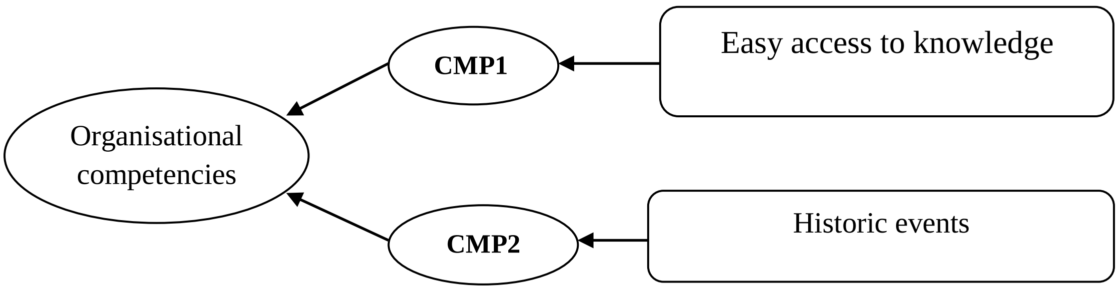
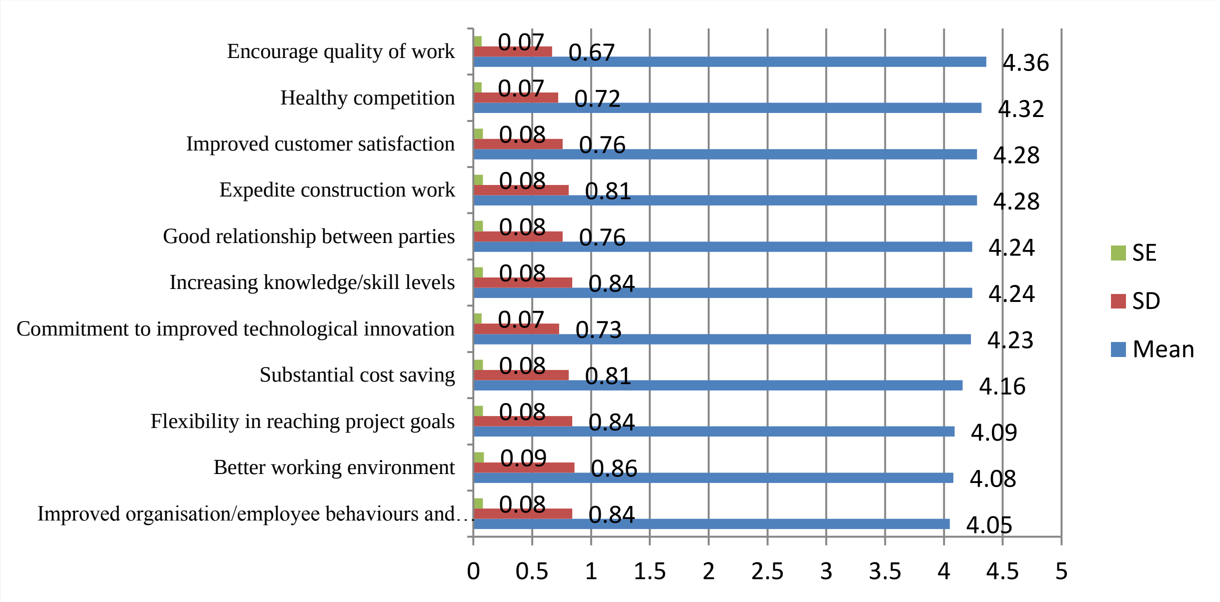


Figure 9.3: Measurement model for organisational competencies

9.12 Economic benefits of incentive schemes in projects

As previously noted, objective three evaluates the economic impact of incentive mechanisms in the construction industry. This section focuses on identifying the economic benefits of incentive schemes in projects. From the literature review, 11 practices were identified for measuring the economic benefits of incentives. Respondents were asked to rank these practices using a Likert scale of 1 (not significant) to 5 (very significant) and the result of this analysis is presented in Figure 9.4. "Encourage quality of work" is highest ranked with a mean score of 4.36 (SD=0.67; SE=0.07), the second ranked is "healthy competition" with a mean score of 4.32 (SD=0.72; SE=0.07) and the third ranked is "improved customer satisfaction" with a mean score of 4.28 (SD=0.76; SE=0.08). The scores of standard deviation reveal that the distribution of responses to the mean is normal while standard errors are relatively small thereby indicating the reliability of the specific sample.

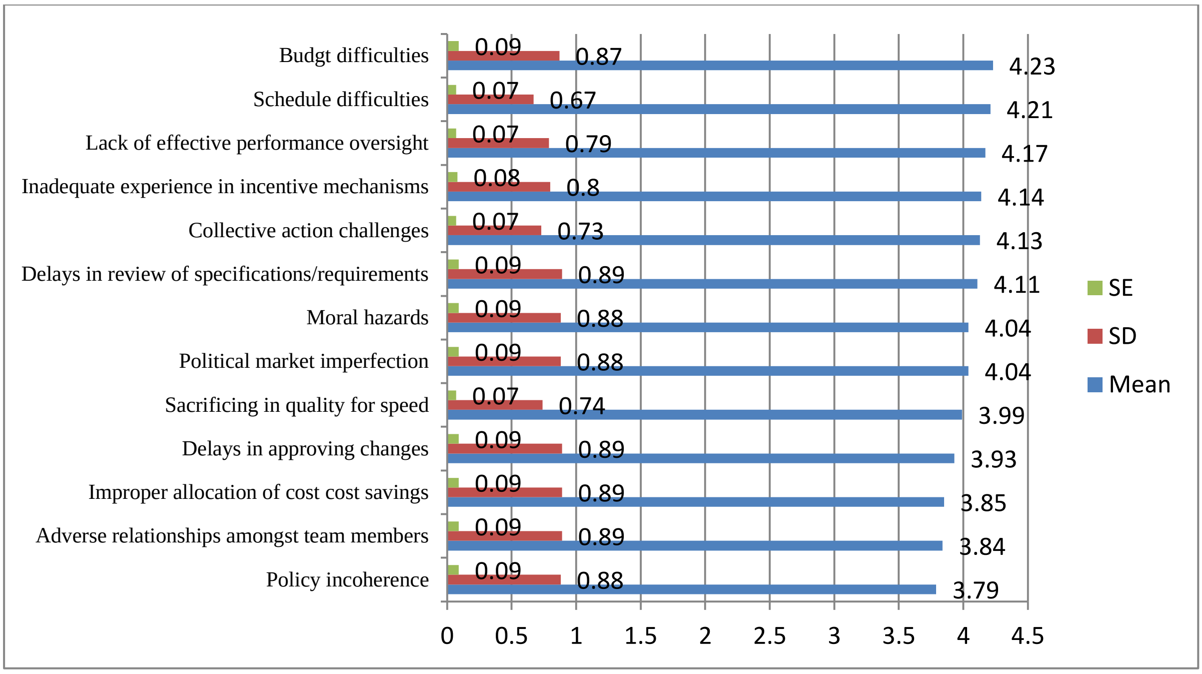


SD=standard deviation; SE=standard error

Figure 9.4: Economic benefits of incentive schemes in projects

9.13 Economic challenges of incentive schemes in projects

In order to achieve the other part of objective three, this section assesses the economic challenges confronting the use of incentive schemes in projects. A total number of 13 economic challenges in relation to the use of incentives were identified from the literature review and the respondents were asked to rank them using a 5-point Likert scale ranging from 0 (no challenge) to 5 (major challenge). Figure 9.5 reveals the mean scores, standard deviations and standard errors of the economic challenges. The highest ranked is "budget difficulties" with a mean score of 4.23 (SD=0.87; SE=0.09), the second ranked is "schedule difficulties" with a mean score of 4.21 (SD=0.67; SE=0.07) and the third ranked is "lack of effective performance oversight" with a mean score of 4.217 (SD=0.79; SE=0.07). The result shows a normal distribution of responses to mean with standard deviations scattered around 1.0 and less while standard errors are relatively small, indicating the reliability of the sample.



SD=standard deviation; SE=standard error

Figure 9.5: Economic challenges confronting the use of incentives in projects

9.14 Payment strategies in performance compensation plans

This section evaluates the payment strategies adopted in compensating for performance in projects. From the literature review, 17 payment strategies were identified and the respondents were asked to select the type(s) of strategies used in their various organisations to compensate for performance. The result of the analysis is presented in Figure 9.6; the most frequently used payment strategy is “annual bonuses” with a percentage score of 28.6. “Awards” as a payment strategy is ranked second with a percentage score of 11.8 while “merit pay” is the third ranked with a percentage score of 10.6.

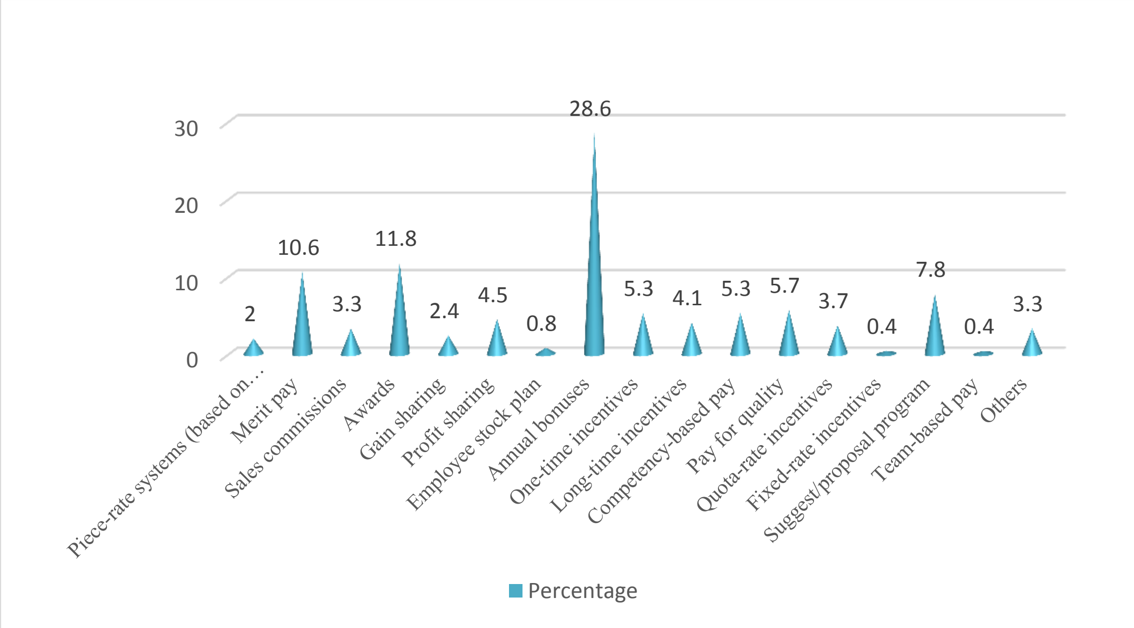


Figure 9.6: Payment strategies in performance compensation plans

9.15 The use of incentives in achieving project performance

The study identified five sub-problems relating to the problem statement and they are translated into hypothetical statements and the respondents were asked to rank them using a 5-point Likert scale of 0 (strongly disagree) to 5 (strongly agree). The result of the analysis is presented using mean scores, standard deviations and p-values (Table 9.39). To assess the ranking, the result is divided into three categories in which + = high acceptance (mean value > 3.50), 0 = neutral (2.5 < mean value < 3.5) and - = rejected (mean value < 2.5). The table reveals that all the hypothetical statements were accepted with average mean scores ranging from 4.45 to 3.70. The standard deviation reveals a normal distribution to mean while p-values for these statements are less than 0.05; therefore the result is accepted as a good measure of the data set.

Table 9.39: Hypothetical statements for evaluating incentive mechanisms in projects

Statements	A	B	C	Av. Mean	SD	p-value
6. The behaviour pattern of project participants can influence the project outcomes	4.38 (+)	4.40 (+)	4.48 (+)	4.45 (+)	0.54	<0.05
7. The weights of various critical project performance measures are fundamental tools to assess performance in projects	4.25 (+)	4.37 (+)	3.95 (+)	4.19 (+)	0.74	<0.05
8. Lack of fairness in organisational justice will have negative impact on project outcomes	4.13 (+)	4.30 (+)	4.31 (+)	4.25 (+)	0.71	<0.05
9. The use of incentives that do not incorporate project risks will impact negatively on project participants and performance objectives	3.94 (+)	4.14 (+)	3.79 (+)	3.96 (+)	0.90	<0.05
10. The level of perception on the use of multiple incentives is low which has significantly contributed to poor working relationship among contracting parties	3.63 (+)	3.72 (+)	3.76 (+)	3.70 (+)	0.96	<0.05

A=clients; B=consultants; C=contractors; Av. Mean=Average mean; SD=standard deviations

9.16 Performance variables influencing compensation/incentive payoffs in projects

This section is focused on identifying the most influential variables required to measure employee performance in an organisation. As previously noted, this will form the parameters for measuring employees' efforts in construction projects. There are eight employee performance variables identified in the literature review and the respondents were asked to rank these variables on a Likert scale of 1 = very low and 5 = extremely high. The result of the analysis is presented in Figure 9.7 where the threshold is 3.50. Based on the threshold, "technical efforts", "work output" and "job requirement" are considered highly significant in assessing the performance of operational staff while "technical efforts", "work output" and "managerial skills" are considered highly significant in assessing the performance of management staff.

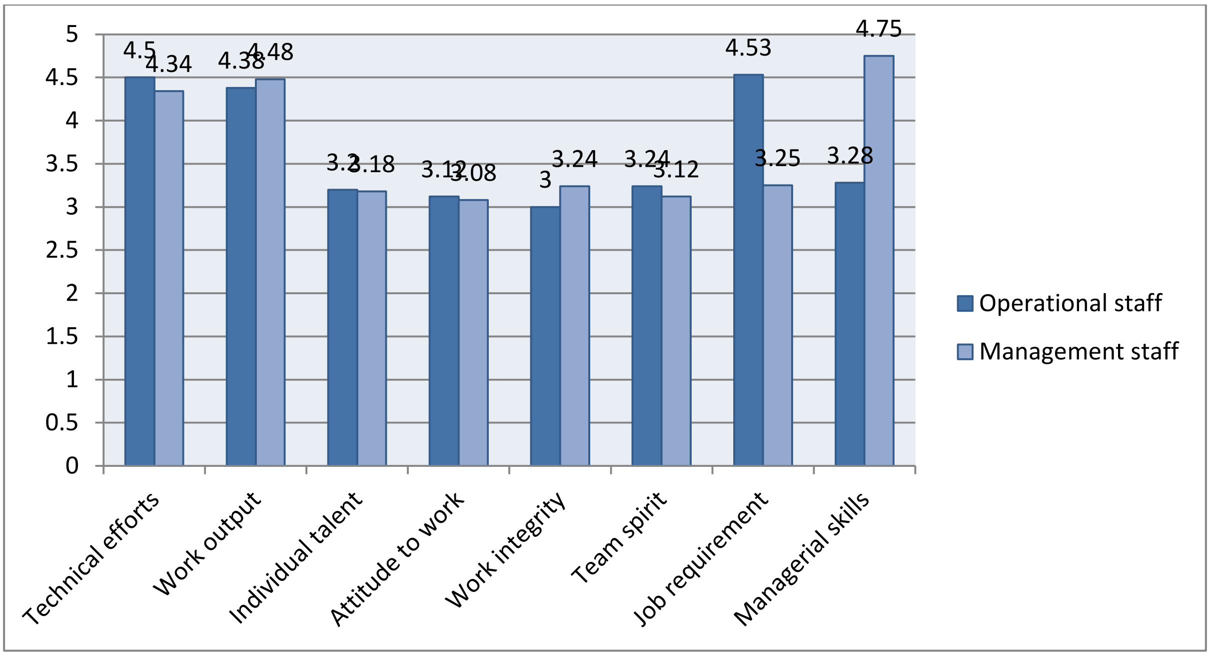


Figure 9.7: Performance variables for employee compensation/incentive payoffs

9.17 Chapter summary

This chapter provided a detailed analysis and discussion of findings derived from the quantitative data collected in Nigeria. The assessment of the management attributes reveals five attributes with the highest loadings that contribute to project improvement and they are as follows: (1) contract policy, (2) organisational culture and commitment, (3) value derived by end users/customers, (4) technological capability and (5) innovation. Management attributes are seen as existing characteristics or skills in an organisation which influence the day-to-day activities within the project environment. The contract policy of a company is usually targeted towards achieving project success and remaining in business. Most respondents believed that it influences how an organisation undertakes its construction activities. The culture and commitment of an organisation towards its employees were considered significant in improving project success; likewise the value derived by end users/customers. Technological capability involves the ability of an organisation to develop and design new products and processes as well as to improve knowledge while innovation acts as a mediating variable between technological capability and a firm's performance. This enables the development and use of new ideas to initiate growth and profitability. The absence of technological capability in any organisation will restrict the impact of innovation. Both technological capability and innovation were considered significant in project improvement; this shows consistency in their responses.

The evaluation of positive motivational drivers that bridge the gap between contractors' objectives and clients' expectations identified three highest ranked drivers as (1) prospect for promotion, (2) working conditions (availability of materials and tools) and (3) income increment. Prospect for promotion is regarded as a prize to motivate workers and encourage them to stay and invest in specific human capital. From the analysis (table 8.17), prospect for promotion is rated first by consultants and contractors. Poor working conditions will negatively influence work productivity while good working conditions will improve job satisfaction and productivity. Income increment is identified as a positive motivator of project performance and productivity. Most respondents agreed that increase in income can significantly motivate the construction workforce.

The data analysis reveals the most preferred incentive schemes as (1) pension scheme, (2) recognition, (3) empowerment, (4) praise for good work and (5) communication (section 8.5). The use of PCA to reduce the data set of performance indicators identified the four performance parameters that influence construction projects as (1) response to incidents, (2) measurement and correction of work, (3) minimise defects, (4) reasonable claims for extension of time. An organisation's ability to respond to incidents is seen as an effective way of achieving safety/health performance in construction projects. In most cases, mobile clinics are situated on the construction sites to aid rapid response to injuries, health conditions and other emergencies. Most respondents believed that the development of an emergency plan and procedures to prevent and control further risks to employees are essential factors in achieving safety/health performance.

Change in work orders is a frequent occurrence on construction projects but when it is poorly managed, it could have a negative impact on project cost and risks. Changes can occur at different phases of a construction projects due to design changes, design errors, additions to scope, resource limitations and uniqueness of the project. Most respondents believed that being able to manage change in work orders will assist to control direct costs relating to subcontractor costs, labour costs and other costs; this is in line with the study conducted by Yitmen *et al.* (2006:1611). Effective change management can be viewed as a cost avoidance technique and risk mitigation tactic.

Most respondents agreed that the ability to minimise defects in construction works will improve quality performance. Quality defects may be difficult to eliminate in construction projects but the concept of "zero defects" provides a culture of thinking or creating a notion that defects are not acceptable. Effective management of the schedules is paramount to time performance in projects where in most cases; penalties are incorporated for time overruns. Most respondents believed that having reasonable claims of time by contractors will improve time performance.

The findings from the possible risk elements in incentive compensation plans reveal "financial stability" as the most critical element influencing risk allocation in projects. Most respondents agreed that financial stability will influence the allocation of risks among contracting parties where economic instability may affect prices of materials and labours. In most cases, financial institutions are not willing to sponsor construction projects. “Contract conditions” was identified as the second ranked element influencing risk allocation where inappropriate allocation of uncontrollable risks might foster an adversarial relationship among contracting parties. The third ranked critical element is “environmental factors” which include economic/financial, construction technology and resources, political, legal, physical, socio-cultural and institutional factors. Projects exist in an environment external to the project itself and these factors pose a range of challenges and constraints. As it is not possible to isolate most projects from the environment these factors should be considered in risk allocation.

Evaluating the effect of organisational justice in motivating the construction workforce towards improved productivity reveals “fairness in pay to staff”, “recognition of merit performance”, “proportional equity in reward distribution” and “basic needs” as the most influential factors. Most respondents agreed that fairness in pay to staff for their genuine contributions in accordance with the organisation’s policies will contribute towards motivating the construction workforce. Recognition of merit performance and proportional equity in reward distribution were ranked above basic needs. This implies that most respondents believed that recognition and rewards play a more important role in motivating employees than provision of basic needs.

“Training”, “communication process”, “profitability of company”, “individual motivation” and “integrity” were identified as the most essential factors influencing organisational performance. Staff training affects the communication process and proficiency of performances in organisations. Most organisations strive to remain in business and this can be achieved through improved profitability. Individual motivation and integrity of managers and employees were also identified as significant factors influencing organisational performance.

The assessment of variables that influence employee/organisational behaviour during project implementation reveals “competition”, “technology capability” and “communication process” as the three significant variables. Healthy competition in an organisation brings out the best in employees thereby inspiring them to push to the next level of performance and it is also considered beneficial to organisational growth. The communication process and reward systems are essential tools required to make competition healthy. As earlier defined, technological capability is the ability to develop new processes which influences behaviours within an organisation. Most employees are willing to explore new processes or ideas.

The use of PCA to assess the organisational competency measures in project delivery, grouped the data set into two components namely: (1) work-related factors (easy access to knowledge) and (2) personal characteristics (historic events). Under work-related factors, “easy access to knowledge” was identified as the variable with the highest loading. Most respondents agreed that having access to knowledge in an organisation is important in assessing the technical skills of the organisation. The literature review discussed different ways of accessing knowledge within an organisation (section 3.4.1). Likewise, “historic events” was identified as the variable with high loading under personal characteristics. Historic events incorporate past activities within an organisation which is not only limited to past projects but also to affiliations, for example, political influence.

The appraisal of the economic impact of incentive mechanisms identified the most critical economic benefits as: (1) encourage quality of work, (2) healthy competition and (3) improved customer satisfaction while the economic challenges are identified as (1) budget difficulties, (2) schedule difficulties and (3) lack of effective performance oversight. Section 8.14 reveals the payment strategies adopted in performance compensation plans. The result shows that "annual bonuses", "awards" and "merit pay" were the most frequently used payment strategies. The result of the hypothetical statements reveals that most respondents agreed that there is a need to introduce multiple incentive mechanisms reflecting the critical performance measures. Project risk is also an essential factor to consider in the design of incentive mechanisms. The findings from the questionnaire survey as presented in this chapter are adopted to develop the qualitative survey questions and also to construct the framework for incentive mechanisms.

The next chapter presents the analysis and discussion of the case study interviews conducted in South Africa and Nigeria.

CHAPTER TEN

CASE STUDY INTERVIEWS (ANALYSIS AND DISCUSSION)

10.1 Introduction

The preceding chapters 8 and 9 presented the quantitative data and analysis with regards to South Africa and Nigeria where the sets of variables were defined. The explanatory sequential approach allows for these variables to be adopted for a qualitative survey process. This chapter presents the results and analysis of a series of interviews conducted in both countries. This is focused on gaining a deeper understanding of the practices of incentive mechanisms and how the operational constructs of performance can be used to improve incentive systems.

This chapter describes the interview structure for this study as well as the procedure and techniques used. A brief description of the selected cases is presented with their responses followed by a discussion of interview findings. Lastly, the summary of this chapter is highlighted.

10.2 Procedure adopted for data collection

As previously noted in section 7.8.6, a set of semi-structured questions was adopted for the qualitative survey. These questions were structured from the findings of the quantitative survey and focused on getting a deeper understanding of the research problem. The purposive sampling technique was used to select the interviewees from strategic levels of the construction sector. The targeted case organisations were construction companies at the highest registered grade in both countries and regulating associations. From the CIDB database in South Africa, the highest grade is 9 while from the new Procurement Act, 2007 in

Nigeria, the highest grade is 3. The interviewees were selected from directors and managerial positions of the case organisations. They were considered to be best placed on matters of knowledge about operations and policies of the organisations and therefore able to provide useful and reliable information about incentive mechanisms and their constructs.

An interview guide was developed for the interview sections (see appendix B); this comprises the key constructs of the framework for incentive mechanisms. The first question is focused on the assessment of various strategies used to compensate for performance in their organisations and how performance is assessed through those strategies. This provided the opportunity to identify issues that could not be raised during the questionnaire survey. The other aspects, such as management attributes, risk allocation, workforce competencies and performance indicators were raised to further explanations and discussions. Before the interview, an introductory letter was sent to the selected interviewees and also the interview guide stipulating the key questions as well as scheduled date and time. Most of the interviewees wrote back to reschedule the date and time and the interviewer replied back to confirm the appointment.

The interviews were conducted at convenient places as stipulated by the interviewees. During the interview sections, the discussions were guided by the interview protocol although in most cases, the interviewees were allowed to express their opinions on issues relating to the research topic that are not stipulated in the interview questions. According to Adams and Schvaneveldt (1991), "even the best interviewer cannot fully recall details well enough for the purpose of falling back to the information at the end of the interview". For the interview sections, an audio tape was used to capture the responses of interviewees and note-taking was used to complement the audio tapes where necessary. The six steps as stipulated by Creswell (2009) were adopted in analysing the collected qualitative data (see section 6.9.2).

10.3 Reliability and validity

Bageis (2008) emphasises that reliability in qualitative research has to do with the background of the interviewer and interviewees, quality of interview context, and methods of data acquisition and interpretations. For the reliability of this qualitative survey, the background of the interviewer is not questionable because the interview sections were conducted by the researcher. The quality and competence of interviewees for this survey were not in doubt because they are within managerial positions of the case organisations; therefore their responses were considered credible and reliable to draw reasonable conclusions. To ensure the quality of the interview context, the interview guide was strictly adhered to and was cross-checked after every interview section to confirm whether the context was addressed. The steps as recommended in section 7.9.2 were used to organise and prepare the raw data for meaningful interpretations, the results were compiled for narrative analysis and comparative study with other text related to the question.

Validity of qualitative research involves the process of assuring the degree of authenticity during an interview which can be examined in terms of correctness of the contents of the interview, social appropriateness and truthfulness exemplified by the interviewee (Flick, 2006). The validity of the interviewees' responses was authenticated by ensuring that they comment on their answers using past events or scenarios which explain the general theory of the contexts under investigation.

10.4 The selection and presentation of cases

In the selection of case organisations for the research purpose, it is essential to consider organisations with some form of relationship with the research problem. Eisenhart (1989) stated that a case organisation must be a typical representative of the studied environment. The eight (8) organisations were selected based on their familiarities with research contexts and also their willingness to participate in the study. However, it was agreed that both case organisations and interviewees should remain anonymous. In order to maintain confidentiality and protect their privacy, the case organisations are numbered as cases 1 to case 8 while the interviewees are represented as interviewees 1 to 8 respectively. Cases 1 to 4 represent case organisations in South Africa while cases 5 to 8 stand for case organisations in Nigeria and likewise for interviewees.

The sub-section provides a brief history of the case organisations and the interviewees while Table 10.1 presents the profile of the eight interviewees from the case organisations.

10.4.1 Case 1

Case 1 organisation is a representative association of the building industry in South Africa. It was established to promote the interests of their members, interact constructively with industry stakeholders, promote best business practice, and foster training of their members. The interviewee for case 1 is an education, training and transformation manager in the organisation and he has served in this position for over five years.

10.4.2 Case 2

Case 2 was conducted in a multi-disciplinary construction and engineering company situated in South Africa with expertise in a range of market sectors such as: infrastructure, power, mining, retail, industrial, oil and gas. The infrastructure sector of this organisation provides expert services to both public and private clients. The interviewee for case 2 is the senior commercial manager who has served in the organisation for over 44 years.

10.4.3 Case 3

Case 3 organisation is a leading global construction company which was rated among the top 100 companies' survey in the world for both 2008 and 2009 by the Sunday Times. The case organisation provides expert services ranging from civil engineering projects, road construction, mixed integrated housing developments, property development, opencast mining to other related services. The construction sector of this organisation has gained powerful reputation for delivering major projects in Southern Africa and it is categorised under grade 9 by the CIDB. The interviewee for case 3 is the commercial manager with civil engineering background and has over 20 years of work experience.

10.4.4. Case 4

Case 4 was carried out in a multi-disciplinary construction group with a capacity of delivering a range of projects of any scale to clients from diverse markets. This includes engineering and construction activities throughout the built environment and is rated under grade 9 of the CIDB database. Their business units are situated in South Africa and sub-Saharan Africa. The interviewee for case 4 is the director of commercial activities and has served in this capacity for over 15 years.

10.4.5 Case 5

Case 5 organisation is a consultancy firm managed by partners who have served and some are currently serving as chairmen at various registered professional bodies in Nigeria. The consultancy firm was initially established in 1987 by two principal partners, and has consulted for several large scale projects within Nigeria. The interviewee for case 5 is one of the founding principal partners in the firm who practices as a consultant quantity surveyor and is also currently serving as chairman in a chapter of the registered professional body.

10.4.6 Case 6

Case organisation 6 is a multinational construction company registered with the Federal Ministry of Works, Abuja. The case organisation provides expert services for both construction and engineering projects. It is rated under grade 3 of the Procurement Act 2007 in Nigeria which represents the highest grading for government contractors. The interviewee for case 6 serves as a project manager in the organisation with over 30 years of work experience.

10.4.7 Case 7

Case 7 was carried out in a public sector organisation established by Federal government. It is a government outfit set up to implement capital projects under various works and services in accordance with the Public Procurement Act 2007. The interviewee for case 7 is the deputy director in the organisation who is a civil engineer by profession with over 32 years of work experience.

10.4.8 Case 8

Case 8 was carried out in a multi-disciplinary construction and engineering company registered with the Federal Ministry of Works, Abuja. The case organisation provides expert services ranging from dam and irrigation works, water supply systems, road construction, mechanical and electrical services, and building projects. The interviewee for case 8 is a project architect who has worked in the organisation for over 16 years.

Table 10.1: Profile of interviewees for the eight cases

Interviewee	Profile	Profession	Years of experience	Interview section	Location
1	Educationist	ETTM	5	1hr 10minutes	South Africa
2	Engineer	SCM	44	32 minutes	South Africa
3	Engineer	CM	20	28 minutes	South Africa
4	Quantity Surveyor	DC	15	35 minutes	South Africa
5	Quantity Surveyor	CQS	28	52 minutes	Nigeria
6	Quantity Surveyor	PM	30	48 minutes	Nigeria
7	Engineer	DDW	32	42 minutes	Nigeria
8	Architect	PA	16	35 minutes	Nigeria

SCM = Senior commercial manager; CM = Commercial manager; CQS = Consultant quantity surveyor; PM = Project manager; DDW = Deputy director of works; PA = Project architect; DC = Director of commercial

10.5 Interview findings and discussion

This section gives a narrative analysis of interview findings and discussion based on the sub-themes. The sub-themes for this survey are grouped into five parts which are represented as follows: (a) practices of incentive mechanisms in the selected case organisations (section 10.5.1); (b) review of management attributes (section 10.5.2); (c) risk allocation – equitable cost risk profile (section 10.5.3); (d) measuring organisational competencies (section 10.5.4); and (e) performance assessment parameters (section 10.5.5). The use of sub-themes was intentionally to provide satisfactory answers to the research questions and eliminate irrelevant responses to the research problem.

10.5.1 Practices of incentive mechanisms in the case organisations

There is a need to establish a common understanding of the use and practices of incentive mechanisms in the construction industry. The interviewees were asked to comment on the types(s) of incentive mechanisms being adopted in their various organisations and their impact in achieving overall performance.

Question: Does your organisation have any incentive mechanism in place targeted towards improved project performance? Please comment on your answers.

Below are remarks made by the interviewees' to the question:

South Africa

Interviewee 1: Yes, these incentives are focused on budget performance, development and training of registered builders or contractors. In contracting for the public sector (clients), there are negative incentives where a contractor is being penalised for not meeting project completion time but there is no existing incentive for early completion.

Interviewee 2: It might be difficult to single out performers in a corporate environment but performance appraisals are compulsory on an annual basis, these include salary increases, promotions and awarding bonuses. Some of the “stars” take a bit longer to be discovered but all companies generally, tend to look after and take care of high performers. In our organisation, the foreman or construction manager is usually appraised based on timeous completion and few remedial works.

From the clients’ perspective, contracts under FIDIC conditions have sub-clause 13.2 which allows the contractor, as value engineering, a fee of 50 percent of savings achieved by means of proposals or alternative design. Some contracts where time performance is of great essence, they allocate bonuses for early completion. For example, the South African National Roads Agency Limited (SANRAL) gives bonuses for achieving a higher standard of rideability on asphalt finishes.

Interviewee 3: Incentives are given to employees based on their performances on assigned jobs; this assessment is usually done yearly using a SMART approach. Smart is a best practice which allows managers to set goals and review performance based on five objectives: specific, measurable, attainable, realistic and timely. From the clients’ view, there is no positive incentive that we are aware of.

Interviewee 4: Incentives are used in our organisation to meet the targeted budget where the savings are shared among the project team and also for safety/health performance. For example, if a budget is allocated for a particular project, being able to achieve the stipulated budget entitles you to 17 percent of cost savings. Incentives being used in our organisation vary from shopping vouchers to cash rewards but it is usually based on the agreement between employees and managers towards achieving a particular goal. Incentives used in our contracts vary according to the type of client in some cases; positive incentive is allocated for safety/health performance while penalties are allocated for time delay.

Nigeria

Interviewee 5: As a consultant on site, incentive is given for achieving project performance within the specified objectives; this is usually 10 percent of net profit. The use of negative incentive is discouraged in the construction industry; rather non-performing consultant could be penalised through disengagement or otherwise.

Interviewee 6: Incentives being used in our organisation to improve employees' performances come in different ways although there is no specific measure to assess them. Most often, incentives are given for successful completion of assigned tasks, for example, 20 percent of salary increase, allowances, official cars and so many others. Higher incentives are usually given to employees in the technical department (workers on site) than employees in the managerial/administrative division.

Interviewee 7: Employees are rewarded for outstanding performance through financial incentives, the method for assessment is determined by the project manager but it is usually 3 to 5 percent of the employee's salary. Time and quality performances are the two common indicators used to assess employee's performance. Cost performance is managed by cost estimators in the organisation and there is no specific measure for rewarding performance. The use of incentives between the organisation and the employer is often based on agreement.

Interviewee 8: Rewarding for project performance is usually ideal but in most cases, there is no specific method of doing it. The type of incentive to adopt for a particular project is based on the agreement between the employer and the contractor; the key objective of the employer for that particular project is used as a measure.

Discussion

It is clear from their responses that there is no stipulated incentive mechanism put in place to achieve overall project objectives such as cost, time, quality and safety/health. In the South African construction industry, there is evidence of the use of safety/health and time performance measures in incentive compensation while most clients focus on the use of negative incentive for time performance. In the Nigerian construction industry, the use of negative incentive is discouraged as a means of sanctioning contractors for their non-performances. Incentives are used in organisations to encourage employees and compensate for their performances but there is no specific approach for assessing performances.

10.5.2 Impact of management attributes in improving performance

Management attributes represent the existing characteristics or skills in an organisation which are used to implement day-to-day activities within the organisation. They constitute variables which can be used to assess the management skills of an organisation towards project improvement. This construct forms a sub-activity in the incentive mechanism framework; therefore the interviewees were asked to rate these attributes based on their influence in assessing an organisation towards improved performance.

Question: Indicate how these management attributes can contribute to the assessment of project improvement? Please rate them using 1 = not influential; 2 = somehow influential; 3 = moderately influential; 4 = influential; 5 = very influential and comment on your answers where necessary.

Table 10.2: Result for interviewees' rating for management attributes in South Africa

Management attributes	Average Score	Ranking
Knowledge/skills transfer process	4.50	2
Environmental influence	3.88	3
Competitive advantage	3.50	4
Achieving specified project goals	4.75	1

Table 10.3: Result for interviewees' rating for management attributes in Nigeria

Management attributes	Average Score	Ranking
Contract policy and procedure	4.00	2
Organisational culture/commitment	4.33	1
Value derived by end users and customers	3.33	4
Technology capability	3.66	3
Innovation	3.66	3

The outcome from the interview sections are presented in Tables 10.2 and 10.3. Responses from interview sections in South Africa reveals "achieving the project goals" has the highest rating, the second rated is "knowledge and skills transfer process" and the third rated is "environmental influence". "Competitive advantage" is rated as least influential among the management attributes. In Nigeria, "organisation culture and commitment" has the highest rating followed by "contract policy and procedure" as the second rated attribute. The third rated attributes are "technology capability" and "innovation". "Value derived from end user and customers" is concerned as least influential in assessing management skills towards project improvement.

Below are remarks made by the interviewees' to the question:

South Africa

Interviewee 1: Most projects have predetermined standards that there must be formal or informal acquired knowledge/skills in place. Most government and municipal projects specify that contractors must engage the workforce in the project environment with the intention to transfer knowledge and skills to the local community. There are situations where small scale contractors are attached to large scale contractors on projects for the purpose of transferring both administrative and technical skills. This process can be effective if there is a stated procedure for such transfer which could be a designed programme focused on promoting effective knowledge/skills transfer rather than a “loose training”.

Project environment has an influence on how a construction organisation exists or runs its projects based on nepotism, bribery and ethic work relations. An organisation can create a competitive advantage over others through a good work relationship with their employees which encourage improved performance. “Achieving specified project goals” is highly influential in assessing the management attributes of any organisation but in most cases, contractors have shown inabilities to achieve these specified project goals.

Interviewee 2: In every workplace, it is always important to transfer skills and more so in South Africa where there is a backlog as result of lack of skilled workforce. Knowledge and skills transfer is very influential because it creates a medium where the “old hand” will gain better insight into possible problems. Due to the profit motive and the necessity to survive in a competitive environment, the first goal would always be to get the job done then environmental influence can be adhered to. All the “bigger players” in the construction market have strong managers, good equipment and good workers. Certain companies have developed stronger tendencies in specific niches, for instance investing in research and development of road construction technology in order to outperform others in this niche. However, with the current shortage of construction works most contractors tend to diverse their expert services so as to broaden the availability of works to tender on. Achieving project goals is equally important as making profit for any contractor. No organisation will want to acquire bad publicity.

Interviewee 3: The contractor's main aim for undertaking any construction work is to make profit but not profit at all costs. Management skills play an important role by enabling the contractor to remain profitable while achieving other aspects of project delivery such as uplifting communities, maintaining good working environment, specified project objectives and so on.

Interviewee 4: The flow of knowledge and skills from the higher skilled workers to the lower skilled ones is quite important to ensure their inputs are according to job expectations. Most government projects specify the need to transfer knowledge and skills to external bodies such as from "bigger players" in the industry to small scale organisations attached to them in a particular project. Commitment with the project environment is highly influential because the community can interrupt your activities; there is a need for compliance with demands and regulations.

Nigeria

Interviewee 5: An existing policy in an organisation has an influence on how the organisation tenders for jobs and run its day-to-day activities. Likewise, the organisational culture/commitment, for example, any organisation has a culture on how to manage their employees that influence their job satisfaction and work productivity. The value derived by end users in a particular project can influence the assessment of project improvement because they can make recommendations on quality and satisfaction gained for that project. Technology capability and innovation can influence the project improvement of any organisation but there are several constraints that restrain their adaptability, for example, power supply. Technology capability may be required for large scale projects but for small scale projects that may not be necessary.

Interviewee 6: Most organisations have a policy which boils down to the fact that all projects have four pillars that support its well-being namely: quality, time, safety/health and cost. Individual project managers tend to attach more importance to one or two of the pillars and less to the others. Most successful project managers are invariably judged on cost and profitability, but other pillars should not be neglected. End users can influence the assessment of a company based on project improvement by recommending the contractor for similar projects. Nigeria is still a developing country although technological capability of any company is essential, but in most cases, foreign companies are preferred over indigenous companies. Most of these foreign companies are being indigenised to enable them to operate efficiently. Emphasis on technology capability can be moderately influential because most of these companies are not willing to adapt to technology change which as result of the high cost of doing business.

Interviewee 7: When there are policies imposed on an organisation by the employer, they can be considered as highly influential because these policies are being monitored to ensure absolute compliance. For example, the policies and procedures of our organisation are monitored by different external bodies appointed by the employer; these assessments are carried out at different intervals; every month, every three months and every six months until project completion. Culture and commitment of any organisation towards its employees will directly influence project improvement. The nature of our organisation encourages technology capability and innovation due to the existing policy which is linked with our foreign partners.

Interviewee 8: Policies and procedures used by contractors are quite important to the employer; regularly assessment of contractors based on these policies is to ensure successful project delivery.

10.5.3 Risk allocation in incentive compensation plans

As previously noted, most clients are not willingly accepting risks in project delivery; they prefer to transfer them to contractors at any cost even when these risks cannot be controlled by such contractors. Most modern contracts are directly concerned with providing clear risk allocation between contracting parties but there are factors which should be considered in allocating project risks. This sub-section focuses on assessing the likely factors that can influence risk allocation through the use of incentive compensation plans in project delivery.

Question: Please rate the criticality of these factors in risk allocation among contracting parties through incentive compensation plans using 1 = not critical; 2 = somewhat critical; 3 = moderate; 4 = critical; 5 = highly critical and comment on your answers where necessary.

Table 10.4: Result for interviewees' rating for risk allocation in South Africa

Project risk factors	Average Score	Ranking
Improper design	5.00	1
Contract conditions	3.75	4
Labour disputes	4.25	2
Contractual risks	3.88	3

Table 10.5: Result for interviewees' rating for risk allocation in Nigeria

Project risk factors	Average Score	Ranking
Environmental factors	4.33	3
Contract conditions	5.00	1
Financial stability	4.67	2
Risk management procedure	4.00	4

The result of the interview sections for South Africa reveals that in allocating risks in construction projects, "improper design" is the highest critical factor followed by the occurrence of "labour disputes" as the second rated critical factor. "Contractual risks" which can be categorised as non-claimable risks are considered as critical for the contractor and it is rated as third critical factor. The "contract conditions" are considered least critical because there is a general understanding that contracting parties are aware of the conditions of contract except the smaller contractors who find them often confusing. On the contrary, “contract conditions” are considered the highest critical factor in Nigeria. The interviewees agreed that there are lots of variations and most contractors are desperate to take up any contract at any cost with the intention to cut corners. “Financial stability” is rated second followed by “environmental factors” which are considered the third critical factor. “Risk management” is considered as the least critical factor.

Below are remarks made by the interviewees’ to the question:

South Africa

Interviewee 1: The risks associated with improper design are in most cases too high and if such risks occur the contractor is usually blamed until after the investigation when it will be determined whether the fault is from designer or contractor. In most cases, such risks may not be identified earlier by the contractor, therefore they are considered highly critical. There are usually stipulated conditions of contract for any project where each party is aware of the risks allocated to him/her. In most cases, these stipulated conditions are being altered by clients using their own terms and conditions. Risk sharing is what most clients prefer to avoid and to rather transfer any risk to contractors at higher costs of project delivery but in a few cases, contractors may decide to work at lower costs at the expense of accepting such project risks.

Risks associated with labour disputes are usually incurred by contractors even though some of these risks may require the interventions of clients. The probability of loss arising from failure in contract performance (contractual risks) is critical in risk allocation but most clients tend to avoid such responsibilities. Proper risk allocation is essential in order to have a “fair playground” for all contracting parties.

Interviewee 2: The impact of improper design is manifold and could lead to friction between the contractor and employer/design team due to arising claims, delay, and drop in morale due to rework. Quality as the end goal is not always clear, resulting in frustrations all round. There is a lot of similarity between different forms of contract conditions and most contractors understand what is required, and how to price and operate in accordance with the specified conditions of contract. It could have an influence on smaller contractors who do not have the knowledge of all the forms of contract conditions and could find it confusing. In labour disputes, delays and cost are often not claimable leading to losses on both parties without any positive contribution to the contract.

Delayed completion could result in penalties being charged to a contractor who has already taken the loss of unrecovered overhead cost and possible damage to the work as result of riot and commotion that often goes hand in hand with labour disputes. As far as is reasonably possible, labour disputes should be avoided and small concessions, even monetary at the contractor's expense, are preferable to industrial action. Bigger contractors employ risk managers to identify the non-claimable risks in a tender and allowances are made for these, either in risk money or insurance premiums. Certain elements are sometimes under-estimated, such as ground conditions and exceptional weather conditions. It has become common practice for employers to inform local communities beforehand of upcoming job opportunities in their area. Sometimes, the information overstates the number of jobs available and this invariably leads to commercial risks that are highly unmanageable.

Interviewee 3: All these factors are critical in risk allocation among contracting parties. In most projects, a risk register is used to record identified risks in projects and then it is either the consultant or client that is queried. If there is no condition attached to such risks (non-claimable risks) then this may result in contractual disputes.

Interviewee 4: Allocating risks in labour disputes can be quite critical but in most cases, there is an agreement between the client and the contractor on the type of labour disputes and who bears the risk associated to it. Most contractual risks are being transferred to the insurer or the sub-contractors to manage especially when they cannot be effectively managed by the contractor.

Nigeria

Interviewee 5: Environmental factors such as weather conditions and soil conditions are considered highly critical in risk allocation. The most commonly used forms of contract conditions are JCC and MEC which stipulate how risks should be allocated, but in some cases those clauses are being amended by the employer. Lack of financial stability can create a negative effect of the overall performance which may generate contractual disputes. There should be an agreed upon structure for payments and reconciliation of financial claims. Lack of an appropriate management plan may result in delays in projects.

Interviewee 6: In most contracts, it is the responsibility of the client to perform the environmental impact assessment at the pre-contract stage. It is the duty of the contractor to request the assessment report where most identified risks are transferred to the client. In risk allocation, environmental factors are considered highly critical because they have to be identified and agreed upon between the client and the contractor. Contract conditions usually stipulate how risks should be shared; it is highly influential because it provides clauses on risk sharing which must be adhered to. Financial instability can create a negative impact on construction project delivery due to discrepancy in initial cost and actual cost where in most cases it leads to contractual disputes.

Interviewee 7: Most contractors tend to overlook some unfavourable contract conditions with the intention of cutting corners during project delivery. For example, in some conditions of contract there is a clause which allows for variation in price while in some cases, clients may amend or eliminate the clause from the contract documents not to reflect allowance for price variations.

Interviewee 8: Risk is deemed to be shared but in most cases, employers prefer to allocate risks to contractors at higher cost.

10.5.4 Assessment of organisational competencies in project delivery

Organisational competencies involve the technical skills required for an organisation to achieve project improvement. Effective management and technical skills are both required for any organisation to achieve efficiency in project delivery. Section 10.5.2 evaluates the attributes of management skills while this section assesses the measures of organisational competencies.

Question: Please rate how these factors influence the assessment of organisational or workforce competencies in project delivery using 1 = not important; 2 = slightly important; 3 = moderate; 4 = important; 5 = very important and comment where necessary.

Table 10.6: Result for interviewees' rating for organisational competencies in South Africa

Competency measures	Average Score	Ranking
Willingness to transfer technology	4.00	3
Educational background	4.25	2
Competence of team members	4.75	1
Work ethic	3.75	4

Table 10.7: Result for interviewees' rating for organisational competencies in Nigeria

Competency measures	Average Score	Ranking
Easy access to knowledge	5.00	1
Historic events (company past activities)	4.00	2

The findings from the interview sections reveal that "competence of team members" is rated highest among the competency measures in South Africa followed by "educational background" which is rated second. The third rated measure is "willingness to transfer technology". In Nigeria, the outcome of the interview sections reveals that "easy access to knowledge" is considered more important than "historic events" of the organisation in assessing competencies.

Below are remarks made by the interviewees' to the question:

South Africa

Interviewee 1: There is an existing culture that 'if you work for me then I don't want you to learn from me because you may surpass me'. Likewise, most project managers or coordinators are not willing to adopt a new technology transfer, the general saying is, "why do you want it the other way? We have always been doing it this way". Willingness to transfer technology in any organisation is very important in assessing organisational competencies in order to plug the gap of a poor skilled workforce. In South Africa, there is a saying that "I want to have your papers" which emphasises the need for formal training to enhance the competence of team members. Work ethic is a good motivator to employees although it might be difficult to assess externally but is a moral principle which should be in place in any organisation.

Interviewee 2: Technology transfer could be a tedious process and very costly especially as the use of local labour for lower categories if work is normally enforced by contract conditions. The risk increases safety/health incidents and despite contractors' experience in cost estimating, they tend to under-allow for certain things so as to tender competitively. The learning curve puts a high price on achieving production whilst also transferring technology at grassroots level. Sharing knowledge and experience within an organisation allow the estimator, the planner and the site manager to find out what the other had in mind when pricing, programming and constructing the work. Educational background and competence of team members are equally important for assessing organisational competencies and effective transfer of technology.

There is normally a wealth of experience present at management level. A lot of procedures and policies are therefore designed and tailored at the head office level. However there remains a fair amount to be decided at the project level. Labour might, for instance want to work in certain amounts of extra time (Saturdays or public holidays) in order to extend the Easter weekend. Whenever this is a deviation from the established principles, it is important to be very clear, precise and exact so as to avoid misunderstanding.

Interviewee 3: When the transfer of technology is stated on the contract conditions, this might be difficult to achieve unless there is a designed procedure which is focused on efficient simulation of such knowledge.

Interviewee 4: Technology transfer is important but not everyone wants to coach others. Personality (skills) of an employee is more important than the educational background and this will enable the right person to be at the right place.

Nigeria

Interviewee 5: In some cases, knowledge may be available but employees are not willing to absorb it. There is a need to rightly motivate them for easy absorption of knowledge that may not be financial. Assessing an organisation based on past activities is very important because it will enable the employer to evaluate the competencies of such organisation in executing the new project.

Interviewee 6: In the construction industry, creating easy access to knowledge has been seen as a major avenue of transferring skills from the expatriates to the indigenes and also from theoretical aspects to practice. Favouritism has played a major role in assessing organisational competencies in Nigeria where a company may have a similar capability but do not have a "god father" and that disqualifies the company from being awarded such contract. Although "due process" is in place most times it is not adhered to. In most PPP projects, communities influence the assessment of organisational competencies in project procurement.

Interviewee 7: Easy access to knowledge is very important because it aids effective communication and information among project team members. This enables members to understand the work process and also eliminate mistakes or failures.

Interviewee 8: Public sector employers are concerned with how to improve construction activities. Easy access to knowledge will assist to transfer knowledge from experts to indigenous contractors thereby improving the industry. The past activities of any organisation are equally important to assess its competencies.

10.5.5 Evaluating performance indicators in construction projects

From the literature review, there are four key performance indicators adopted for this study which are focused on developing a multiple incentives approach to achieve overall performance. The quantitative analysis identified the parameter that has the highest significance for each of the key performance indicators. In order to acquire better explanation on why and how they are essential, the interviewees were asked to rate and comment on them.

Question: In assessing the overall project performance, please rate the significance of these performance indicators using 1 = not significant; 2 = slightly significant; 3 = moderate; 4 = significant; 5 = very significant and comment on your answers where necessary.

Table 10.8: Result for interviewees' rating for performance parameters in South Africa

Performance parameters	Average Score	Ranking
Quality of materials used	4.88	1
Minimise safety/health incident rates	4.63	2
Timely completion	4.88	1
Efficient cash flow system	4.13	3

Table 10.9: Result for interviewees' rating for performance parameters in Nigeria

Performance parameters	Average Score	Ranking
Response to safety/health incident rates	4.67	2
Measurement and correction of work (re-work)	5.00	1
Minimise defects	4.67	2
Reasonable claims for extension of time	4.33	3

The interviews' result shows "quality of materials used" and "timely completion" are rated the highest significant performance parameters in the South African construction industry. This implies that there is more emphasis on quality and time performances than other performances. "Minimise safety/health incident rates" is rated second while "efficient cash flow system" is considered as the least significant parameters. In Nigeria, cost performance plays the highest significant role in construction projects followed by safety/health and quality performances as the second rated parameters. Time performance is regarded as the least significant among other performances; the interviewees explained that most time overruns are caused by clients; therefore there is always avenue for reasonable claims for extension of time.

South Africa

Interviewee 1: The quality of materials used in projects does not only improve quality performance but creates a good reputation for an organisation. Having an efficient cash flow system is very significant in achieving cost performance due to the existing economic situation.

Interviewee 2: Conformance with specified quality of materials has been of great importance for both the employer's and the contractor's reputations. Safety/health starts off with proper risk assessments, determining the risks and providing or mitigating for the identified risks are significant measures of achieving safety/health performance in construction projects. Proper toolbox talks and participations by all are required to minimise incident rates on sites. There is a need to enforce these measures and take disciplinary actions against perpetrators and those that do not conform. Quite often in contracts, negligence of safety/health could result in termination of the contract by the employer.

Timely completion has been a significant indicator used by the employer to assess contractor's performance where any delay will incur penalties. In efficient cash flow systems, both the curtailing of cost as well as the maximizing of revenue plays a part. There is no doubt that cash is the lifeblood of any contractor. Employers have all sorts of blockages (some real, some imaginative) for not paying contractors on time. The money sits better (to his mind-set) in the employer's bank than in the contractor's bank. The contractor, on the other hand, has huge expenses, especially when starting off a project and it is often required that the employer pays a 10 percent advance against a guarantee to the contractor.

Interviewee 3: The first aim of a contractor is to make a profit on a particular project but this is measured against good procurement of materials, good construction site (safety/health aspects), timely and full payment of work done.

Interviewee 4: Most clients are conservative and are reluctant to use incentives to achieve project performance.

Nigeria

Interviewee 5: Quick response to safety/health incidents on site will improve not only safety/health performance but also time performance. Completion of a project within the specified time has been a challenge for most contractors because most projects are awarded with existing structures and historic artifacts. Most delays in projects are caused by the employer; this may also include delay in mobilizing contractors to the construction sites. Minimising defects on work is very important because the cost of re-work will affect the contractor's profit.

Interviewee 6: Most forms of contract conditions specify the need for safety/health measures on site which are focused not only to prevent but to respond to accidents and fatalities. Change in work order or re-work can create a negative impact on cost performance if not properly managed. Minimising defects of work does affect both quality and cost performance and a company's reputation. The conditions of contract allows for contractors to put up claims of 10 to 15 percent of the preliminary cost for any time delay. Several conditions can affect delay in timely completion such as force majeure, existing structures and so on; these mostly occur in government projects. Therefore, having reasonable claims for extension of time will significantly improve time performance.

Interviewee 7: To a contractor, the primary aim is to remain profitable. Being able to manage project deliverables should yield the tendered margin of profit. Avoiding re-work will improve cost performance and other related indicators such as quality and time.

Interviewee 8: Re-work on the part of contractor could be expensive but if there is change order of work, the contractor needs to have a stringent change control system in order not to incur substantial loss in time and cost.

General comments:

- There is a need to focus on the positive approach to incentive mechanisms in construction projects, this will boost the industry thereby avoiding "wipe and stone" method and adopting "carrot and stick" method.
- The use of incentives usually cut both ways where the employer gets a better product or earlier access and a good contractor can achieve little additional profit.
- There is a need for good orientation and culture to understand the fundamentals of incentives in projects in order to benefit from these schemes.

10.6 Chapter summary

This chapter provided a detailed analysis of case study interviews conducted in South Africa and Nigeria. It described the procedures adopted for data collection and a brief explanation of the reliability and the validity of qualitative data. Furthermore, a brief history of the case organisations was highlighted and interview findings were presented. A qualitative survey was used as an explanatory approach to the quantitative survey. This approach was used to explore the practices of incentive mechanisms and the operational aspects of construction performance in relation to incentive mechanisms. Case study investigations were used to provide in-depth explanations to the 'how' and 'why' of incentive mechanisms. The findings from the qualitative survey are summarised as follows:

Practices of incentive mechanisms in the case organisations:

The findings revealed that there are evidences of the use of incentive schemes in promoting project performance in both countries. Most of the incentive plans are based on achieving a single objective thereby neglecting other aspects of the project objectives. This is similar to the findings from previous studies in other countries as reviewed in the literature review where most researchers focused on the use of a single incentive plan. The case study investigations revealed the use of a single incentive plan in most public sector projects in South Africa focusing on achieving time performance in construction projects. This type of incentive is used to penalise contractors for failing to achieve project deadlines. As previously noted, the major aim of incentive designs is to improve working relationships among contracting parties therefore there is a need to focus on rewards rather than penalties. The findings also revealed the use of a single incentive to achieve cost and time performances in the Nigerian construction industry. There is no formal framework for adopting an incentive mechanism which incorporates the key performance metrics (multiple incentives).

The case study investigations also revealed several forms of compensation plans adopted by different organisations to reward employees' performance and in most cases; employees are assessed based on managers' discretions where employees may be not aware of the measures adopted in their performance appraisals. This provides the need to develop models for rewarding employee's performance in the construction industry. The critical variables for measuring incentive payoffs for operation workers and management staff were identified in sections 8.16 and 9.16 and these variables were adopted to develop models for employee incentive payoffs (see section 11.4.2). The processes involved in adopting these employee incentive models in construction projects are illustrated in the developed incentive framework (see figure 11.1). At organisational level, the study proposes the use of a multiple incentives plan incorporating the key performance metrics: such as cost, time, quality and safety/health. Section 11.4.1 describes how the model for organisation incentive payoff was developed and the process for adopting this model is further illustrated in the developed framework (figure 11.1).

Evaluating performance indicators in construction projects:

The first functional activity in the conceptual phase is identifying the project objectives. There are four key performance objectives used in this study which are quality, cost, time and safety/health. The findings identified the highest significant parameter for each performance objective (see tables 10.8 and 10.9). The case study investigations in South Africa revealed that the conformance with specified quality of materials has been of great importance for both employers and contractors' reputations in achieving quality performance. The use of penalties for late completion as adopted by the Department of Public Works is important to achieve time performance but there is also the need to reward early completion.

Minimising safety/health incident rates through enforcing safety/health measures and taking disciplinary actions against perpetrators and those who do not conform to those measures will lead to safety/health performance on construction sites. The findings also revealed that cash flow is the lifeblood of any contractor, but in most cases, employers try to raise all sorts of blockages to prevent paying contractors on time while contractors have expenses to pay for. Therefore, having an efficient cash flow system will significantly improve cost performance in projects. In this regard, it is important to mention that both South Africa and Nigeria still do not regulate for prompt payment and adjudication as is the case in a number of other countries, for example, the United Kingdom, Australia, Hong Kong, Singapore and many others.

In Nigeria, the case study investigations revealed avoiding re-work and having a stringent control system over change in work order will improve cost performance and other related indicators such as time and quality. The findings specify the need for safety/health measures which are focused not only to prevent but to respond to accidents and fatalities. Minimising defects on work will improve the contractor's reputation and profit margin. Although completion of projects within the specified time has been a major challenge for most contractors, since most projects are awarded with existing structures, therefore having a reasonable claim for extension of time will improve time performance.

Assessment of organisational competencies in project delivery:

Evaluating organisational competencies is the second functional activity in the conceptual phase of the developed incentive framework. This is considered an essential activity required during the selection process of a contractor; it involves the assessment of the technical abilities of the contractor for a particular project. The findings from the PCA revealed the four most important measures in South Africa and the two most important measures in Nigeria (see tables 10.6 and 10.7). The case study investigations in South Africa revealed that these four measures will enhance formal training of employees and also encourage efficient work productivity. Although technology transfer may be tedious, the assessment of organisational competencies through these measures would force the contractor to provide a procedure for efficient simulation of knowledge. The case study investigations revealed that the use of these two most important measures in Nigeria would also force contractors to devise means of incentivising easy access to knowledge so as promote communication and information exchange among team members. This would provide better understanding of the work processes thereby eliminating mistakes and failures.

Impact of management attributes in improving performance:

The review of management attributes is highlighted as the first functional activity in the construction phase of the developed incentive framework. The findings identified four identified critical attributes which can be used to assess the management skills of an organisation towards project improvement (see tables 10.2 and 10.3). The findings from the case study investigations in South Africa revealed that these critical attributes can promote profitable outcomes and enhance the reputation of contractors. The shortage in the skilled construction workforce can be improved through the transfer of administrative and technical skills to small-scale contractors using an effective design program. The case investigations in Nigeria revealed that the four identified critical attributes can influence job satisfaction and work productivity in organisations. Most companies are not willing to adapt to changes due to several constraints; for example, unreliable power supply. Stipulating these critical attributes encourage companies to adapt to these changes which will improve project performance.

Risk allocation in incentive compensation plans:

Risk sharing in construction projects is an aspect that clients prefer to avoid by accepting higher costs for contractors to take up such risks. The literature review revealed that most existing incentive plans focused on reward/penalty distribution among contracting parties. This provides the need to incorporate risks and rewards in incentive designs to encourage good working relationships among parties. Risk allocation is a functional activity in the conceptual phase of the developed incentive framework. The findings revealed the four most critical risk factors influencing risk allocation in incentive compensation plans in both countries (see tables 10.4 and 10.5). In South Africa, the case study investigations revealed that the identified critical risk factors should be considered in incentive compensation projects in order to ensure that such risks are properly controlled or mitigated. For example, risks associated with labour disputes are often not claimable therefore diverse ways for compensating the party involved is required to create a good working relationship. The case study investigations in Nigeria revealed that the four identified critical risk factors will promote a good background whereby the contractor would not tend to overlook any unfavourable condition in order to win the bid and thereafter cut corners during project delivery to cover his losses. This will also provide the need for an agreed upon structure of payments and reconciliation of financial claims thereby preventing contractual disputes.

CHAPTER ELEVEN

FRAMEWORK DEVELOPMENT AND VALIDATION

11.1 Introduction

The second part of objective four for this study aims at developing the best-suited framework for incentive mechanisms in construction projects. To achieve this, the previous chapters seven and eight identified the variables and measures which are associated with constructs of incentive mechanisms. This chapter describes the concept of a framework development and the approach adopted in constructing the framework for this study. It presents the description phases of the framework and incentive payoff models and lastly, the procedure used to validate the framework.

11.2 The concept of framework development

A framework is a real or conceptual structure of interlinked items intended to serve as a support to a specific objective and /or guide that can be modified as required by adding or deleting items (Online business dictionary, 2015; Techtarget online, 2015). The literature review identifies the two existing models for incentive systems in the construction industry, with two of them proven to be useful in one way or the other. These models failed to establish a mechanism that incorporate the operational and sociological constructs and also reflect the phases of the construction process. The use of a single incentive plan was identified and the literature review established that it is problematic. This study argued for the use of multiple incentives which incorporate performance metrics such as cost, time, quality and safety/health.

As noted previously, Rao (2010: 1) emphasises that incentive plans should be linked to a contract strategy to be effective. Hibberd (2009:9) also suggested that the use of performance metrics in a contract should be in conjunction with a framework reflecting a strategic approach. The development of this framework for incentive mechanisms is based on the outcome of reviewed literature and questionnaire surveys. The findings from the studied constructs including parameters of risk allocation in projects were then integrated to produce the general process and structure of a standardised framework. The framework is presented as a process model and is generic which means that it can be applied across the construction sector.

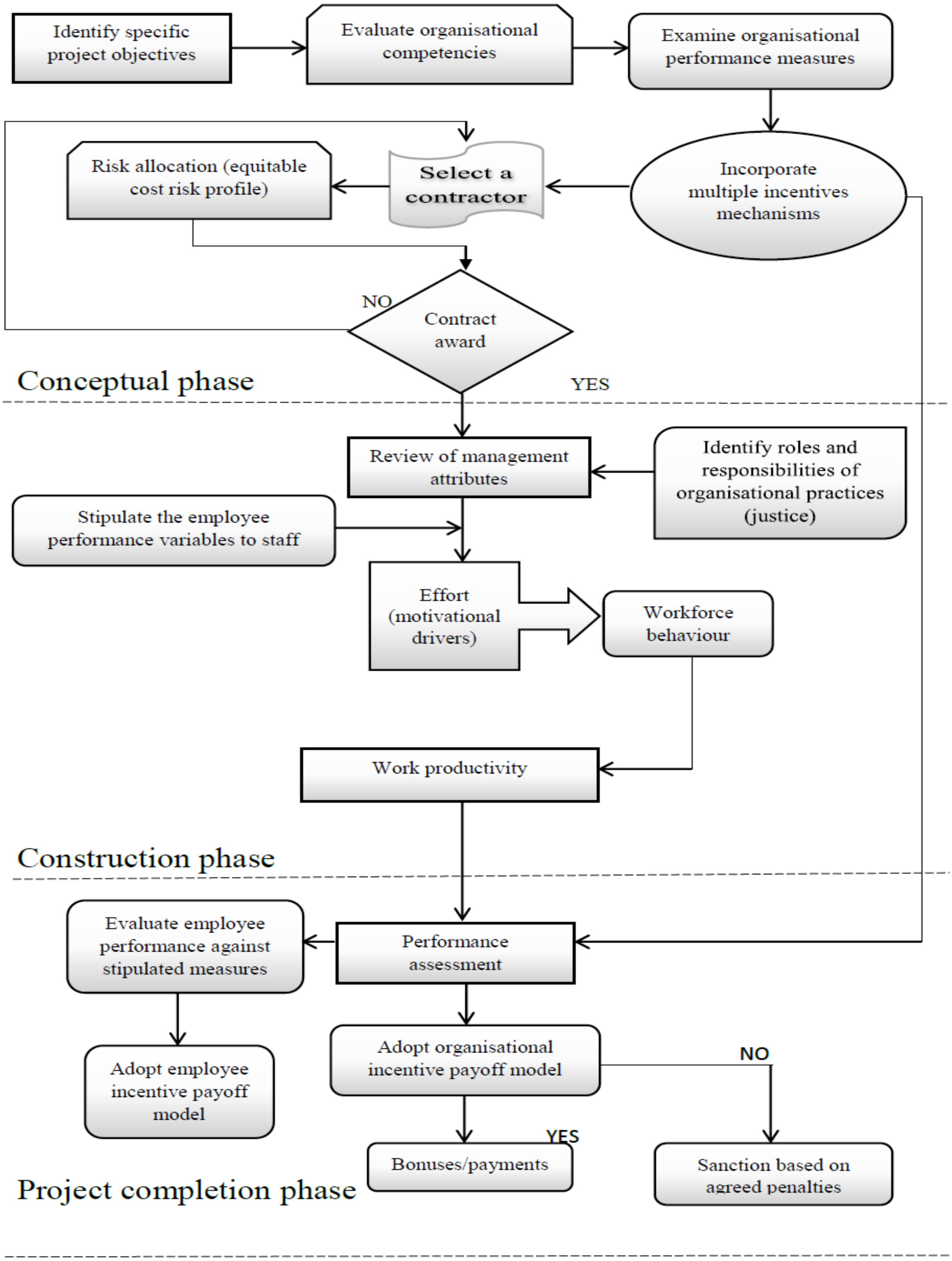


Figure 11.1: Developed framework for incentive mechanisms in construction projects

11.3 Framework for incentive mechanisms in construction projects

The process model of the developed framework is illustrated in figure 11.1 and it comprises of three phases namely: (1) conceptual phase, (2) construction phase and (3) project completion phase. For each of these phases, a number of sub-activities have been identified and the components of these activities are described as follows:

11.3.1 Conceptual phase

This phase consists of six functional activities conducted before the award of a contract to ascertain the parameters required for incorporating incentive mechanisms in a particular project. These interlinked items are discussed as follows:

I. Specific project objectives: Section 10.5.5 discussed the specific project objectives relevant in each country. These indicators might vary based on the project constraints; there is a need to specify the project objectives at the initial stage.

II. Organisational competencies: This functional activity involves the evaluation of organisational competency measures to select the relevant factors to use in assessing the capabilities of contractors. For this study, a total of 20 measures were identified and analysed for both countries (see sections 8.11 and 9.11). The result identifies the most important competency measures. Section 10.5.4 presents the outcome of the case studies conducted using these measures and remarks made by the interviewees.

III. Organisational performance measures: This provides the measures used to evaluate organisational performance in relation to the specified project objectives. A total number of 24 factors were identified from the literature review and the analysis identifies the most important factors in evaluating organisational performance (sections 8.9 and 9.9).

IV. Incorporate multiple incentive mechanisms: The multiple incentives scheme is introduced at this stage, targeted towards achieving cost, quality, time and safety/health performances. The formulas for bonus sharing and penalty fees for each performance metric are stipulated.

V. Contractor selection: The process used in selecting a contractor varies according to the client. At this stage, the stipulated procedure by the client or the employer has to be adopted. This framework is not focused on developing a procedure for contractor selection but rather to formulate a process in which incentive mechanisms can be introduced into project contracting.

VI. Risk allocation (equitable cost risk profile): Risk allocation is usually stipulated in the conditions of contract. This study identified critical factors that should be considered when allocating risks in order to provide a good working relationship among contracting parties; these critical factors are represented in sections 8.7 and 9.7. Section 10.5.3 presents the result of case study interviews conducted for these critical factors. After this stage, the contract is either awarded to the contractor or not.

11.3.2 Construction phase

This phase begins after the contract has been awarded to the successful contractor; most of these activities are performed by the contractor and may be monitored by the employer. There are six functional activities highlighted in this phase and are discussed as follows:

I. Management attributes: At this stage, management skills are adopted in the organisation targeted towards achieving the project goals. For this study, a total number of 20 management attributes were identified to assess the most influential attributes for both countries; the result of this analysis is presented in sections 8.3 and 9.3. The outcome of the case study interviews on these attributes is discussed in section 10.5.2.

II. Roles and responsibilities of organisational practices (justice): Organisational justice is considered a functional activity required in a project to achieve best performance. It is essential for contractors to adopt this construct in project delivery. The study further identified the most effective parameters of organisational justice in both countries (see sections 8.8 and 9.8 for details).

III. Stipulate the employee performance variables to staff: This involves the process of allowing the staff to become acquainted with the actual measures adopted to assess their performances.

IV. Effort (motivational drivers): As previously noted, motivation is defined as the intermediate variable between principal project activities and project performance (Rose and Manley, 2011: 766). This study identified the positive motivational drivers for both countries in sections 8.4 and 9.4.

V. Workforce behaviour: The expected behaviour of an employee occurs as a result of certain factors; sections 8.10 and 9.10 highlighted the most influential factors affecting employee/organisational behaviour during the construction phase for both countries.

VI. Work productivity: This represents the output derived from implementing these functional activities during the construction phase.

11.3.3 Project completion phase

This phase involves the process of assessing contractor's performance to ascertain how the project goals are achieved. There are six functional activities used at this phase to either compensate or penalise for service delivery and they are discussed as follows:

I. Performance assessment: The assessment of project performance is performed using the stipulated project objectives which have been identified at stage I of the conceptual phase. If the assessment is considered successful then the organisational incentive payoff is adopted for compensation, if unsuccessful then the contractor is sanctioned based on the agreed upon penalties.

II. Adopt organisational incentive payoff model: The model for organisational incentive payoff is used to assess the key performance metrics as stipulated in section 11.4.1.

III. Bonuses/payments: Payments or rewards are allocated to the contractor based on the successful achieved performance metrics.

IV. Sanction based on the agreed upon penalties: This involves the sanctioning of the contractor based on the agreed upon penalties.

V. Evaluate employee performance against stipulated measures: At this stage, employees are evaluated based on the measures for incentive payoffs.

VI. Employee incentive model: The model used in incentive payoff for employees is introduced to assess both operational and managerial staff (see section 11.4.2 for details).

11.4 Modelling process for incentive payoffs in construction projects

As previously noted, the study conducted by Hughes *et al.* (2007) reveals that incentives operate at two different levels, namely: the employee and the organisation. For the purpose of this study, the research modelling process is performed for organisational incentive payoff and employee incentive payoff. Organisational incentive payoff denotes incentives initiated between the employer and the organisation targeted towards improved performance while employee incentive payoff represents the compensation plans used within the organisation to motivate employees.

11.4.1 Modeling for organisational incentive payoff

This study focused on developing a multiple incentives scheme which is targeted towards incorporating the key performance metrics, namely: cost, time, quality and safety/health. In order to select the parameters constituting these measures, a questionnaire was designed to assess the level of importance of the identified performance parameters in both the countries under investigation in this study. The results of the analysis for both countries are described in sections 7.6 and 8.6 where four components were retained in each country. The factor with the highest loading was selected as a representative factor for each performance indicator. A total number of four performance parameters were adopted for qualitative survey in each country. The case study interviewees were asked to rate these parameters and to provide comments on their answers. The result of the case study interviews is presented in Tables 10.8 and 10.9 under section 10.5.5. Based on the result, the metrics for measuring organisational incentive payoff are described in Table 11.1 and model for organisational incentive payoff is presented in Figure 11.2.

Table 11.1: Metrics for measuring organisational incentive payoff

KPF	**Measure**	**Parameters in South Africa**	**Parameters in Nigeria**
PF1	Cost	Meeting target cost	Measurement and correction of works
PF2	Time	Timely completion	Reasonable claims for extension of time
PF3	Quality	Conformance with quality	Minimise defects (zero defect)
PF4	Safety/health	Minimise incident rates	Response to incident rates

KPF = key performance factors; PF = performance factor

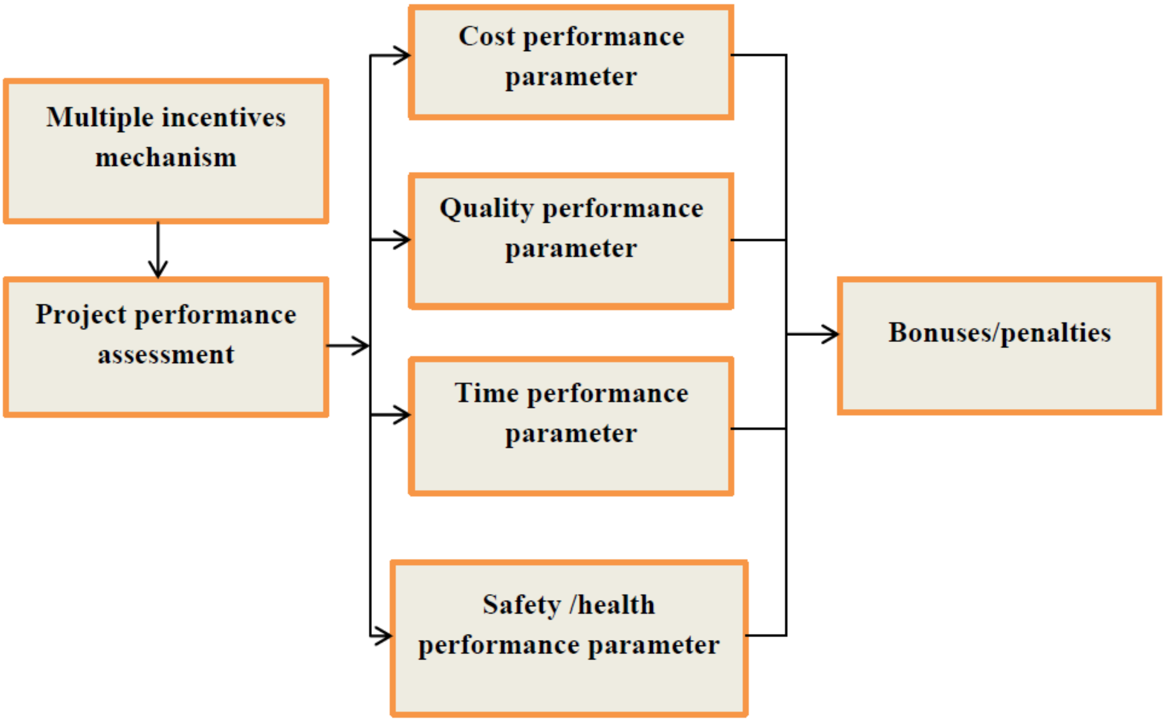


Figure 11.2: Organisational incentive payoff model

The following scaling factors represent the selected parameters for measuring organisational incentive payoffs in South Africa. The study further provides an illustrative example on how to adopt these parameters to assess incentive payoffs for an organisation (see appendix 4). The scaling factors for each parameter are described as follows:

- **Meeting target cost:**

$$\text{Cost ratio} = \frac{[\text{Estimated project cost (EPC)} * \text{stretching value}]}{\text{Final project cost (FPC)}}$$

$$= [1.0 - \text{cost ratio}] * \text{FPC}$$

Cost incentive payoff = Result * fee ratio

Note: If the index is less than one (1) then multiply with the agreed upon bonus sharing ratio but if index is greater than one (1) then multiply with the agreed upon penalty fee ratio.

- **Timely completion:**

Time incentive payoff = Estimated time of project completion (ETPC) - Actual time of project completion (ATPC)

= Result * fee ratio

Note: If there is a negative value for the index then multiply with stipulated penalty fee but if it is a positive value for the index then multiply with the stipulated bonus sharing ratio.

- **Conformance with quality**

Quality incentive payoff = Achieved quality rating score - Threshold value (measured against the rating scale)

= Result *fee ratio

Note: The rating scale for quality measure is a seven point scale system of 1 = very dissatisfied, 2 = dissatisfied, 3 = slightly dissatisfied, 4 = neutral, 5 = slightly satisfied, 6 = satisfied, 7 = very satisfied while the threshold value is 6. Quality rating is usually measured subjectively based on the system metrics of a particular project. A positive index signifies that the fee ratio should be based on stipulated bonus ratio but in most cases, employers still pay bonuses for zero index which implies quality satisfaction. A negative index is multiplied by the penalty fee ratio.

- **Minimise incident rates**

Safety/health incentive payoff = Minimum acceptable level of incident rate - Actual incident rate

= Index * fee ratio

The scorecard approach is commonly used to assess safety/health system effectiveness in projects and their basic measures include the accident record, the audit score and perception survey results (EHS, 2001). The actual incentive rate is measured using occupational safety and health administration act (OSHA) incident formula which is the total number of injuries and illnesses recorded multiplied by 200,000 and divide by number of hours worked by all employers.

Note: If there is positive index then multiply with the stipulated bonus ratio but if there is a negative index then multiply with the stipulated penalty fee ratio**.** High penalty fee or sanctions should be given to contractors for any unreported incident.

The selected parameters for measuring organisational incentive payoffs in Nigeria are described using scaling factors. The study further provides an illustrative example on how to adopt these parameters to assess incentive payoffs for an organisation (see appendix 5). The scaling factors for each parameter are shown below:

- **Measurement and correction of works**:

Net value of variation = Actual project cost - [Estimated project cost + Cost of change orders] - Cost of re-work

Cost incentive payoff = Net value of variation * fee ratio

Note that in cost performance, if there is a positive index then multiply with the stipulated bonus sharing ratio but if it is a negative index then multiply with the stipulated penalty fee.

- **Reasonable claims for extension of time:**

Time incentive payoff = [ETPC + EOT] - ATPC = Index * fee ratio

Where ETPC is estimated time for project completion; EOT represents extension of time granted by the client; ATPC is actual time of project completion.

Note: If there is a negative index then multiply with the stipulated penalty fee but it is a positive index then multiply with the stipulated bonus sharing ratio.

- **Minimise defects**

Quality incentive payoff = Achieved quality rating score * [Rework performed - Quality defects recorded] - Threshold value

= Index * fee ratio

Note: Rating is done using a seven point scale as described above, if there is a positive index then multiply with the stipulated bonus fee but if it is a negative index then multiply with the agreed penalty fee.

- **Response to incident rates**

The effectiveness of a contractor's safety/health efforts cannot be measured using traditional criteria. There are factors used to assess a contractor's safety/health efforts towards safety/health performance, they are as follows:

Measuring safety/health effort = [audit score] * [perception survey rating]

Safety/health incentive payoff = Rating of safety/health efforts - Minimum acceptable level of incident rate

Note: If there is a positive index then multiply with the stipulated bonus ratio but if it is a negative index then multiply with the stipulated penalty fee ratio**.**

These measures provide practical formulas for assessing a contractor's ability to meet the key performance metrics incorporated in a multiple incentives mechanism. As previously stated in section 2.8.4 and Table 2.10, a multiple incentives contract allows for partial bonuses or losses to be awarded for each performance and therefore it affects the opportunity to attain other bonuses. This study did not intend to develop a single metric for overall organisational incentive payoff because it is not realistic and its application may not achieve the key performance measures. Therefore, it is more practical to assess these metrics separately using the formula specified for each performance metric.

11.4.2 Modeling for employee incentive payoff

Compensating employees for performance is an important tool required to enhance maximum productivity of the workforce. There are two categories of workforce used for this survey which are operational workers and management staff. The literature review identified several variables influencing compensation/incentive payoff in construction projects. Both countries investigated in this study have similar results and these critical variables are used to measure employee incentive payoffs (see analysis in section 8.16 and 9.16). Figure 11.3 illustrates the employee incentive payoff model for operational workers while Figure 11.4 shows the employee incentive payoff model for management staff.

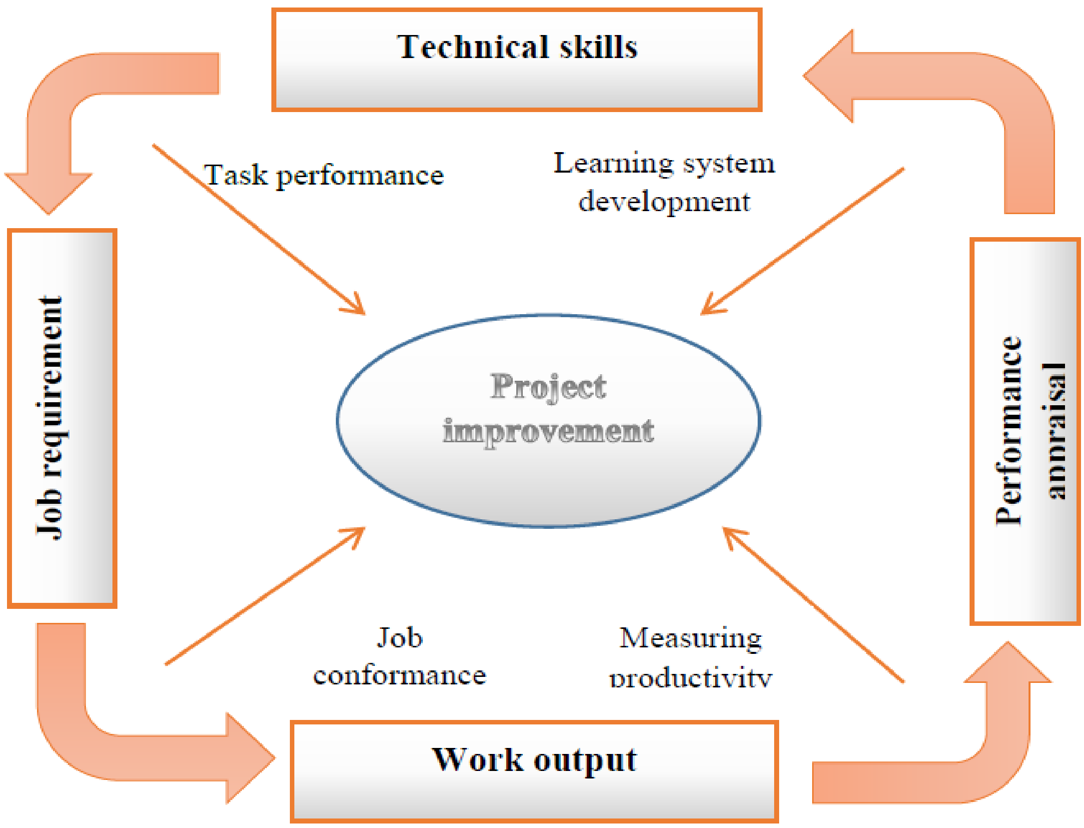


Figure 11.3: Employee incentive payoff model for operational workers

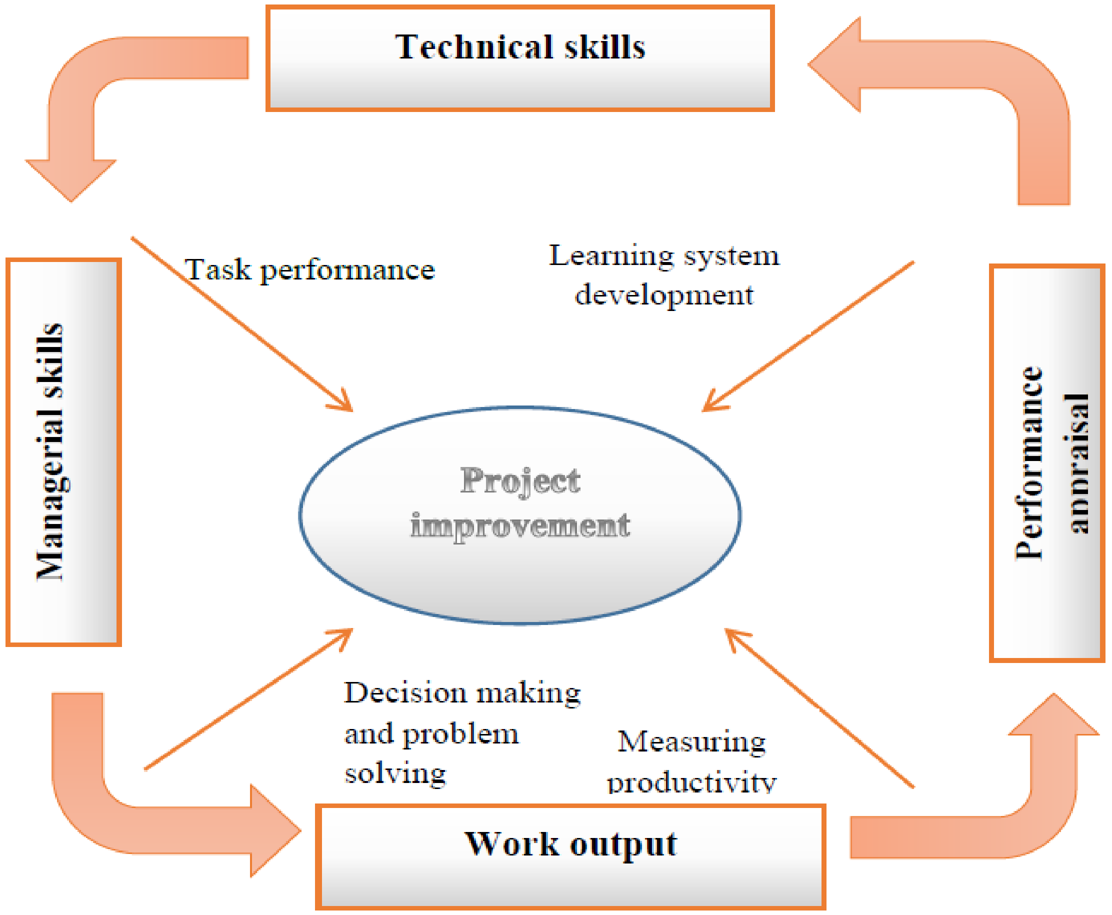


Figure 11.4: Employee incentive payoff model for management staff

The reward systems for these models are described as follows:

<u>Employee incentive payoff for operational workers</u>

$EI_1 = f\ (T) + g\ (J) + h\ (W)$

Work output (W) = f (P – Q)

Where T represents the technical ability of the worker

J is the job requirement

W represents work output of the worker

P is the performance of the organisation

Q is the performance of other employees

f (T) is an increasing function of T

g (J) is an increasing function of J

h (W) is an increasing function of W

<u>Employee incentive payoff for management staff</u>

$EI_1 = f(T) + g(M) + h(W)$

Where T represents the technical ability of the worker

M is the managerial skills

P is the performance of the organisation

Q is the performance of other employees

W represents work output of the worker

f (T) is an increasing function of T

g (M) is an increasing function of J

h (W) is an increasing function of W

11.5 Procedure adopted for the framework validation

This section presents the procedure adopted in validating the framework for incentive mechanisms as illustrated in Figure 11.1. The essence of this validation is to test the workability and practicability of the developed framework. This validation process allowed for project practitioners in the construction industry to participate in the research by identifying the strengths and weaknesses of the developed framework and also suggest on how to resolve gaps observed in the framework. According to Yahaya (2008), the validation process of a conventional model can be done through: (1) a conceptual model, (2) an operational model, (3) a computerised model and/or (4) data used to construct and validate the model. This study adopted the conceptual framework validation process because it is still at the conceptual stage and the data used to construct this framework have been validated in chapters eight and nine.

In order to validate the framework for incentive mechanisms, potential participants were first identified from South Africa and Nigeria and then a formal letter of consent was sent to them. Upon the receipt of confirmation to participate, copies of the evaluation instruction was sent to them (see appendix 3). They were asked to rate the developed framework based on logical structure, clarity and intelligibility, comprehensive, practicability and efficiency using a scale of 1 = extremely poor; 2 = poor; 3 = average; 4 = above average and 5 = excellent. Participants were also asked to state the framework's potential strong and weak points as well as any suggestions aimed at improving the validity and effectiveness of the developed framework. This is in line with the study conducted by Martis (2006) which advocated that the purpose of validating a framework is to ensure its appropriateness of structure, logical and casual relationships, effectiveness, pragmatism and clarity.

11.6 Validation results

A total number of 11 invitees were asked to participate in the framework validation and 9 out of 11 returned their reports giving it a response rate of 82 percent. The result reveals that two directors in the public sector, three managers from the private sector, three contract/commercial managers from the construction sector and one project architect from a construction firm participated in the validation process. Table 11.2 reveals that 33.3 percent of the participants have between 20 to 30 years of work experience, 22 percent have above 30 years and between 10 to 20 years of experience respectively.

Table 11.2: Background information of participants

Profile	Frequency	Percentage
Job description		
Chief Director/Deputy Director	2	22.2
Managers	3	33.3
Contract/commercial Managers	3	33.3
Project Architect	1	11.1
Total	9	**100**
Type of organisation		
Association bodies	3	33.3
National Department of Public Works	1	11.1
Department of Works	1	11.1
XXX construction companies	4	44.5
Total	**9**	**100**
Years of experience		
Less than 10years	2	22.2
10 to 20 years	2	22.2
20 to 30 years	3	33.3
Above 30 years	2	22.2
Total	**9**	**100**

The result of the framework assessment is presented in Figure 11.5; the analysis reveals that the mean scores range from 4.45 to 3.98 which are all above 3.5. This implies most participants agreed that the incentive framework can have a positive impact in the construction industry. Logical structure of the framework which assesses the systematic structure of the sub-activities in project design was rated 4.15. This implies that there is coherence in the structure of the design. Comprehensiveness of the measures has the highest score of 4.45, most participants agreed that all the measures required to achieve effective implementation of the incentive scheme were well-represented. This is a good indication that there was no omission in the design process. Clarity of the design process and intelligibility of the concept was rated second with a mean score of 4.38. This signifies that the framework is defined showing a clear understanding of how it works and it is also easy to comprehend. Applicability, efficiency and practicability of the framework were rated 4.09, 4.11 and 3.98. The mean scores are still above the acceptable level but practicability of the framework received the lowest score. The reason might be the weak point recommended by some participants which emphasises the need for a good orientation in the industry in order to maximise the benefits of incentive systems.

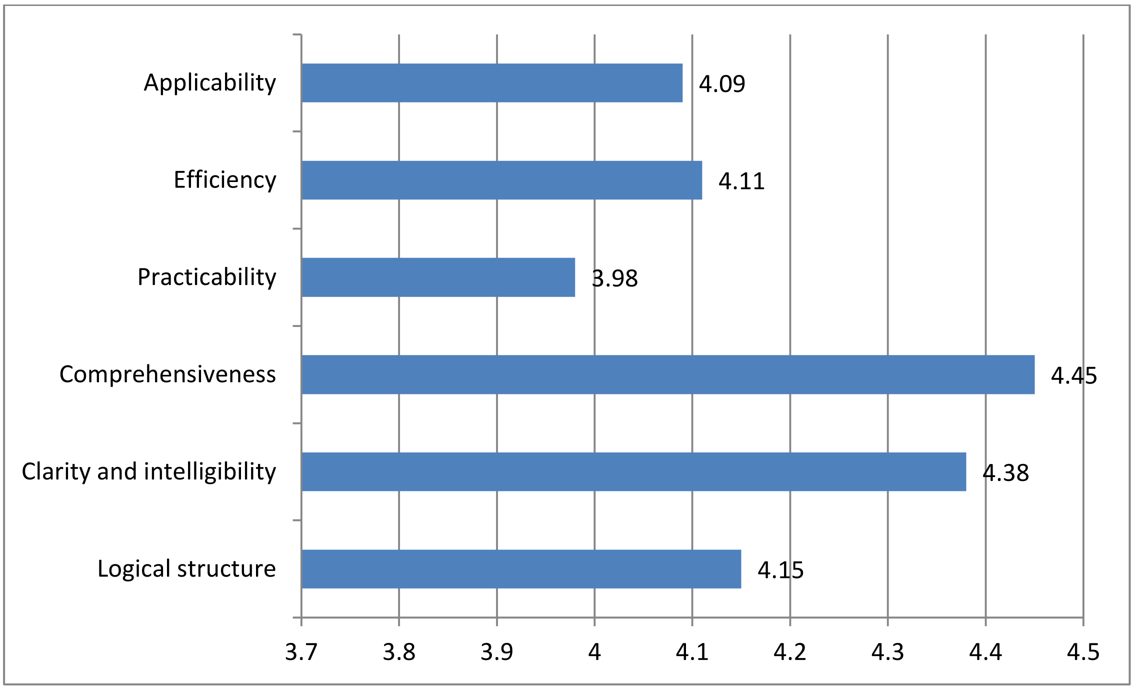


Figure 11.5: Rating of the developed incentive framework

There is a clear indication that all participants are pleased with the framework and their comments based on strong points, weak points and suggestions are stated below.

<u>Strong points</u>

- Evaluation of organisational competencies and performance measures are the strengths and opportunities in the framework and this will contribute to the improvement of performance assessment.
- Incentives for performance can be reached through the framework.

- The first of its kind, a comprehensive and intelligent mechanism that could be used to ensure the contractor's competencies and capability to achieve the project goals before the contract award.
- It provides practical ways of a cordial relationship between the contractor and the employer as well as measures for compensation or punishment for performance/non-performance.
- Involvement of contracting parties during risk allocation will provide a "fair play ground" project delivery.
- Once a specific contractor has the scheme working and workers have faith that they will receive the incentives upon delivery, the contractor will probably draw the cream of the labour force. One must, however, expect strong opposition from unions who insist on the same remuneration for the same type of work throughout its membership.
- It is very comprehensive and provides a good potential for project improvement.
- The framework provides a good clarification of performance objectives to contractors and also encourages contractors to achieve them by stating the bonuses and penalties involved.
- The evaluation and assessment throughout the process is necessary and can prove effective.

<u>Weak points</u>

- Selection of a contractor before evaluating organisational competencies and performance variables where these variables are introduced late to the staff (this comment was used to amend the framework).
- There is a need for a good orientation before the framework can be applied effectively.

- May be difficult to implement in real practice because of the complexities.
- There are sets of rates of pay throughout the industry and these determine tender rates for items of labour and unless a contractor can lower the basic rate of pay and supplement with incentives it will be hard to tender competitively. The scheme will operate better on the management (salaried) part of the workforce but normally these are the self-motivators.
- The theory is well set out but the implementation might be challenging.

Suggestions

- Ways of improving workforce behaviour to lead to improved productivity using incentives need to be strengthened.
- It will be a good idea if this framework together with a summary of the outcome of this research is made available to both public and private sectors clients to conceptualise the ideas.
- A system that worked reasonably well within a specific company was based on incentive throughout its entire workforce and whereby the management and labour all shared in the same incentive. Whenever a site was able to beat its allowance the difference between allowable and profit achieved was split 50/50 between site and company. The site manager was at liberty to split the incentive among the rest in whichever way he choses.
- After evaluation of organisational performance variables, write a report reflecting the process.

11.7 Chapter summary

This chapter described the details on how the framework was developed and validated. It further presented the modeling process for incentive payoffs in construction projects. The framework and models were developed using inputs from the literature review, quantitative and qualitative data analyses. The procedure adopted in the framework validation was discussed and the results were presented. The overall outcome of the validation process reveals that the framework is sufficiently comprehensive and useful for introducing incentives in project contracting, achieving project goals and creating a mutual understanding between contracting parties.

CHAPTER TWELVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

12.1 Introduction

This thesis presents the investigation undertaken to explore the use of incentive mechanisms in construction projects in South Africa and Nigeria and also to develop and validate incentive framework and models for incentive payoffs. Previous chapters discussed the background of this study, problem formulation, statement of problem, hypotheses, justification of study, key assumptions, literature review, research methodology, findings from quantitative and qualitative surveys, and framework development.

This chapter presents a summary of the main findings from the literature review and the research. The basic conclusions and recommendations are made and the implications of the study are also discussed.

12.2 Main findings

The main findings emanating from the study are summarised into two broad headings: (1) findings from the literature review and (2) findings from the research.

12.2.1 Findings from the literature review

An extensive literature review was conducted to gather existing knowledge as well as previous investigations relating to this study with a view towards providing direction and justification for the study. Consequently, a number of findings were made as listed hereunder:

1. There is no existing framework or model for adopting incentive mechanisms in construction projects which is targeted towards performance improvement in South

Africa and Nigeria. Although there are evidences of previous studies in the developed countries, the use of incentive mechanisms is still faced with challenges relating to having a subtle balance in the design process.

2. Previous studies on the use of incentive schemes reveal the use of a single incentive plan in construction projects whereby they failed to reflect the key performance metrics (multiple incentives). This has led to over-investment of one's effort in one area at the expense of other metrics. Incorporating organisational goals in incentive design will encourage contractors not only to focus on performance areas which are explicitly rewarded but also on goals that may be harder to specify and measure, this will promote best performance.
3. Two theoretical fundamentals associated with the use of incentives are identified as risks and rewards. The decision to allocate risks in project contracting is influenced by several factors. A number of 29 risk factors were identified in the literature review and they form the variables used to assess the critical risk factors involved in the design of incentive compensation plans in construction projects. The literature review also revealed a total number of 17 incentive schemes adopted as reward strategies in construction projects, which form the variables for identifying the most efficient incentive schemes in both countries. These incentive schemes are categorised as financial, semi-financial and non-financial schemes.
4. It is argued that employee performance influence organisational performance which in turn affects the attainment of client's expectations in projects. Likewise, the perceptions of construction employees in an organisation affect their levels of commitment and participation in projects. Workforce behaviour is seen as an essential element which explains why and how an individual's or a group's actions influence an organisational performance and the environment. Behaviour is identified as a

major link between organisational culture and project performance. There are 23 variables identified in the literature review that influence employee/organisational behaviours and they are grouped as individual personality, organisation values/beliefs, work characteristics, and work environment.

5. The reviewed models for incentive mechanisms from the previous studies reveal that these models failed to propel the attainment of multi-objective systems. The findings revealed that these models focus on a single performance objective and also failed to consider the prevailing structure of the construction sector which is focused on meeting deadlines and short-term projects.
6. Multiple incentives schemes are identified as multi-objective systems which can be used to achieve functionality and quality, to complete on or before the target date and within or at the target cost. Although there is no existing empirical study on the use of multiple incentives, most researchers advocated that achieving the key performance metrics which are time, cost, quality and safety/health through an incentive plan will motivate contractors to achieve better results (Legal Information Institute, 2000; Ittnera *et al.*, 2003; Lahdenpera and Koppinen, 2003; Beer *et al.*, 2004).

12.2.2 Findings from the research

The overall aim and objectives of the study have earlier been stated in chapter one. This section discusses how the research process addressed the stated aim and objectives of this study. The principal aim of this research is to evaluate the use of incentive mechanisms in achieving project performance in construction projects in South Africa and Nigeria. This was achieved through questionnaire surveys and case study approach targeted towards exploring the practice of incentive mechanisms. These survey techniques were applied in the research process through an explanatory sequential approach of mixed methods research design. The findings from the data analysis and interviews as summarised as follows:

1. The case study interviews revealed the use of a single incentive plan in both countries at the organisational levels. Evidences showed that the single incentive plan has frequently been tied to time performance in the public sector projects in South Africa and this is focused on penalising contractors for not meeting the stipulated project deadlines only. The findings from the Nigerian construction industry revealed the use of an incentive plan which is tied to time and/or cost performances. There is no formal framework for adopting incentive mechanisms at the organisational level in both countries.
2. The study revealed that there are several forms of incentive compensation plans adopted by different organisations to reward employees' performance at the employee level. In most cases, they are assessed based on managers' discretions in which the measures for their performance appraisals are not made known to employees. The critical variables for measuring incentive payoffs for operational workers and management staff were identified. The four key performance objectives used for assessing organisational performance in the study are cost, time, quality and safety/health. The study identified the significant parameter for each objective as it relates to both countries. Based on the research outcomes, models were developed for employee/organisational incentive payoffs and a best-suited framework for incentive mechanism in construction projects was also developed. These findings addressed the objective four of the study.
3. The sociological and operational constructs of performance in relation to incentive mechanisms in construction projects were identified and analysed. The study assessed two sociological constructs of performance which are organisational justice and

employee behaviour while three metrics for operational constructs which are organisational competencies, management attributes and risk allocation were analysed.

The effect of organisational justice in motivating the construction workforce towards improved productivity:

"Rewarding employees' efforts", "respect for people" and "fairness in pay to staff" are the top ranked measures in South Africa while "fairness in pay to staff", "recognition of merit performance", "proportional equity in reward distribution" and "basic needs" are the top ranked measures in Nigeria.

Assessing the variables that influence employee/organisational behaviour during project implementation:

The findings identified that "communication process", "learning process" and "respect for co-workers" are the top ranked variables that contribute to workforce behaviour in South Africa while "competition", 'technology capability' and 'communication process" are the top variables in Nigeria.

Assessment of organisational competencies in project delivery

The study identified "competence of team members" and "educational background" as the top rated measures in South Africa while "easy access to knowledge" and "historic events (company past activities)" are the top rated measures in Nigeria.

Impact of management attributes in improving performance

The result from the case studies revealed that "achieving specific project goals" and "knowledge and skills transfer process" as the top rated attributes that influence an organisation's ability to achieve improved performance in South Africa. "Organisational culture/commitment" and "contract policy and procedure" are the top rated management attributes that influence improved performance in Nigeria.

Risk allocation in construction projects

The findings revealed “improper design” and “labour disputes” as the most influential factors in risk allocation in South Africa while “contract conditions” and “financial stability” are the most influential in Nigeria.

4. The study established that that “timeous payment”, “prospect for promotion” and “good supervision” as the top ranked motivational drivers in South Africa while “prospect for promotion”, “working conditions (availability of materials and tools)” and “income increments” are ranked as the top drivers in Nigeria. The findings addressed the second part of objective one.
5. The most influential incentive schemes were identified as “empowerment”, “recognition” and “praise of good work” for South Africa while “pension schemes”, “recognition” and “empowerment” were identified as the most influential for Nigeria. The findings addressed the first part of objective one.
6. The study identified “Improved customer satisfaction”, “encourages quality of work” and “better working environment” as the top ranked benefits of incentive mechanisms in South Africa while ‘encourage quality of work”, “healthy competition” and “improved customer satisfaction” are the top ranked benefits in Nigeria. The findings revealed the economic benefits of incentive schemes which are part of objective three.
7. The findings reveal that “delay in approving changes”, “budget difficulties” and “delay in review of specifications/requirements” as the top ranked challenges associated with the use of incentive mechanisms in South Africa while in Nigeria, “budget difficulties”, “schedule difficulties” and “lack of effective performance oversight” are ranked as the top challenges associated with the use of incentives in Nigeria. This addressed the second part of objective three.

12.2 Implications of the study

This thesis has provided valuable contributions to the existing body of knowledge in this research area. The following sub-sections highlight the practical and theoretical implications of this study.

12.2.1 Contributions to theory

First, the study contributes to the existing performance improvement theory by applying a theoretical framework developed from extant literature to empirically develop and validate a best-suited framework for incentive mechanisms. It provides a detailed explanation on how to successfully implement the phases of the developed incentive framework to achieve best practice.

Second, the study equally provides a valuable contribution to the body of knowledge of incentive mechanisms by providing empirical insight into the use of key performance metrics and the development of a multiple incentives plan in construction projects. This study further assessed the most significant parameter for each of the four key performance metrics in both countries through a quantitative survey and qualitative case study, and thereafter incorporated them into the framework development and modelling process. The result provides a comprehensive detail on how these metrics can be effectively utilised to improve the practice of incentive mechanisms.

Third, the study also provides the first ever survey as far as could be established, based on an empirical study, for sociological and operational constructs of performance in relation to incentive mechanisms. This study identified these constructs through an extensive review of related literature and categorised them based on their functions. These constructs were further evaluated through a questionnaire survey and case study investigations to develop a body of factors associated with incentive mechanisms in the context of the construction industry in South Africa and Nigeria.

Fourth, the study has provided an understanding of the economic benefits and challenges of incentive mechanisms in the construction industry in South Africa and Nigeria and how to resolve these challenges through best practice.

Fifth, the study establishes the theoretical fundamentals of incentive mechanisms as risks and rewards. It reinforces the theory of incentives that risks exist in a form of relationship with rewards in an incentive plan. It is important to point out that it is the first empirical study based on the researcher's knowledge that incorporated risk elements in incentive design.

12.2.2 Practical implications

The thesis suggests some practical implications to the construction industry in South Africa and Nigeria.

First, the study establishes that employee performance influence organisational performance thereby affecting the attainment of clients' expectations. This provides the need to motivate employee rightly to achieve project goals.

Secondly, the research has provided basic constructs to use in adopting a multiple incentives plan in both countries. It further provided distinctive factors for each country in measuring these basic constructs of performance in incentive plans.

Thirdly, the validation results revealed that this framework is comprehensive, well-designed and efficient as well as coherence in structure but subject to a good orientation within the industry in order to fully benefit from the scheme. Moreover, the findings gave insight on how to implement the process model using the specified functional activities across the construction sector.

12.3 Recommendations for further research

Based on the findings of this thesis, the following areas for further research are recommended:

1. The major purpose of this thesis is to develop a framework for incentive mechanisms. There is a need to further develop user friendly application software capable of incorporating weightings of importance attached to sociological and operational constructs as identified in this study.
2. This thesis developed incentive payoff models for organisations and employees which are incorporated in the incentive framework. There is a need to further establish how these models impact on performance improvement within the construction industry (see illustrative examples in appendices 4 and 5).
3. The case study interviewees and the participants from the framework validation process recommended that a good orientation and culture of incentive mechanisms can make the practice more efficient. It is important to note the developed framework incorporate multiple incentives and this can be used to resolve the challenge associated with lack of effective performance oversight.
4. The study is limited to the Gauteng province in South Africa and Abuja zone in Nigeria. Although it could be generalised in a lesser scale to other parts of the respective countries, more comparative research needs to be carried out in other developing nations in Africa.

12.4 Closing remark

This chapter has provided the summary of the main findings in this study, implications as well as recommendations for further research. It is worth noting that the study developed and validated the framework for incentive mechanisms as a way of contributing to efforts targeted at ensuring performance improvement in construction projects. The explanatory research has resulted in significant and innovative conclusions relevant to academia and practitioners in the field of study. The identified further research areas will assist to refine the concept of incentive mechanisms as investigated in the study.

REFERENCES

ACIL Tasman, 2005. *Economic impact modelling study: TG construction documentation and scenario analysis. A* report prepared for CRC for construction innovation, Sydney: ACIL Tasman.

Adams, G.R. & Schvaneveldt, J.D. 1991. *Understanding research methods*, 2nd edition, New York: Longman.

Adams, J.S. 1963. Wage inequities, productivity and work quality. *Industrial relations: Journal of Economy and Society*, vol. 3, no. 1, pp. 9-16.

Adams, J.S. 1965. Inequity in social exchange, In: *Advances in experimental social psychology*. Edited by L. Berkowitz, 2nd edition, New York: Academic Press, pp. 267-299.

Adecco 2013. *10 guidelines for recognizing and rewarding employees*. [Online]. Available: http://www.adecconsa.com, [viewed 3 December 2013].

Adnan, H., 2008. An assessment of risk management in joint-venture projects (JV) in Malaysia. *Asian Social Science*, vol. 4, no. 6, pp. 691-695.

Aghaei, N., Moshiri, K. & Shahrbanian, S. 2012. Relationship between organisational justice and job burnout in employees of sport and youth head office of Tehran. *Advances in Applied Science Research*, vol. 3, no. 4, pp. 2438-2445.

Ajayi, F.A. 2007. *Impact of Financial Incentives on the Productivity on Construction Sites Workers in Nigeria.* B.Tech. Dissertation, Nigeria: Federal University of Technology, Akure.

Akerlof, G.A. & Kranton, R.E. 2005. Identity and the economics of organizations. *Journal of Economic Perspectives*, vol. 19, no. 1, pp. 9-32.

Akintan, O.A. & Morledge, R. 2013. Improving the collaboration between main contractors and sub-contractors within traditional construction procurement. *Journal of Construction Engineering*, Article ID 281236, 11 pages, doi:10.115/2013/281236.

Akpobasah, M. 2004. *Development strategy for Nigeria*, Paper presented at overseas development/Nigeria economic summit group meeting in Nigeria, June 16-17 2004.

Alderfer, C.P. 1972. An empirical test of a new theory of human needs. *Organization Behaviour and Human Performance*, vol. 4, pp. 142-175.

Alfred, O.O. 2008. Due process and contractor selection for public works in Nigeria. *Building Abroad*. [Online]. Available: http://www.grif.umontreal.ca, [viewed 12 May 2013].

Al-Nsour, M. 2012. Relationship between incentives and organisational performance for employees in the Jordanian Universities, *International Journal of Business Management*, vol. 7, no. 1, pp. 78-89.

Alwang, J., Peterson, E. & Mills, B. 2001. Assessing the impacts of incentives to attract new businesses: a case study of scrap recycling industry. *A preliminary report*. Available: http://www.dis.virginia.gov, [viewed 18 February 2013].

Amaratunga, D., Sarshar, M. & Baldy, D. 2002. Process improvement in facilities management: the SPICE approach. *Business Process Management Journal*, vol. 8, no. 4, pp. 318-337.

Ambe, I.M. & Baderhorst-Weiss, J.A. 2012. Procurement challenges in the South African public sector. *Journal of Transport and Supply Chain Management*, vol. 6, no. 1, pp. 242-261.

Amercian Psychological Association (APA), 2008. Making teamwork rewarding, vol. 2, no. 4, published on 16 July 2008. [Online]. Available: http:www.apaexcellence.org, [viewed 10 April 2015].

Andersen, J., Nyek, M. Jolly, L. & Radcliffe, D. 2005. Design management in a construction company, *Proceedings of the 2005 ASEE/AaeE 4th global colloquium on engineering education.* [Online]. Available: http://www.espace.library.uq.edu.au, [viewed 22 May 2013].

Andersson, K., Ydreborg, B., Fagerlund, I. & Ashaksen, W. 2005. Socio-economic factors, lifestyle and personal attitudes influence report of SBS-symptoms in questionnaire surveys. In: *proceeding Indoor Air*. [Online]. Available: http://www.ust.is, [viewed 26 November 2013], pp. 3736-3740.

Arditi, D. & Yasamis, F. 1998. Incentive/disincentive contracts: perceptions of owners and contractors. *Journal of Construction Engineering and Management*, vol. 124, no. 5, pp. 361-373.
Argote, L. 2013. *Organisational learning: creating, retaining and transferring knowledge*. New York: Springer Science Business Media.

Armstrong, M. 2010. *Armstrong's Handbook of Reward Management Practice*, United Kingdom: Kogan Press.

Arowojolu-Alagwe, T. & Adegoke, B. F. 2013. An evaluation of risk factors affecting performance of projects in South-western Nigeria. *PM World Journal*, vol. ii, no. x, pp. 1-13.

Arowojolu-Alagwe, T., Ankeli, A.I., Odewande, A.C. & Apata, O.C. 2013. An appraisal of skilled labour migration in the Nigerian construction industry, *International Journal of Business Administration*, vol. 4, no. 1, pp. 86-91.

Asad, S. & Dainty, A.R. 2005. Job motivation factors for disparate occupational groups within the UK construction sector: a comparative analysis, *Journal of Construction Research*, vol. 6, no. 2, pp. 223-236.

Ashley, D.B. & Workman, B.W. 1986. *Incentives in construction contracts.* CII Source Document SD-8, CII, Austin, TX.

ASTD, 2012. *Bridging the skill gaps*. USA: The American Society for Training and Development.

Atchison, T.A. 2003. Exposing the Myths of Employee Satisfaction. *Healthcare Executives*, vol. 17, no. 3, pp. 20.

Atkinson, A.A., Waterhouse, J.H. & Wells, R.B. 1997. A stakeholder approach to strategic performance measurement. *Sloan Management Review, Cambridge*, vol. 38, no. 3, pp. 25-30.

Atkinson, C. & Shaw, S. 2006. Managing performance. In: *Human Resource Management in an International context*. Edited by R. Lucas, B. Lupton & H. Mathieson, UK: CIPD.

Babbie, E. 2007. *The practice of social research*, 11th edition, USA: Thomson Wadsworth.

Baciman, G.L. 2005. Promoting organisational learning in higher education to achieve equity in educational outcomes. *New directions for higher education*, no. 131, USA: Wiley Periodical Inc.

Bageis, A.S.O. 2008. *Contractors' decision to bid: development of a bid/no bid strategic decision model.* PhD thesis, Edinburgh: Heriot-Watt University.
Bainbridge, C. 2013. *Intrinsic and Extrinsic motivation*. [Online]. Available: http//.www.giftedkids.about.com, [viewed 23 April 2013].

Bak, N. 2004. *Completing your thesis: a practical guide*. Pretoria: Van Schaik.

Bakers, G.P. 1992. Incentive contracts and performance measurement. *Journal of Political Economy*, vol. 100, no. 3, pp. 598-614.

Baldwin, S. 2005. *Organisational justice*. [online]. Institute of Employment Studies, United Kingdom. Available: http://www.mbsportal.bl.uk, [viewed 8 November, 2013].

Barnes, M. 1981. Project management by motivation. In: *Proceedings of the PMI/INTERNET 1981 Joint Symposium*, Boston, 101-123.

Bauer, T & Erdogan, B. 2013. *Motivating employees through performance incentives*. [Online]. Available: http://www.catalog.flatworldknowledge.com, [viewed 3 December 2013].

BBC News, 2012. *South Africa profile*. [Online]. Available: http://www.bbc.co.uk, [viewed 25 April 2013].

Beer, M., Cannon, M.D., Baron, J.N., Dailey, P.R., Gerhart, B., Heneman, H.G., Kochan, T., Ledford, G.E. & Locke, E.A. 2004. Promise and Peril in implementing pay-for-performance. *Human Resource Management*, vol. 43, pp. 3-48.

Bei, J. 2013. The selection of incentive team-based reward model. *Proceeding of 20th International Conference of Management Science and Engineering*, 17-19 July, Harbin, pp. 987-992.

Bennett, J. & Jayes, S. 1995. *Trusting the team: the best practice guide to partnering in construction*, Centre for Strategic Studies in Construction/Reading Construction Forum, Reading.

Berends, T.C. 2000. Cost plus incentive fee contracting: experiences and structuring. *International Journal of Project Management*, vol. 18, no. 3, pp. 165-171.

Berkovitch, E., Isreal, R. & Spiegel, Y. 2010. A double moral hazard model for organisation design. *Journal of Economics and Management Strategy*, vol. 19, no. 1, pp. 55-85.

Bierhoff, H.W., Cohen, R.L and Greenberg, J. 1986. *Justice in social relations*, New York: Plenum Press.

Bies, R.J. and Moag, J.F. 1986. Interactional justice: communication criteria of fairness, In: *Research on negotiations in organisations*, Edited by R.J. Lewicki, B.H. Sheppard, & M.H. Bazerman, vol. 1, Greenwich, CT: JAI Press, pp. 43-55.

Bijlsma-Frankema, K., & Costa, A.C. 2005. Understanding the trust-control nexus. *International Sociology*, vol. 20, pp. 259-398.

Blair, J., Czaja, R.F. & Blair, E.A. 2014. *Designing surveys: a guide to decisions and procedures*, 3rd edition, California: Sage publications limited.

Blyth, H.A. 1969. Design of incentive contracts - basic principles. *Journal of Aeronautic Society*, vol. 73, no. 822, pp. 119-124.

Boesen, N. & Therkildsen, O. 2004. *Between Naivety and Cynicism: A pragmatic approach to donor support for public-sector capacity development.* [Online]. Available: http://www.jica.go.jp, [viewed 12 March, 2013].

Bogdan, R.C. & Biklen, S.K. 1998. *Qualitative Research in Education: An Introduction to Theory and Methods*, 3rd edition, Boston: Ally and Bacon.

Bolton, P. 2006. Government procurement as a policy tool in South Africa. *Journal of Public Procurement*, vol. 6, no. 3, pp. 193-217.

Bonner, S.E. & Sprinkle, G.B. 2002. The effects of monetary incentives on effort and task performance: theories, evidence, and a framework for research. *Accounting, Organizations and Society*, vol.27, nos.4-5, pp. 303-345.

Boukendour, S. & Bah, P. 2001. The guaranteed maximum price contract as call option, *Construction Management and Economics*, vol. 19, no. 6, pp. 563-567.

Bower, D. 2003. Contractor selection, contract award and contract law in the UK. In: *Management of procurement*. Edited by D. Bower, London: Thomas Telford, pp. 15-33.

Bower, D., Ashby, G., Gerald, K. & Smyk, W. 2002. Incentive mechanism for project success. *Journal of Management in Engineering*, vol. 18, no. 1, pp. 37-43.

BPI, 2013. Morning feature- distributive justice [online], Blogistan Polytechnic Institute. Available: http://www/bpicampus.com, [viewed 10 November, 2013].

Brenen, M. & Marshall, N. 2000. Motivation, commitment and the use of incentives in partnerships and alliances. *Construction Management and Economics*, vol. 18, no. 5, pp. 587-598.

Bresnen, M. 2007. Deconstructing partnering in project based organization: seven paradoxes and seven deadly sins. *International Journal of Project Management*, vol. 25, no. 4, pp. 365-374.

Brickingham, M. 2005. What great managers do? Harvard Business Review, vol. 3, no. 3, pp. 70-79.

Brooks, I. 2003. *Organisation behaviour*, second edition, England: Pearson Education.

Brooks, I. 2009. *Organisation behaviour: individual, groups and organisation*, Harlow: Financial Times/Prentice Hall.

Broome, J. & Perry, J. 2002. How practitioners set share fractions in target cost contracts. *International Journal of Project Management*, vol. 20, pp. 59-66.

Bryman, A. & Bell, E. 2007. *Business Research Methods*. UK: Oxford University Press.

Bryson, A., Freeman, R., Lucifora, C., Pellizzari, M. & Perotin, V. 2011. Pay for performance: incentive pay schemes and employees' financial participation, draft paper, *European Science Foundation*. [Online]. Available: http://www.cep.ise.ac.uk, [viewed 20 April 2013].

Bubshait, A.A. 2003. Incentive/ disincentive contracts and its effects on industrial projects. *International Journal of Project Management*, vol. 20, no. 1, pp. 59-66.

Budget Review, 2011. [Online]. Available: http://www.treasury.gove.za, [viewed 12 May 2013].

Buertey, J.I.T., Abeere-Inga, E. & Kumi, T.A. 2013. The financial impact of risk factors affecting project cost contingency: evidence reasoning method, *Journal of Engineering, Project, and Production Management,* vol. 3, no. 2, pp. 65-73.

Burger, R. & Woolard, I. 2005. The state of labour market in South Africa after the first decade of democracy, *CSSR working paper,* no. 133, University of Camp Town: Centre for Social Science Research.

Burtonshaw-Gunn, S.A. 2009. *Risk and financial management in construction*, Gower, Camberley.

Business Day, 2011. Construction industry rich enough to drive economy, [Online]. Available: http://www.businessdayonline.com, [viewed 2 May 2013].

Business Day. 2012. *Survey of Nigeria's unemployment rate*. [Online]. Available: http://www.businessdayonline.com, [viewed 2 May 2013].

Bygballe, L.E., Jahre, M. & Sward, A. 2010. Partnering relationships in construction: a literature review. *Journal of Purchasing and Supply Management*, vol. 16, pp. 239-253.

Cameron, J. & Pierce, W.D. 2002. *Rewards and intrinsic motivation: resolving the controversy*. Westport, CT: Bergin & Garvey, Greenwood.

Camilleri, E. 2011. *Project success: critical factors and behaviours*, UK: Gower publishing limited.

Cardona, P. & Elola, A. 2003. Trust in management: the effect of managerial trustworthy behavior and reciprocity. IESE Working paper no. D/496. [Online]. Available: http://dx.doi.org/10.2139/ssrn.462624, [viewed 12 May 2013].

Carpenter, B., Fekpe, E. & Gopalakristina, D. 2003. Performance-based contracting for the highway construction industry [Online]. Available: http://www.ncppp.org/resources/papers, [viewed 2 July 2015].

Carr, P.G. 2005. Investigation of bid price competition measured through pre-bid project. *Journal of Construction Engineering and Management*, vol. 131, pp. 1165-1172.

Cauley, J., Cornes, R. & Sandler, T. 1999. Stakeholder incentives and reforms in China's state owned enterprises: a common-property theory. *China Economic Review*, vol. 10, no. 2, pp. 191-206.

Central Intelligence Agency (CIA), 2012. *The world fact book*, [Online]. Available: http://www.cia.gov, [viewed 29 April 2013].

Central Intelligence Agency (CIA), 2013. *The world fact book*, [Online]. Available: http://www.cia.gov, [viewed 29 April 2013].

Chan, D.W.M., Chan, A.P.C., Lam, D.T.I., Yeung, J.F.Y. & Chan, J.H.L. 2011. Risk ranking and analysis in target cost contracts: empirical evidence from the construction industry, *International Journal of Project Management*, vol. 29, no. 6, pp. 751-763.

Chapman, C & Ward, S. 2008. Developing and implementing a balanced incentive and risk sharing contract. *Construction Management and Economic*, vol. 26, no. 6, pp. 659-669.

Chappell, D., Marshall, D., Powel-Smith, V. & Cavender, S. 2001. *Building contract dictionary*. 3rd edition, UK: The Blackwell Science.

Chen, H. 2008. Hypothetical and theoretical system framework of cultivation of organisational citizenship behaviour and validation. *International Journal of Business and Management*, vol. 3, no. 3, pp. 56-61.

Cheng, E.W.L & Ho, D.C.K. 2001. The influence of job and career attitudes on learning motivation and transfer. *Career Development International*, vol. 6, pp. 20-27.
Cheung, S.O., Yiu, T.W. & Lam, M.C. 2013. Interweaving trust and communication with project performance. *Journal of Construction Engineering and Management*, vol. 139, pp. 941-950.

Chiejina, A. 2012. *Improving Nigeria's business environment for increased investments*. [Online]. Available: http://www.businessdayonline.com, [viewed 1 May 2013].

Chun, C.K.S. 1993. *Incentive contract use in military construction*. PhD dissertation, California: Rand Graduate School.

Clarke, O. 2012. *Alliancing and partnering: forming a successful alliance*. [Online]. Available: https://www.osborneclarke.com, [viewed 13 August 2013].

Cohn, E.S., White, S.O. & Sanders, J. 2000. Distributive and procedural justice in seven nations. *Law Human Behaviour*, vol. 24, no. 5, pp. 553-579.

Colquitt, J.A. 2004. Does the justice of the one interact with the justice of the many? Reactions to procedural justice in teams. *Journal of Applied Psychology*, vol. 89, no. 4, pp. 633-646.

Comminos, D. & Frigenti, E. 2006. Business focused project management. *Alusani Skills and Training Network*. [online]. Available: http://www.alusani.biz, [viewed 6 March 2013].

Commonwealth Network, 2013. Construction and engineering in Nigeria, [online]. Available: http://www.commonwealthofnations.org, [viewed 2 May 2013].

Connor, G., McFadden, M. & McLean, L. 2012. *Organisational design*. In: Developing people and organisations. Edited by J. Stewart & P. Roger, CIPD. [Online]. Available: http://www.cipd.co.uk, [viewed 27 November 2013].

Construction Education and Training Authority (CETA). 2008. *Overview of construction sector, construction education and training authority.* [Online]. Available: http://www.ceta.org.za, [viewed 10 April 2013].

Construction Industry Development Board (CIDB), 2006. Construction procurement best practice guidelines #A4: Evaluating quality in tender submissions. [Online]. Construction Industry Development Board, Pretoria. Available: http://www. cibd.org.za, [viewed 13 February, 2013].

Construction Industry Development Board (CIDB), 2007. Skills for infrastructure delivery in South Africa: the challenge of restoring the skills pipeline. [Online]. *Construction Industry Development Board, Pretoria*. Available: http://www. cibd.org.za, [viewed 13 February, 2013].

Construction Industry Development Board (CIDB), 2009. Standard for uniformity in construction procurement. Government Gazette No. 31823. [Online]. Construction Industry Development Board, Pretoria. Available: http://www. cibd.org.za, [viewed 13 February, 2013].

Construction Industry Development Board (CIDB), 2010. Standard for uniformity in construction procurement; board notice 86 of 2010 [Online]. Construction Industry Development Board, Pretoria. Available: http://www. cibd.org.za, [viewed 13 February, 2013].

Construction Industry Institute, 2013. What are employee incentives and why use them? [Online]. Available: http://www.construction-institute.org, [viewed 14 March 2013].

Construction Industry Review Committee, 2001. *Construct of excellence*. [Online]. Available: http://www.devb.gov.hk, [viewed 3 February 2013].

Cooke, B. & Williams, P. 2009. *Construction planning, programming and control*, 3rd edition, Oxford: Blackwell.

Coorley, W.W. 1978. Explanatory observation studies. *Educational Researcher*, pp. 9-15.

Corbetta, P. 2003. *Social research theory, methods and techniques*. London: SAGE publications.

Costello, A. 1997. Incentive Strategies for Performance-based contracting. *The Acquisition Directions Advisory*, Virginia: Acquisition Solutions Inc.

Cox, R.F, Issa, R.R. & Ahrens, D. 2003. Management's perception of key performance indicators for construction. *Journal of Construction Engineering and Management*, vol. 129, no. 2, pp. 142-151.

Creswell, J.W. 2007. *Qualitative inquiry and research design: choosing five approaches,* second edition, USA: Sage publication limited.

Creswell, J.W. 2009. *Research design: qualitative, quantitative, and mixed methods approaches*. 3rd edition, Los Angeles: Sage Publications.

Creswell, J.W. 2013. *Qualitative inquiry and research design: choosing five approaches*, 3rd edition, USA: Sage publication limited.

Creswell, J.W. 2014. *Research design: qualitative, quantitative and mixed methods approaches*, 4th edition, USA: Sage publication limited.

Creswell, J.W., & Plano Clark, V.L. 2011. *Designing and conducting mixed methods research.* 2nd edition, Thousand Oaks, CA: Sage publication limited.

Crosby, P.B. 1979. *Quality of life*. New York: McGraw-Hill books.

Cunic, B. 2003. Performance-based contracting: plant decision and engineering. *Hydrocarbon Processing*, vol. 82, no. 12, pp. 43-46.

Cunningham, T. 2013. Choosing an appropriate main contract for building work in the Republic of Ireland- an overview [Online], Dublin Institute of Technology. Available: http://arrow.dit.ie/beschreoth, [viewed 3 July 2015].

Curtis, T. 2004. *Standards-based knowledge environment, Environments for oil and gas industry*. [Online]. PPPM Association. Available: http://ppdm.org, [viewed 25 June, 2011].

Danmole, T.O. 2004. Sustainability and city development- a critique of the implementation of the Abuja master plan. *Paper presented for publication by Environmental conservation Research Team,* Akure: FUT.

Dantata, S. 2007. *General overview of the Nigerian construction industry*. PhD thesis, USA: Massachusetts Institute of Technology.

Dartey-baah, K & Amponsah-Tawiah, K. 2011. Influencing organisational behaviour through the application of learning theories. *European Journal of Business Management*, vol. 3, no. 11, pp. 10-19.

Datta, P.P. & Roy, R. 2011. Operations strategy for the effective delivery of integrated industrial product-service offerings: two exploratory defence industry case studies. *International Journal of Operations and Production Management*, vol. 31, no. 5, pp. 579-603.

Datta, P.P. & Roy, R. 2012. Incentive issues in performance-based outsourcing contracts in the UK defence industry- a simulation study. *Production Planning and Control*, pp. 359-374.

Davila, T. 2003. Performance and design of economic incentives in new product development. *Research paper, no. 1647, Staford University*. [Online]. Available: http://www.citeseerx.ist.psu.edu, [viewed 11 April 2013].

De Silva, S. 1998. An introduction to performance and skilled-based systems, ILO. [Online]. Available: http://www.ilo.org, [viewed 21 May 2013].

De Vaus, D. 2001. *Research design in social research.* London: Sage publication limited.

Deci, E.L. & Ryan, R.M. 1985. *Intrinsic motivation and self-determination in human behaviour,* New York: Plenum press.

Defence Acquisition University, 2001. *Incentive strategies for defense acquisitions*, Washington: Defense Acquisition University press.
Deng, F. & Smyth, H. 2013. Contingency-based approach to firm performance in construction: critical review of empirical research, *Journal of Construction Engineering and Management*, vol. 139, pp. 1-13.

Department of Energy (DOE), 2010. General guide to contract types for requirement officials. *Department of Energy, USA*. [Online]. Available: http//:energy.gov, viewed 18 April 2013.

Department of Enterprise Services, 2015. Performance-based contracting [Online], Washington State. Available:http://www.des.wa.gov/services, [viewed 2 July 2015].

Department of Labour, 2009. *Ageing workforce-seniority pay, promotions and older job seeker*. Wellington, NZ: Department of Labour.

DeSilva, S. 2004. An introduction to performance and skilled-based pay systems. [Online]. Available: http://www.ilo.org, [viewed 12 April, 2013].

DeVos, A.S. Strydom, H., Fouche, C.B. & Delport, C.S.L. 2011. *Research at grassroots: for the social sciences and human service professions*, 4th edition, Pretoria: Van Schaik publishers.

Dlamini, S. 2012. *Relationship of construction sector to economic growth.* [Online]. Available: htpp://www.sitsabo.co.za, [viewed 13 May 2013].

Dubois, A. & Gadde, L.E. 2002. Systematic combining: An Abductic approach to case research. *Journal of Business Research*, vol. 55, no. 7, pp. 553-560.

Easterby-Smith, M., Thorpe, R., Jackson, P. & Lowe, A. 2008. *Management research*. 3rd edition, London: Sage.

Economic Sector Review, 2009. *Climate change risks and opportunities for the South African economy*. [Online]. Available: http://www.climateriskandopportunity.co.za, [viewed 13 May 2013].

Edwards, B. & Eckblad, J. 1984. Motivating the British construction industry. *Construction Management and Economics*, vol. 2, pp. 145-156.

Egan, J. 1998. *Rethinking Construction*. London: HMSO.

EHS, 2001. The safety scorecard: suing multiple measures to judge safety and system effectiveness, available at http://www.ehstoday.com, retrieved on 4 June 2015.

Eisenhart, K.M. 1989. Building theories from case study research. *Academy of Management Review*, vol. 14, no. 4, pp. 532-550.

Elias, J. & Scarbrough, H. 2004. Evaluating human capital: an exploratory study of management practice. *Human Resource Management Journal*, vol. 14, no. 4, pp. 21-40.

Erikkson, H. 2002. *Benefits from TQM for Organisational Performance*. A PhD thesis. Lulea: Lulea University of Technology.

Eriksson, P.E. & Westerberg, M. 2011. Effects of cooperative procurement procedures on construction project performance: A conceptual framework. *International Journal of Project Management*, vol. 29, no. 2, pp. 197-208.

Eriksson, P.E. 2010. Improving construction supply chain collaboration and performance: a estimates, actual bid prices, and number of bidders. *Journal of Construction Engineering and Management*, vol. 131, no. 11, pp. 1165-1172.

ETA/ Business Relations Group Report, 2004. America's Construction Industry: Identifying and addressing workforce challenges. Available: http://www.doleta.gov, [viewed 6 February 2011].

Eze J. I, Obiegbu M.E & Jude-Eze N.E 2005. *Statistics and Quantitative Methods for Construction and Business Managers*. Nigeria: The Nigeria Institute of Building.

Fagbenle, O.I., Ogunde, A.O. and Owolabi, J.D. 2011. Factors affecting the performance of labour in Nigerian construction sites. *Mediterranean Journal of Social sciences*, vol. 2, no. 2, pp. 251-257.

Falqi, I.I. 2011. *Knowledge capture and retrieval in construction projects*. PhD thesis, Edinburgh: Heriot-Watt University.

Farhat, S., Sonia, G.M., Mazhar, F. Zia, S. & Kausar, S. 2013. *Factors determining job satisfaction of employees.* [online]. Available: http://www.slideshare.net, [viewed 12 October 2013].

Farrell, P. 2011. *Writing a built environment dissertation: practical guidance and examples*, UK: John Wiley & sons Ltd.

Fatt, C.K., Sek Khin, E.W. & Heng, T.N. 2010. The impact of organisational justice on employee's job satisfaction: the Malaysian companies perspectives. *American Journal of Economics and Business Administration*, vol. 2, no. 1, pp. 56-63.

Fehr, E. & Falk, A. 2002. Psychological foundations of incentives. *European Economic Review*, vol. 46, pp. 68 -724.

Fellows, R. & Liu, A. 1997. *Research methods for construction*. Oxford: Blackwell Science.

Fellows, R. & Liu, A. 2003. *Research methods for construction*. UK: Blackwell.

Fellows, R. & Liu, A. 2008. *Research methods for construction*. 3rd edition, Chichester: WileyBlackwell.

Fergon, J. 2010. Pluses and minuses: cost-plus versus fixed-price contracts. *Construction Accounting and Taxation,* September/October edition, pp. 14-17.

Fernanades, E. & Valdiviezo, L.E. 1997. Total cost management of interdependent projects. *International Journal of Technology Management*, vol. 13, no. 1, pp. 15-24.

Fiol, M.C. & Lyles, M.A. 1985. Organizational learning. Academy of Management Review, vol. 10, pp. 803-813.

Flick, U. 2006. *An introduction to qualitative research*. 3rd edition, New Delhi: Sage.
Food and Agriculture Organisation of the United Nations, 2004. What does it take? The role of incentives in forest plantation development if Asia and the Pacific. *RAP publication.* [online]. Available: http://ftp.fao.org, [viewed 22 October 2013].

Forchen, N. 2003. Designing and coding survey instruments for statistical analysis. *Botswana Journal of African Studies*, vol. 17, no. 1, pp. 67-84.

Gabe, T.M. & Kraybill, D.S. 2002. The effect of state economic development incentives on employment growth of establishment. *Journal of Regional Science*, vol. 42, pp. 703-730.

Gaertner, K.N. & Nollen, S.D. 1998. Career experiences, perceptions of employment practices, and psychological commitment to the organization. *Human Relations*, vol. 42, no. 11, pp. 975-991.

Gagnon, Y. & Dragon, J. 1996. The impact of technology on organisational performance. In: *Information Technology and Organisational Transformation*. Edited by R.D. Galliers & W.R.J. Baets, Wiley Series in Information System, Toronto, CA.

Galbraith, J.R. 2002. *Designing organisations: an executive guide to strategy, structure and process*. 2nd edition, San Francisco: Jossey-Bass.

Gedamu, A. 2002. *Causes and consequences of brain drain*, Germany: State University Kassel press.

Geen, R.G. 1995. *Human motivation: a social psychological approach*. [Online]. Available: http://www.kent.ac.uk, [viewed 19 2013].

Germann, M. 2004. Influence of project managers on the motivational factors of a project team", *Paper presented at the 13th International Conference on Management of Technology IAMOT*, April, Washington, D C.

Ghalayini, A.M. & Nobel, J.S. 1996. The changing basis of performance measurement. *International Journal of Operations & Production Management*, vol. 16, no. 8, pp. 63-80.

Gill, J. & Johnson, P. 2002. *Research Methods for Managers*. London: Sage publishing.

Global Construction Perspective and Oxford Economics, 2010. *Global construction perspective and oxford economics 2020*. [Online]. Available: http://www.rlb.com, [viewed 26 May 2013].

Gonzalez, E. 1991. *Construction Worker Motivation-The means to improving worker productivity*. M.Sc. Dissertation, USA: University of Florida.

Gordon, A.A. & Kaswin, J.L. 2010. Effective employee incentive plans: features and implementation processes. *Cornell HR Review*. [Online]. Available: https://digitalcommons.ilr.cornell.edu/chrr/3, [viewed 20 May 2013].

Gray, D.E. 2009. *Doing research in the real world*. 2nd edition, Great Britain: T.J. International limited.

Griffith, A. & Bhutto, K. 2004. The integrated management system for project quality, safety and environment: pilot survey research findings of development in IMS. *International Journal of Construction Management*, no. 4, no. 1, pp. 75-81.

Grillitsch, W., Muller-Stingl, A. & Neumann, R. 2007. Successful sharing of project knowledge: initiation, implementation and institutionalization. *The Electronic Journal of Knowledge Management*, vol. 5, no. 1, pp. 19-28.

Grönroos, C. 2000. *Service management and marketing, a customer relationship management approach*. Chichester: John Wiley.

Growth and Employment in States, 2010. Support for construction and real estate sector in Nigeria. [Online]. Available: http://www.develox.com, [viewed 18 March 2010].

Gruneburg, S., Hughes, W.P. & Ancell, D. 2007. Risk under performance-based contracting in the UK construction sector, *Construction Management and Economics*, vol. 25, no. 7, pp. 691-699.

Gundencha, M.M. 2012. *Study of factors affecting labour productivity at a building construction project in USA: web survey*, M.Sc. thesis, USA: North Dakota State University of Agriculture and Applied Science.

Gursoy, D. & Swanger, N. 2007. Performance-enhancing internal strategic factors: impacts on financial success. *International Journal of Hospitality Management*, vol. 26, no. 1, pp. 213-227.

Hackman, J.R. & Oldham, G. R. 1975. Development of the job diagnostic survey. *Journal of Applied Psychology*, vol. 60, no. 2, pp. 159-170.

Hampson, K. & Brandon, P. 2004. *Construction 2020: A vision of Australia's property and construction industry*. Brisbane: Cooperative Research Centre for Construction Innovation.

Hancock, G.N. 2014. Labor trends in the construction industry and the incentives companies provide to retain and motivate their skilled craft workers, *B.Sc. Honors thesis*, USA: University of Florida.

Harlow, H.F. & McClearn, G.E. 1954. Object discrimination learned by monkeys on the basis of manipulation motives, *Journal of Comparative and Physiological Psychology*, vol. 47, pp. 73-76.

Harris, F., McCaffer, R. & Edum-Fotwe, F. 2006. *Modern construction management*. 6th edition, Oxford: Blackwell Publishing.

Hass, K. 2007. May the Blending of Traditional and Agile Project Management. PM World Today, vol. IX, no. V. Available: http://www.pmforum.org/library/tips/2007/PDFs/Hass-5-07.pdf, [viewed 18 June, 2012].

Hauck, A., Walker, D., Hampson, K. & Peters, R. 2004. Project alliancing at National museum of Australia-collaborative process. *Journal of Construction Engineering and Management,* vol. 130, no. 1, pp. 143-152.

Heathfield, S. 2013. Motivation is all about the managers…Duh!" Available: http//.www.humanresources.about.com, [viewed 2 July 2013].

Henneveld, M. 2006. Alliance Contracting: Removing the boundaries for Infrastructure delivery, *Presented at Annual Conference of the Transportation Association of Canada Charlottetown*, Prince Edward Island.

Hermanta, D. & Xia-Hua, J. 2008. Modeling multi-criteria decision analysis for benchmarking management practices in project management. *CIB W78 2008 International conference on Information Technology in construction*, Santiago, Chile.

Herzeberg, F. 1966. *Work and the nature of man*. Cleveland, OH: World Publishing Company.

Hibbert, P. 2004. The place of standard forms of building contract in the 21st century. A paper presented at a Society of Construction Law conference in Wakefield, 11 March 2004.

Holmes, B. 2011. *Employee motivation factors within a large New Zealand Construction Company*. B.Sc. project work, New Zealand: University of Technology.

Holmstrom, B. & Milgram, P. 1991. Multi-task principal-agent analyses: incentive contracts, asset ownership and job design. *Journal of Law, Economics and Organisation*, vol. 7, pp. 24-52.

Hosie, J. 2001. Egan's view on contracts. *Engineering Management Journal*, vol. 11, no. 2, pp. 43-48.

Huang, Y. & Lu, K. 2008. *Job satisfaction of construction workers of subcontractors*. Paper presented at the bai-conference construction engineering. [Online]. Available: http://bai-conference.org/ files/BAI2010%20Proceeding/Papers/7.OB&HRM/7092.pdf, [viewed 4 November, 2012].

Hughes, W.P., Yohannes, I. & Hilling, J.B. 2007. Incentives in construction contracts: should we pay for performance? In: *Proceedings of CIB world building congress: construction for development.* Edited by T. Haupt & R. Milford, Cape Town, South Africa, 14-17 May 2007, pp. 2273-2283.

Human Resource (HR) Focus, 2001. *Incentive pay plans: which ones work and why*. April issue, p. 3. [Online]. Available: http://www.hr-focus.com, [viewed 3 March 2013].

Incentive Performance Center (IPC), 2008. *Incentives, motivation and workplace performance.* [online]. Available: http://www.incentivecentral.org, [viewed 19 2013].

Industrial Development Corporation (IDC), 1998. South African economy: an overview of key trends since 1994. *Department of Research and Information*. [Online]. Available: http://www.idc.co.za, [viewed on 27 March 2014].

Informetrics and Trade/Industrial Policy Strategies, 2011. *Review of trade trends between New Zealand and South Africa: a road map to future bilateral relations*. [online]. Available: http://www.nzembassy.com, [viewed 1 May 2013].

Iqbal, K. 2013. Determinants of organisational justice and its impact on job satisfaction: a Pakistan base study. *International Review of Management and Business Research*, vol. 2, no. 1, pp. 48-56.

Ismail, W.K.W., Nor, K.M. & Marjani, T. 2009. The role of knowledge sharing practice in enhancing project success. *Institute of Interdisciplinary Business Research*, no. 1.

Ittnera, C.D., Larcker, D.F. & Meyer, M.W. 2003. Subjectivity and the weighting of performance measures: Evidence from a balanced scorecard. *The Accounting Review*, vol. 78, no. 3, pp. 725-758.

Ivankova, N.V., Creswell, J.W. & Clark, V.L.P. 2007. Foundations and approaches to mixed methods research. In: *First steps in research*, Edited by K. Maree, revised edition, Pretoria: Van Schaik Publishers.

Iyer, K.C. and Jha, K.N. 2005. Factors affecting cost performance: evidence from Indian construction projects. *International Journal of Project Management*, vol. 23, pp. 283-295.

Jabareen, Y. 2009. Building a conceptual framework: philosophy definitions and procedure. *International Journal of Qualitative Methods*, vol. 8, no. 4, pp. 49-62.

Jansson, K. & Ryddoke, R. 2010. Quality incentive and quality outcomes in procured public transport- case study Stockholm, *Research in Transportation Economics*, vol. 29, pp. 11-18.

Jaraiedi, M., Plummer, R.W. & Aber, M.S. 1995. Incentives/ disincentives guidelines for highway construction contracts. *Journal of Construction Engineering and Management*, vol. 121, no. 1, pp. 112-120.

Jarkas, A.M. & Radosavljevic, 2013. Motivational factors impacting the productivity of construction master craftsmen in Kuwait. *Journal of Management in Engineering*, vol. 29, pp. 446-454.

Jin, Z., Deng, F., Li, H. & Skitmore, M. 2013. Practical framework for measuring performance. *Journal of Construction Engineering and Management*, vol. 139, pp. 1154-1167.

Johns, G. & Saks, A.M. 2007. Organisational behaviour-understanding and managing life at work, sixth edition, Canada: Pearson Education Limited.

Kadefors, A. 2005. Fairness in inter-organizational project relations: Norms and strategies. *Construction Management and Economics*, vol. 23, no. 8, pp. 871-878.

Kagan, J. 1972. Motives and development. *Journal of Personal Socio-psychology*, vol. 22, pp. 51-66.

Kandelousi, N.S. & Abdollahi, O.J. 2011. Key success factors for managers' projects, *World Academy of Science, Engineering and Technology*, pp. 1826-1830.

Kaput, M.B. 2013. *Advantages and disadvantages of employee incentives*. [Online]. Available: http://www.pprc.org, [viewed 3 December 2013].

Ke, Y., Wang, S., Chan, A.P.C. & Lam, P.I.I. 2010. Preferred risk allocation in China's public-private partnership (PPP) projects. *International Journal of Project Management*, vol. 28, pp. 482-492.

Kelemen, M. & Rumen, N. 2008. *An introduction to critical management research*, UK: Sage publications limited.

Kerzner, H.R. 2013. *Project management metrics, KPIs, and dashboards: a guide to measuring and monitoring project performance*. US: John Wiley and sons.

Khatrin N., Pawan, B. & Chong, T.F. 1999. Employee turnover: bad attitude or poor management? A working paper, *Nanyang Business School,* Singapore: Nanyang Technological University.

Kim, S.H., Cohen, M.A. & Netessine, S. 2007. Performance contracting in after-sales service supply chains. *Management Science*, vol. 53, no. 12, pp. 1843–1858.

Kirshenblatt-Gimblett, B. 2006. *Part 1: What is research design? The context of design, performance studies methods course syllabus*. New York University, Spring.

Kochanski, J., hellerma, M. & Insler, D. 2013. Incentive plan design. *Sibson consulting*. [Online]. Available: htpp://www.sibson.com, [viewed 21 May 2013].

Koelmans, R.G. 2004. Project success and performance evaluation. In: *International Platinum Conference 'Platinum Adding value'*, The South African Institute of Mining and Metallurgy, pp. 229-236. Available: www.saimm.co.za, [viewed 2 July 2015].

Kohlmeyer, J.M & Drake, A. 2008. Risk-taking in new project selection: can bonus incentives overcome past performance history? *AAA 2008 MAS Meeting paper*. [Online]. Available: Social Science Research Network, [viewed 3 March 2013].

Kohn, A. 1993. Why incentive plans cannot work? *Harvard Business Review*, September 1993 edition.

Kolawole, J.O. & Boison, R.B. 1999. A study of issues affecting motivation and productivity in the construction industry in a developing economy. *Journal of Environmental Science*. vol. 3, no. 2, pp. 220-233.

Korico, S.W. & Korico, J.S. 2005. The partnering solution, NJ: Career Press.

Kothari, C.R. 2004. Research Methodology, Methods and Techniques. New Delhi: New Age International.

Kuhn, 1970. *The structure of scientific revolutions*, Chicago: University of Chicago press.
Kwak, Y.H. & LaPlace, K.S. 2005. Examining risk tolerance in project-driven organisation, *Technovation*, vol. 25, pp. 691-695.

Kwak, Y.H. & Smith, B.M., 2009. Managing risks in mega defense acquisition projects: performance, policy and opportunities, *International Journal of Project Management*, vol. 27, no. 8, pp. 812-820.

Laan, A., Noorderhaven, N., Voorijk., H. & Dewulf, G. 2011. Building trust in construction partnering projects: an exploratory case-study. *Journal of Purchasing and Supply Management*, vol. 17, no. 2, pp. 98-108.

Laerd Statistics, 2013. *Pearson product-moment correlation*. [Online]. Available: http://www.statistics.laerd.com, [viewed 4 February 2015].

Laffont, J.J. & Martimort, D. 2001. *The theory of incentives I: the principal-agent model.* [Online]. Available: http://www.xmlservice.unisi.it, [viewed 20 May 2013].

Lahdenpera, P. & Koppinen, T. 2003. Charting of Incentive payment bases for multi objective construction projects, *Proceedings of the Joint International Symposium of CIB working Commissions*, Singapore, pp. 481-493.

Latham, G.P. 2004. The motivational benefits of goal-setting. *Academy of Management Executive*, vol. 18, pp. 126-129.

Ledbetter, R. 2003. Organisational structure: influencing factors and impact in the Grand praine fire department. *A research paper submitted to National Fire Academy, Texas*. [Online]. http://www.usfa.fema.gov, [viewed 20 May 2013].

Leedy, P.D., & Ormrod, J.E. 2010. *Practical research: planning and design*. Upper Saddle River, New Jersey: Merrill.

Legal Information Institute, 2012. *Structuring multiple-incentive contracts.* [Online]. Available: http//.www.law.cornell.edu, viewed 18 April 2013.

Li, H., Chen, Z. & Wong, C.T.C. 2003. Barcode technology for an incentive reward program to reduce construction wastes. *Computer-aided Civil and Infrastructure Engineering*, vol. 18, no. 4, pp. 313-324.

Lifson, M.W. & Shaifer, E.F. 1982. Decision and Risk Analysis for Construction Management, New York: Wiley.

Lim, C.S. and Mohamed, M.Z. 1999. Criteria of project success: an exploratory re-examination. *International Journal of Project Management*, vol. 17, no. 4, pp. 243-248.

Lin, B.W. & Berg, D. 2001. Effects of cultural difference on technology transfer projects: an empirical study of Taiwanese manufacturing companies. *International Journal of Project Management*, vol. 19, no. 5, pp. 287-293.

Ling, F.Y., R'ahman, M.M. & Ng, T.C. 2006. Incorporating contractual incentives to facilitate relational contracting. *Journal of Professional Issues in Engineering Education and Practice*, vol. 132, no. 1, pp. 57-66.

Liu, H. & Liu, Z. 2009. Conceptual framework and key issues of project management based on knowledge management, *Proceeding of International conference on Management Service Science*, 20-22 September 2009, Beijing, China.

Longres, J, & Scanlon, E. (2001). Social justice and the research curriculum. Journal of Social Work Education, vol. 37, no. 3, pp. 447-463.

Love, P.E.D., Davis, P.R., Chevis, R. & Edwards, D.J. 2011. Risk / reward compensation model for civil engineering infrastructure alliance projects. *Journal of Construction Engineering and Management*, vol. 137, no. 2, pp. 127-136.

Low S.P. & Chuan, Q.T. 2006. Environmental factors and work performance of project managers. *International Journal of Project Management*, vol 21, pp. 24-37.

Lu, S. & Yan, H. 2007. An empirical study on incentives of strategic partnering in china: views from construction companies. *Journal of Project Management*, vol. 25, no. 3, pp. 241-249.

Luka, G.T. & Muhammad, S.I. 2014. Evaluating the impact of risk factors on construction projects in Nigeria. *The International Journal of Engineering and Science*, vol. 3, no. 6, pp. 10-15.

Luu, T.V., Kim, S.Y., Cao, H.L. & Park, Y.M. 2008. Performance measurement of construction firms in developing countries. *Construction Management and Economics*, vol. 26, pp. 373-86.

Malhotra, N. 1999. *Marketing research: an applied orientation*. Upper Saddle River: Prentice Hall.

Malone, T.W. & Lepper, M.D. 1987. Making learning fun: a taxonomy of intrinsic motivations for learning. In: *Aptitude, Learning and Instruction, Conative and Affective Process Analyses.* Edited by R.E.S.M.J. Farr, vol. 3, pp. 223-253, Hilsdale, NJ: Erlbaum.

Manion, J. 2005. *From management to leadership*, San Francisco: Jossey-Bass.

Maree, K. & Pietersen, J. 2007. Standardisation of a questionnaire, In: *First steps in research*, revised edition, Edited by K. Maree, Pretoria: Van Schaik Publishers, pp. 215-223.

Maritz, M.J & Ogwueleka, A.C. 2013. Construction employees' perspectives on workforce motivational drivers in Akwa Ibom Sate of Nigeria. *Journal of Construction*, vol. 5, no. 2, pp. 2-7.

Maritz, M.J. 2003. Towards establishing national standards for the classification of construction information in the Republic of South Africa. *PhD thesis*, Pretoria: University of Pretoria.

Martin, L.L. 2003. Approaches to Performance Based Contracting (PBC) for Social Sciences. [Online]. Available: http://www.uky.edu, [viewed 3 March 2012].

Martin, L.L. 2007. Performance based contracting for Human Services: A proposed model. *Public Administration Quarterly*, vol. 31, no. 2, pp. 130-158.

Martin, L.L. 2008. *Approaches to Performance Based Contracting (PBC) for Social Sciences*. [Online]. Available: http://www.uky.edu, [viewed 3 March, 2012].

Martis, M.S. 2006. Validation of simulation models: a theoretical outlook. *The electronic Journal of Business Research Methods*, vol. 4, no. 1, pp. 39-46.

Marx, H.J. 2013. Results of the 2012 survey of Construction Industry Development Board. [Online]. Available: http://www.cidb.org.za, [viewed 10 April 2013].

Marx, K. 1867. *Capital: A critique of political economy*, USSR: Progress Publishers.

Maslow, A. H. 1954. *Motivation and Personality*, New York: Harper and Brothers.

Maswanganyi, N. 2013. South Africa's economic growth well below potential, *Business Day*, [online]. Available: http://www.bdiwe.com, [viewed 3 May 2013].

Mathieu, J. & Zajac, D. 1990. A review of meta-analysis of the antecedents, correlates and consequences of organizational commitment. *Psychological Bulletin*, vol. 108, no. 2, pp. 171-194.

Mathieu, V. 2001. Product services: from a service supporting the product to a service supporting the client. *The Journal of Business and Industrial Marketing*. vol. 16, no. 1, pp.39-61.

McAuley, J.D., Jones, M.R., Holub, S., Johnston, H.M. & Miller, N.S. 2006. The time of our lives: lifespan development of timing and event tracking. *Journal of Experimental Psychology*, vol. 135, pp. 348-367.

McClelland, D.C. 1961. *The Achieving Society*, New York: The Free Press.

McCluskey, A. 1996. *Learning technologies in companies and administrations in Switzerland*. [Online]. Available: http://www.tecfa.unige.ch, [viewed 27 November 2013].

McGregor, D. 1960. *The human side of enterprise*, London: McGraw Hill.

Meeampol, S. & Ogunlana, S.O. 2006. Factors affecting cost and time performance on highway construction projects: evidence from Thailand. *Journal of Financial management of Property and Construction*, vol. 11, no. 1, pp. 3-20.

Mehta, S. 2011. *The problem with financial incentives*. [Online]. Available: http://www.rdmanagement.blogspot.com, [viewed 5 April 2013].

Meng, X. & Gallagher, B. 2012. The impact of incentive mechanisms on project performance. *International Journal of Project Management*, vol. 30, pp. 352-362.

Mercer, 2011. *What's working survey*? [Online]. Available: http://www.mercer.com, [viewed 28 April 2013].

Michie, J. 2013. *Reader's guide to the social sciences*, USA: Routledge.

Milne, P. 2007. Motivation, incentive and organisation culture. *Journal of Knowledge Management*, vol. 11, no. 6, pp. 28-38.

Mitchell, J. D. 1998. *Impact of incentives on project performance.* M.Sc. thesis, Austin: The University of Texas.

Montaquila, J.M. & Olson, K.M. 2012. *Practical tools for non-response bias studies*. [Online]. Available: http://www.amstat.org/sections/srms/webinarfiles/NRBiasWebinar April 2012.pdf, [viewed 26 September 2014].

Montgomery, K.C. 1954. The role of exploratory drive in learning. *Journal of Comparative Physiological Psychology*, vol. 47, pp. 60-64.
Morse, G. 2003. Why we misread motives. *Harvard Business Review*, vol. 81, no. 1, pp. 18.

Muller, F.H. & Louw, J. 2004. Learning environment, motivation and interest: perspectives of self-determination theory, *South African Journal of Psychology*, vol. 34, no. 2, pp. 169-190.

Mullins, L.J. 1999. *Management and organisational behaviour*, 5th edition, London: Financial Times Pitman Publishing.

Murtaza, G., Shad, I., & Shahid Malik, W. 2011. Impact of organizational justice on employees job satisfaction: evidence from Pakistan. *International conference on management*, pp. 1123-1135.

Muzumdar, P. 2011. Influence of interactional justice on the turnover behaviour decision in an organisation. *Journal of Behavioural Studies in Business*, vol. 4, pp. 1-11.

Nabatchi, T., Bingham, L.B. & Good, D.H. 2007. Organisational justice and workplace mediation: a six factor model. *International Journal of Conflict Management*, vol. 18, no. 2, pp. 148-176.

Naoum, S. 2003. An overview into the concept of partnering. *International Journal of Project Management*, vol. 21, no. 1, pp. 71-76.

National Treasury, 2012. *Budget review*. [Online]. Available: http://www.treasury.gov.za, [viewed 12 May 2013].

Nazeri, A., Nosratpour, M. & Rashidi, S. 2012. The impact of human resource management and organisational behaviour on individual performance. In: *Proceeding of 2nd International conference Trends in Mechanical and Industrial Engineering*, 30 June-1 July, Bali.

Neil, J.M. 1990. *Incentives- another management tool*, AACE Transactions, Boise.

Neill, A. & Al-Battaineh, H. 2011. Compare risk allocation for different project delivery methods in Canada, *Paper presented at the Maintenance and Construction Session of the 2011 Annual Conference of Transport*, Alberta, pp. 1-15.

Nelson, D.L. & Quick, J.C. 2003. *Organizational Behaviour: Foundation, Realities and Challenges*, 4th Edition, Thomson South-Western: Australia.

Neuman, W.L. 2006. *Social research methods: qualitative and quantitative approaches*. 6th edition, Toronto: Pearson.

Neuman, W.L. 2012. *Basics of social research: qualitative and quantitative approaches*, 3rd edition, USA: Pearson Education.

Ng, S.T., Skitmore, R.M., Lam, K.C. & Poon, A.W. 2004. Demotivating factors influencing the productivity of civil engineering projects. *International Journal of Project Management*, vol. 22, no. 2, pp. 139-146.

Nieuwenhuis, J. 2007. Qualitative research designs and data gathering techniques. In: *First steps in research*. Edited by K. Maree, revised edition, Pretoria: VanSchaik publishers.

Nigerian Bureau of Statistics, 2006. *The Nigerian statistical fact sheets on economic and social development*, Abuja:NBS.

NNPC, 2010. *History of the Nigeria Petroleum Industry*. [online]. Available: http://www.nnpcgroup.com, [viewed 1 May 2013].

Nonaka, I., Toyama, R & Konno, N. 2000. SECI, Ba and Leadership, A unified model of dynamic knowledge creation. *Long Range Planning*, vol. 33, no. 1, pp. 5-34.

Noop, N.L. 2012. *Extrinsic motivation*. [Online]. Available: http://www.noop.nl.com, [viewed 23 April 2013].

Noor, N.M. & Salim, J. 2012. The influence of individual, organisational and technological factors on knowledge sharing in the private sector in Malaysia. In: *2012 International Conference on Information Retrieval and Knowledge Management (CAMP)*, 13-15 March, Kuala Lumpur, Malaysia, pp. 167-171.

O'Huallachain, B. & Satterthwaite, M. 1992. Sectorial growth patterns at the metropolitan level: An evaluation of economic development incentives. *Journal of Urban Economics*, vol. 31, pp. 25-58.

O'Toole, J. 1996. *Leading change: The argument for values-based leadership*. New York: Ballentine Books.

Ocheni, S. & Nwankwo, B.C. 2012. Assessment of application of due process policy in public procurement and contracts under Obasanjo administration in Nigeria 2003-2007, *International Business and Management*, vol. 5, no. 1, pp. 93-98.

Office of Government Commerce (OGC), 2003. *Achieving Excellence in Construction: Procurement and Contract Strategies*, OGC, London.

Ogbonna, B.O. 1989. Work of productivity orientation; the construct, Research Proposition and Managerial Implications. *Journal for Work Productivity among Construction workers in Nigeria*, vol. 10, no. 20, pp. 1-14.

OGC, 2007. Project procurement lifecycle: the integrated process. *Achieving Excellence Guide 3*. [Online]. Available: http://www.webarchive.nationalarchives.gov.uk, [viewed 20 April 2013].

Ogunlana, S.O. & Chang, W.P. 1998. Worker motivation on selected construction sites in Bangkok, Thailand, *Engineering Construction and Architectural Management*, vol. 5, no. 1, pp. 68-81.

Oguonu, C.N. 2007. *Due process and procurement in the Nigerian public sector*. [Online]. Available: http://www.hollerafrica.com, [viewed 29 May 2013].

Ogwueleka, A.C. & Maritz, M.J. 2014. Effect of organisational justice in motivating construction workforce towards improved work productivity, In: *5th International Conference on Engineering, Project and Production Management (EPPM)*, 26-28th November 2014, Port Elisabeth, South Africa, pp. 215-224.

Ogwueleka, A.C. 2010. Stochastic dominance in projects. *International Journal Project Organization and Management*, vol. 2, no. 2, pp. 208-217.

Ogwueleka, A.C. 2011. The critical success factors influencing project performance in Nigeria. *International Journal of Management Science and Engineering Management*, vol. 6, no. 5, pp. 343-349.

Ogwueleka, A.C. and Maritz, M.J. 2013. A review of incentive issues in the South African construction industry, the prospects and challenges, In: *Proceedings of the 2013 International Conference on Construction and Real Estate Management*, Germany. Edited by Wang et al. (Virginia: ASCE), pp. 83-98.

Okorie, K.C. 2011. *Performance evaluation of buildings in educational institutions: a case of Universities in South-East Nigeria*. PhD thesis, Port Elisabeth: NMMU.

Olomolaiye, P.O. & Ogunlana, S.O. 1989. A system for monitoring and improving construction operative productivity in Nigeria, *Construction Management and Economics*, vol. 7, no. 2, pp. 175-186.

Olowe-Okere, E.O. 1985. Constructing industry in Nigeria, *Journal for Building and Civil Engineering contractors in Nigeria*, vol. 2, no. 2, pp. 6-10.

Olugbenga, A.O. 2011. Performance of incentive schemes in construction projects in Nigeria. *Global Journal of Management and Business Research*, vol. 11, pp. 10, pp. 38-44.

Online Business dictionary, 2015. [Online]. Available: http://www.businessdictionary.com, [viewed 14 January 2015].

Organ, D.W., Podsakoff, P.M. & MacKenzie, S.B. 2006. *Organizational citizenship behaviour: Its nature, antecedents, and consequences*. Thousand Oaks, CA: Sage

Osipova, E. & Eriksson, P.E. 2011. How procurement options influence risk management in construction projects. *Construction Management and Economics*, vol. 29, no. 11, pp. 1149-1158.

Osterloh, M. & Frey, B.S. 2000. Motivation, knowledge transfer and organisation form. *Organisation Science*, vol. 11, no. 5, pp. 538-550.

Owen, J.M. & Rogers, P.J. 1999. *Program evaluation: forms and approaches*, International edition, London: sage.

Owolabi, A.B. 2012. Effect of organisational justice and organisational environment on turn-over intention of health workers in Ekiti state, Nigeria. *Research in World Economy*, vol. 3, no. 1, pp. 28-34.

Oyedele, O.L. 2009. Sustaining architects and engineers motivation in design firms: an investigation of critical success factors. *Engineering, Construction and Architecture*, vol. 17, no. 2, pp. 180-196.

Palm, P. 2007. *Closing the loop: the use of post-occupancy evaluations in real estate management.* Stockholm: Kungliga Tekniska Hogskolan

Parkin, A.B., Tutesigensi, A. & Buyukalp, A.I. 2010. Motivation amongst construction workers in Turkey. *In Proceeding 25th Annual ARCOM Conference*. Edited by A.R.J. Dainty, 7 -9 September, Reading.

Patrashkova-Volzdoska, R.R., McComb, S.A., Green, S.G. & Compton, W.D. 2003. Examining a curvilinear relationship between communication frequency and team performance in cross-functional project teams, *IEEE Transactions on Engineering Management*, vol. 50, pp. 262-269.

Perry, J.G. & Barnes, M. 2000. Target cost contracts: an analysis of the interplay between fee, target, share and price. *Engineering, Construction and Architectural Management*, vol. 7, no. 2 pp. 202-208.

Personal Finance, 2013. *The causes and costs of absenteeism in the workplace*. [online]. Available: http://www.forbes.com, [viewed 12 October 2013].

Peterson, T.O. & VanFleet, D.D. 2004. The ongoing legacy of R.L. Kata: an updated typology of management skills. *Management Decision*, vol. 42, no. 10, pp. 1297-1308.

Pheng, L.S. and Teo, J.A. 2004. Implementing total quality management. *Journal of Management in Engineering*, vol. 20, no. 1, pp. 8-15.

Phillips, J. 2003. *Project management professional study guide*, Emeryville, CA: McGraw-Hill.

Pickens, J. 2005. *Attitudes and perceptions*. [online]. Available: http://www.healthadmin.jbpub.com, [viewed 14 November 2013].

Planning Committee on the National Construction Policy, 1989. Government White paper on the National Construction Policy. Planning Committee on the National Construction Policy, Nigeria.

Plutynski, A. 2011. Four problems of abduction: a brief history. The Journal of the International Society for the History of Philosophy of Science, vol. 1, pp. 1-23.

Pollution prevention resource center (PPRC), 2008. *Economic incentives: reasons for economic incentives.* Available: http://www.pprc.org, [viewed 3 December 2013].

Popp, L. & Zenger, T.R. 2002. Do Formal Contracts and Relational Governance Function as Substitutes or Complements. *Strategic Management Journal*, vol. 36, no. 4, pp. 794-829.

Porter, L.W. and Lawler, E.E. 1968. *Managerial attitudes and performance*, Homewood, IL: Dorsey Press.

Posas, P. & Fisher, T. 2008. Organisational behaviour and public decision making in the EA context. In: *Environment assessment lecturers' handbooks*, Two EAM. Edited by T.B. Fisher, P. Gazzola, U. Jha-Thakur, I. Belaoakora & R. Aschemann, pp. 93-138.

Pournara, I. & Wernisch, L. 2007. Factor analysis for gene regulatory networks and transcription factor activity profiles. *BMC Informatics*, vol. 8, no. 61, pp. 1-20.

Project Management Institute, 2004. *A guide to the project management body of knowledge*, USA: PMI.

Raduescu, C. & Heales, J. 2005. Incentives and their effect on information systems projects, *Proceedings of the 13th European conference on information systems, Information systems in a rapidly changing economy*, Regenburg, Germany, May 26-28th 2005, paper 15.

Rahman, M.M. and Kumaraswamy, M.M. 2004. Contracting Relationship Trends and Transitions. *Journal of Management in Engineering*, vol. 20, no. 4, pp. 147-161.

Ramanathan, K. 1994. The polytrophic components of manufacturing technology. *Technological Forecasting and Social Change*, vol. 46, pp. 221-258

Randeree, K. 2008. Organisational justice: migrant worker perceptions in organisations in the United Arab Emirates, *Journal of Business Systems, Governance and Ethics*, vol. 3, no. 4, pp. 57-67.

Rao, N. 2011. Organisational behaviour- theoretical framework. *Management Theory Review*. [Online]. Available: http://www.nraomtr.blogspot.com, [viewed 3 March 2013].

Rao, N. 2011. *Organisational behaviour- theoretical frameworks. Management theory Review*. [Online]. Available: http://www.nraomtr.blogspot.com, [viewed 24 November 2014].

Reichstein, T., Salter, A. & Gann, D. 2005. Last among equals: comparison of innovation on construction, services and manufacturing in UK, *Construction Management and Economics*, vol. 23, no. 6, pp. 631-644.

Republic of South Africa, the Construction Industry Development Board act, 38 of 2000. *Revised standard for uniformity in construction procurement*. South Africa: Government Printer.

Rethinking Standards in construction, 2006. *Can standards support industry performance improvement?* Available: http://www.constructexcellence.org.uk, [viewed 21 October 2013].

Rhodes, J., Hung, R., Lok, P., Lien, B. & Wu, C. 2008. Factors influencing organisational knowledge transfer; implication for corporate performance. *Journal of Knowledge Management*, vol. 12, no. 13, pp. 84-100.

Richards, L. 2013. *Internal and external forces that influence employee behaviour*. [Online]. Available: http://www.smalbusiness.chron.com. [viewed 28 November 2013].

Richmond-Coggan, D. 2001. *Construction Contract Incentive Scheme- Lessons from experience (C554)*. London: Construction Industry Research and Information Association.

RICS, 1999. *Surveyors' construction handbook*. London: Royal Institute of Chartered Surveyors.

Robbins, S.P., Judge, T.A., Odendaal, A. & Roodt, G. 2009. *Organisational behaviour: global and Southern African perspectives*, second edition, South Africa: Pearson Education Inc.

Roque, R.J. & Marly, M.C. 2013. Understanding the impact of project risk management on project performance: an empirical study. *Journal of Technology Management and Innovation*, vol. 8, pp. 64-78.

Rose, T. & Manley, K. 2010. Client recommendations for financial incentives on construction projects. Engineering Construction and Architectural Management, vol. 17, no. 3, pp. 252-267.

Rose, T.M. & Manley, K. 2005. A conceptual framework to investigate the optimization of financial incentive mechanisms in construction projects, In: *Proceedings of CIB W92/T23 International Symposium on Procurement Systems*, Las Vegas, Neveda, USA, pp. 439-448.

Rose, T.M. & Manley, K. 2010. Client recommendations for financial incentives on construction projects. *Engineering, Construction and Architectural Management*, vol. 17, no. 3, pp. 252-267.

Rose, T.M. & Manley, K. 2011. Motivation towards financial incentive goals on construction projects. *Journal of Business Research*, vol. 64, no. 7, pp. 765-773.

Rose, T.M. 2008. *The impact of financial incentive mechanisms on motivation in Australia Government large non-residential building projects*. Unpublished dissertation. Brisbane: Queensland University of Technology.

Rosen, S.M., Simon, J., Macleod, W., Thea, D.M. &Vincent, J.R. 2001. Investing in the Epidemic: the impact of HIV/AIDS on Businesses in Southern African, Mimeo.

Rosenberg, A. 2013. *Adapt to Nigeria's changing business environment*. [Online]. Available: http://www.howwemadeitinafrica.com, [viewed 1 May 2013].

Roser, S.J. 1984. *Cost plus percentage of costs in government contracts*, Unpublished M.Sc. Thesis, USA: George Washington University.

Ross, J. 2003. *Introduction to project alliancing*. Alliance contracting conference, Sydney: Project Control International Pty Ltd.

Rouse, M. 2008. *Project management*. [Online]. Available: http://searchcio.techtarget.com, [viewed 6 March 2014].

Rubin, R.A., Fairwweather, V. & Guy, S.D. 1999. *Construction claims: prevention and resolution*. USA: John Wiley and sons.

Ryan, R.M. & Deci, E.L. 2000. Intrinsic and extrinsic motivation: classic definitions and new directions. *Contemporary Educational Psychology*, vol. 25, pp. 54-67.

Saka, N. & Ajayi, O.M. 2010. A comparative assessment of incentive scheme between indigenous and multinational construction contractors in Nigeria. *Proceedings of 26th Annual ARCOM Conference,* 6th-8th September, Leeds, UK.

Saks, A.M. 2006. Antecedents and consequences of employee engagement. *Journal of Managerial Psychology,* vol. 21 no. 7, pp. 600-619.

SAS Tutorials, 2014. Data manipulation in SAS. Available: www.stattutoria.ls.com/SAS, [viewed on 2 October 2014].

Saunders, M., Lewis, P. & Thornhill, A. 2000. *Research methods for business students*. Harlow: Pearson Education Limited.

Saunders, M., Lewis, P. & Thornhill, A. 2009. *Research methods for business students,* 5th edition, Pearson Education Limited, Essex, UK.

Saunders, M., Lewis, P. & Thornhill, A. 2012. *Research methods for business students*, 6th edition, UK: Pearson Education limited.

Schippmann, J.S., Ash, R.A., Battista, M., Carr. L., Eyde, L.D.&, Hesketh, B. 2000. The practice of competency modeling. *Personnel Psychology*, vol. 53, pp. 703–740.

Schwarzwald, J., Koslowsky, M. & Shalit, B. 1992. A field study of employees' attitudes and behaviours after promotion decisions. *Journal of Applied Psychology*, vol. 77, pp. 511-514.

Schweyer, A. & Stotz, R. 2011. Motivating today's workforce: the future of incentive and recognition program design, [online]. *Incentive Research Foundation*. Available: http//.www.theirf.org, [viewed 18 April 2013].

Scott, B. 2001. *Partnering in Europe-Incentive based alliancing for projects.* London: Thomas Telford.

Seeley, I.H. 1997. *Quantity Surveying Practice*, London: Macmillan.

Seiler, S., Lent, B., Pinkowska, M. & Pinazza, M. 2012. An integrated model of factors influencing project managers' motivation - findings from a Swiss Survey. *International Journal of Project Management*, vol. 30, pp. 60-72.

Sekaran, U. 2003. *Research methods for business: a skill building approach*. 4th edition. New York: John Wiley and Sons Inc.

Service Canada, 2011. *Performance problems*. [Online]. Available: http://www.jobsetc.gc.ca, [viewed 25 November 2013].

Shanks, N.H. 2011. *Management and Motivation*. Jones and Bartlelt Publishers, Available: http://www.jbleaning.com, [viewed October 20 2012].

Sharp, H., Hall, T. & Baddoo, N. 2007. Exploring motivational differences between software developers and project managers, *Poster Session presented at 6th Joint Meeting on European Software Engineering Conference and the ACM SIGSOFT Symposium on the Foundations of Software Engineering*, September, Dubrovnik.

Shenhar, A.J., Dvir, D. Levy, O. Mattz, A.C. 2001. Project success: a multidimensional strategic concept. *Long Range Planning*, vol. 34, pp. 699-727.

Silverman, M. 2004. *Non-financial recognition: the most effective rewards?* London: The Institute of Employment Studies.

Sinclair, A.L. 2003. The effects of justice and cooperation on team effectiveness. *Small Group Research*, vol. 34, pp. 74-100.

Sirgy, M.J. 1986. A quality-of-life theory derived from Maslow's developmental perspective: 'quality' is related to progressive satisfaction of a hierarchy of needs, lower order and higher. *American Journal of Economics and Sociology*, vol. 45, no. 3, pp. 329-342.

Skinner, R.P. 1969. *Managerial and Technical Motivation: Assessing needs for achievement, power and affliction.* New York: Praeger.

Slezak, P. 2012. *Curbing absenteeism in the workplace*. [Online]. Available: http://www.recruitloop.com, [viewed 12 October 2013].

Sliwka, D. 2003. *On the hidden costs of incentive schemes*. Bonn Econ Discussion papers, 12/2003. [Online]. Available://www.ggse.uni-bonn.de, [viewed 20 March 2014].

Smith, A. 1976. *The wealth of nations: The modern library*, New York: Random House Inc.

Smith, D.C. and Grinker, W.J. 2003. *The promise and pitfalls of Performance based contracting*, Washington: APPAM, Available: http://www.sedcoorg/archive/publications, [viewed 17 March, 2012].

Snell, S. 1999. *Motivate Your Staff—Self Study Workbook*, 2nd edition, London: Kogan Page Limited.

Soltanzadeh, J. & Khoshairat, M. 2012. How can technology transfer concepts lead to a successful ERP implementation*? Research Journal of Applied Science, Engineering and Technology*, pp. 1-8.

South Africa Info, 2013. *South Africa: open for business*. [Online]. Available: http//.www.southafricainfo.com, [viewed 25 April 2013].

South African National Standards, 2004. *Construction procurement processes, methods and procedures,* Standards, South Africa: Pretoria.

State of New South Wales (DET), 2009. *Personal value belief and attitudes*. [online]. Available: http://www.sielearning.tafensw.edu.aw, [viewed 26 November 2013].

State of the Construction Industry, 2012. *The state of the South African construction industry*, [Online]. 2nd quarter. Available: http//.www.industryinsight.co.za, [viewed 10 April 2013].

Statistics South Africa 2012 *Statistics South Africa, 2012. PO441- Gross Domestic Product (GDP),* 4th Quarter [Online]. Available at http://www.statsa.org.za, [viewed 10 March 2013].

Staw, B.M., Bell, N.E. & Clausen, J.A. 1986. The dispositional approach to job attitudes; a lifetime longitudinal test. *Administrative Science Quarterly*, vol. 31, pp. 56-77.

Steer, R.M. & Porter, L.W. 1991. *Motivation and Work Behaviour*. New York: McGraw-Hill.

Stevens, J. 1986. *Applied multivariate statistics for the social sciences*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Stum, D.L. 2001. Maslow revisited: building the employee commitment pyramid. *Strategy and Leadership*, vol. 29, no. 4, pp. 4-9.

Styles, A. 2001. Statement of Angela B. Styles, Administrator for Federal Procurement Policy before the subcommittee on technology and Procurement Policy, Committee on Government Reform. [Online]. *United States House of Representatives*. Available: https://acc.dau.mil, [viewed 3 February 2013].

Sun, M. & Meng, X. 2009. Taxanomy for change causes and effects in construction projects.
Tabachnick, B.G. & Fidell, L.S. 2007. *Using multivariate statistics*, 5th edition. Boston: Pearson Education, Inc.

Tabibnia, G., Satpute, A.B. & Lieberman, M.D. 2008. The sunny side of fairness: preference for fairness activates reward circuitry (and disregarding unfairness activates self-control circuitry). *Psychology Science*, vol. 19, pp. 339-347.

Takim, R. & Akintoye, A. 2002. Performance indicators for successful construction project performance. In: *18th Annual ARCOM conference*. Edited by D. Greenwood, 2-4 September 2002, vol. 2, pp. 545-555.

Tang, S.L., Poom, S.W., Ahmed, S.M. & Wong, F.K.W. 2003. *Modern construction project management*, second edition. Hong Kong: Hong Kong University Press.

Tang, W., Qiang, M., Duffield, C.F & Young, D.M 2008. Incentives in the Chinese Construction Industry. *Journal of Construction Engineering and Management*, vol. 34, no. 7, pp. 457-467.

Tang, W., Qiang, M., Duffield, C.F., Young, D.M. & Lu, Y. 2007. Risk management in the Chinese construction industry. *Journal of Construction Engineering and Management*, vol. 133, no. 12, pp. 944-956.

Tashakkori, A. & Teddie, C. 2010. *SAGE handbook of mixed methods in social and behavioural research*, 2nd edition, USA: Sage publication Inc.

Techtarget, 2015. [Online]. Available: http://www.whatis.techtarget.com, [viewed 14 January 2015].

Teddlie, C. & Tashakkori, A. 2009. *Foundations of mixed methods research integrating quantitative and qualitative approaches in the social and behavioural sciences*, California: Sage publication Inc.

Tepeci, M. 2001. *The effect of personal values, organisational culture and person-organisation fit on individual outcomes in the restaurant industry*, Unpublished PhD thesis, USA: The Pennsylvania State University.

The Business, Trade and Investment Guide, 2010/2011. *Construction overview: the awakening of a sleeping giant.* [Online]. Available: http://www.corporatenigeria.com, [viewed 2 May 2013].

The Construction Industry Institute, 1995. The uses of incentive. *CII conference implementation packet*, Austin, TX: CII.

The Great Soviet Encyclopedia, 1979. Third edition. [online]. Available: http://www.encyclopedia2.thefreedictionary.com, [viewed 20 May 2013].

The Guardian, 2014. *Nigeria becomes Africa's largest economy: get the data*. [Online]. Available: http://www.theguardian.com/globaldevelopment/datablog/2014/apr/07, [viewed 19 November 2014].

The National Bureau of Statistics, 2002. [online]. Available: http://www.nigerianstat.gov.ng, [viewed 12 March 2013].

The National Economic Development Office, 1982. Target cost contracts – a worthwhile alternative. Civil Engineering Economic Development Committee, London, UK: NEDCO.

The National Economic Development, 1991. *Partnering-contract without conflict*. London: NEDO, HMSO.
Thomas, A.B. 2004. *Research skills for management studies*. London: Rutledge.

Thomas, G. & Thomas, M. 2005. *Construction partnering and integrated team working*, United Kingdom: Blackwall publishing limited.

Thwala, W.D. & Mathonsi, M.D. 2012. Selection of procurement systems in the South African construction industry: an exploratory study. *Acta Commercii*, pp. 13-26.

Toloei, P. & Abbasi, H. 2008. *The processes of organisation and management*. [online]. Available: http://www.slideshare.net, [viewed 14 November 2013].

Torrington, D., Hall, L. & Taylor, S. 2005. *Human resource management*, sixth edition, London: Pearson education Limited.

Tran, Q. & Tian, Y. 2013. Organisational structure: influencing factors and impact on a firm. *American Journal of Industrial and Business Management*, vol. 3, pp. 229-236.

TRC, 2009. *Non-response bias in survey sampling*. [Online]. Available: http://www.greenbook.org, [viewed 12 November 2014].

Trench, D. 1991. *On target- a design and manage target cost procurement system*. London: Thomas Telford

Trigg, A.B. 2004. Deriving the Engel Curve: Pierre Bourdieu and the social critique of Maslow's hierarchy of needs. *Review of Social Economy*, vol. 62, no. 3, pp. 393-406.

Turzak, E. 2008. An effective annual incentive plan-it starts with the design process. *Executive edition archive*, no. 3. [Online]. Available: http://www.harygroup.com, [viewed 20 May 2013].

Twort, A.C. & Rees, J.G. 2004. *Civil engineering project management*, fourth edition, UK: Elsevier Butterworth-Heinemann.

Ude, U. & Coker, M.A. 2012. Incentive schemes, employee motivation and productivity in organisations in Nigeria: analytical linkages, *Journal of Business and Management*, vol. 1, no. 4, pp. 32-39.

Udofia, P.E. 2011. Applied statistics with multivariate methods, 1st edition, Enugu, Nigeria: Immaculate Publications limited.

UNCTAD, 2003. *FDI and performance requirements; evidence from selected countries*, Geneva: UNCTAD.

UNDP, 2006. Incentive systems: incentives, motivation and development performance. [Online]. Available: http://www.unpcdc.org, [viewed 22 March 2014].

UNICEF, 2013. *Annual report 2013*. [Online]. Available: http://www.unicef.org/publications, [viewed 24 October 2013].

Usmani, S. & Jamal, S. 2013. Impact of distributive justice, procedural justice, interactional justice, temporal justice, spatial justice on job satisfaction of banking employees. *Review of Integrative Business and Economics Research*, vol. 2, no. 1, pp. 351-383.

Uwakah, O.T. 1997. *Due process in Nigeria's administrative law system: history, current status and future*, USA: University Press of America.

Uwakweh, B.O. 2006. Motivational climate of construction apprentice. *Journal of Construction Engineering and Management*, vol. 132, no. 5, pp. 525-532.

Vanguard, 2010. *Due process saved Nigeria's N88.5b in 2 years-BPP boss*, July 27, 2010. [Online]. Available: http://www.vanguardngr.com, [viewed 12 May 2013].

Vlaar, P.W.L, Van den Bosh, F.A.J. & Volberda, H.W. 2006. Coping with problems of understanding in interorganizational relationships: using formalization as a means to make sense. *Organization Studies*, vol. 27, pp. 1617-1638.

Volker, L. & Rose, T.M. 2012. Incentive mechanisms in infrastructure projects : a case-based comparison between Australia and the Netherlands. In: *Working Paper Series*, *Proceedings of the 2012 Engineering Project Organizations Conference - Global Collaboration*, University of Colorado, Rheden, The Netherlands, pp. 1-18.

Vroom, V.H. 1964. *Work and motivation*, San Francisco: Jossey-Bass.

Walker, F.K. 1997. Workers' participation in Management: Problems practice and prospects. *L. S. Bulletin*, Geneva International Institute of Labour Studies, no. 12, pp. 6.

Walker, R. & Greenstreet, D. 1991. The effect of government incentives and assistance on location and job growth in manufacturing. *Regional Studies*, vol. 25, pp. 13-30.

Wang, S. & Noe, R.A. 2010. Knowledge sharing: a review and directions for future research. *Human Resource Management Review*, vol. 20, no. 2, pp. 115-131.

Wang, S., Tang, W. & Li, Y. 2013. Relationship between owners' capabilities and project performance on development of hydropower projects in China. *Journal of Construction Engineering and Management*, vol. 139, pp. 1168-1178.

Waris, M., Liew, M.S., Khamidi, M.F. & Idrus, A. 2014. Criteria for the selection of sustainable on-site equipment. *International Journal of Sustainable Built Environment*, vol. 3, no. 1, pp. 96-110.

Waroonkun, T. 2007. *Modelling international technology transfer in Thai construction projects.* PhD thesis, Australia: Griffith University.

Washington, W.N. 1997. Motivation: how to increase project team performance. *Project Management Journal*, pp. 50-69.

Weiss, H. & Adler, S. 1984. Personality and organisation behaviour. In: *Research in Organisation Behaviour*. Edited by B.M. Staw & L.L. Cummings, Greenwich, CT: JAI Press.

Welman, C., Kruger, F. & Mitchell, B. 2005. *Research methodology*, 3rd edition, South Africa: Oxford University Press.

White, R.W. 1959. Motivation reconsidered, *Psychology Review*, vol. 60, pp. 297-333.

Whitmore, D.A. 2012. *Incentive-Financial reward Schemes*, [Online]. Available at http://www.manager.net.com, [viewed 5 April 2013].

Whittingto, J.L. & Evans, B. 2005. General issues in management: the enduring impact of great ideas. *Problems and Perspectives in Management*, vol. 2, pp. 114-122.

Wiguna, I.P.A. & Scott, S. 2005. Nature of the critical risk factors affecting project performance in Indonesian building contracts, In: *Proceedings of 21st Annual Conference, London*. Edited by F. Khosrowshahi, London: University of London, pp. 225-235.

Wild, L., Chambers, V., King, M. & Harris, D. 2012. Common constraints and incentive problems in service delivery. Working paper presented in preliminary form for discussion and critical comment. [Online]. *Overseas Development Institute.* Available: http://www.odi.org, [viewed 5 April 2013].

Wiley, C. 1997. What motivates employees according to over 40 years of motivation surveys? *International Journal of Manpower*, vol. 18, no. 3, pp. 263-280.

Wong, T.C. 1999. *Marketing research*. Oxford, UK: Butterworth-Heinemann.

World Bank, 2008. *Country brief: Nigeria*, [Online], Available: http//.www.worldbank.com, [viewed 2 February 2013].

World Bank, 2011. *South Africa Overview*, [Online], Available: http//.www.worldbank.com, [viewed 2 February 2013].

World Bank, 2013. *South Africa Overview*, [Online], Available: http//.www.worldbank.com, [viewed 2 February 2013].

Yahaya, M.I. 2008. *Developing a model for vision-based progress measurement and visualisation of As-Built construction operations.* PhD thesis, UK: Heriot Watt University.

Yamane, T. 1967. *Statistics: an introductory analysis*, 2nd edition. New York: Harper & Row.

Yauch, C.A. 2006. Incentive systems. In: *International encyclopedia of Ergonomics and Human factors*, volume 1. Edited by W. Karwowski, USA: Taylor and Francis group.

Yisa, S.B., Holt, G.D. & Zakeri, M. 2000. Factors affecting management motivation in the Iranian construction industry: a survey of site managers. In: *16th Annual ARCOM*

Conference, 6-8 September 2000, Edited by A. Akintoye, Glasgow Caledonian University. Association of Researchers in Construction Management, vol. 2, pp. 465-472.

Yu, A.G., Flett, P.D. & Bowers, J.A. 2005. Developing a value-centered proposal for assessing project success. *International Journal of Project Management*, vol. 23, no. 6, pp. 428-436.

Zaghloul, R. & Hartman, F. 2002. Reducing contract cost: the trust issue. *AACE International Transactions*, CD161-164.

Zaman, G., Ali, N. & Ali, N. 2010. Impact of organisational justice on employee outcomes: an empirical evidence. *Abasyn Journal of Social Sciences*, vol. 3, no. 1, pp. 44-53.

Zhi-hong, Z. & Yu-hui, G. 2013. Model construction of trust culture generation of top management team. *Advances in Applied Economics and Finance*, vol. 4, no. 1, pp. 643-645.

Appendix 1: Research questionnaire

Department of Construction Economics
Tel: 012-420 4972
Fax: 012-420 3598

19 June 2014

Dear respondent,

Ogwueleka, Amaka C. is a PhD student in Quantity Surveying at Department of Construction Economics, University of Pretoria, South Africa. She is undertaking a research project on **"Evaluation of incentive mechanisms on performance-based contracting systems in South Africa and Nigeria".** The research focuses on evaluating how best to motivate construction employees and organisations to achieve project goals by aligning employees' and contractors' expectations with clients' objectives.

The information provided will be used as a guide to assess and make recommendations on how to improve project performance and also to model for incentive payoff in the construction industry. We kindly request that you complete the following questionnaire; it will take no longer than 30 minutes of your time. With regards to any queries, please do not hesitate to contact the undersigned persons.

Your participation is highly appreciated, thank you. Please you can email your completed questionnaire to: Amaka.Ogwueleka@up.ac.za or amakaogwueleka@gmail.com.

Professor M.J. Maritz
Head of Department/ Supervisor
Email: Tinus.Maritz@up.ac.za
+27 12 4202581

Ogwueleka, Amaka C.
PhD student
Email: Amaka.Ogwueleka@up.ac.za
+27-78 5671044
+234-8051839180

Respondent number V0

Please answer the questions by marking the appropriate box with an X or writing in the space provided

Section A: General information

1 In which country do you reside? V1

South Africa	1
Nigeria	2

2 Please indicate the kind of organisation you work for: V2

Client	1
Consultant	2
Contractor	3
Subcontractor	4
Supplier	5
Other (specify)	

3 The level of the position you have in the organisation? V3

Managerial position	1
Middle management position	2
Operational (skilled/unskilled)	3
Other (please specify)	

4 Please indicate the length of work experience in the construction industry: V4

……………………….years

5 Please point out the number of projects you have participated in: V5

…………………………….

6 Please indicate your highest formal education level: V6

Matric/Waec	1
N.Diploma/H.Diploma	2
B.Tech./B.Sc. (Hons)	3
M.Sc. /M.Tech.	4
PhD/D.Tech.	5
Other (please specify)	

Section B: Performance evaluation

7 To what extent do the following management attributes contribute to the assessment of project performance in the construction sector?

Management attributes	Hardly	Slightly	Moderately	Significantly	Absolutely	
1. Human development capability						
Employee satisfaction	1	2	3	4	5	V7_1a
Knowledge/skill transfer process	1	2	3	4	5	V7_1b
Organisation competence	1	2	3	4	5	V7_1c
Learning process	1	2	3	4	5	V7_1d

2. Management strategy						
Revenue and sales growth	1	2	3	4	5	V7_2a
Cost saving	1	2	3	4	5	V7_2b
Organisation culture/commitment	1	2	3	4	5	V7_2c
Business efficiency	1	2	3	4	5	V7_2d
3. Operational strategy						
Achieving specified project goals	1	2	3	4	5	V7_3a
Technological capability	1	2	3	4	5	V7_3b
Innovation	1	2	3	4	5	V7_3c
Work productivity	1	2	3	4	5	V7_3d
4. Product/market efficiency						
Competitive advantage	1	2	3	4	5	V7_4a
Organisation reputation	1	2	3	4	5	V7_4b
Value derived by end users/customers	1	2	3	4	5	V7_4c
Social responsibility	1	2	3	4	5	V7_4d
5. External factors						
Contract policy	1	2	3	4	5	V7_5a
Environment impact	1	2	3	4	5	V7_5b
Socio-economic impact	1	2	3	4	5	V7_5c
Government policy	1	2	3	4	5	V7_5d

8 To what extent do you agree with the following statements regarding performance evaluation of construction workforce in projects?

Statements	Strongly disagree	Disagree	Neither disagree or agree	Agree	Strongly agree	
The behaviour pattern of project participants can influence the project outcomes	1	2	3	4	5	V8_1
The weights of various critical project performance measures are fundamental tools to assess performance in projects	1	2	3	4	5	V8_2
Lack of fairness in organisational justice will have a negative impact on project performance	1	2	3	4	5	V8_3
The use of incentives that do not incorporate project risks will impact negatively on project participants and performance objectives	1	2	3	4	5	V8_4
The level of perception on the use of multiple incentives is low, which has significantly contributed to poor working relationship among the contracting parties	1	2	3	4	5	V8_5

9 Please evaluate the following performance indicators/parameters based on their level of importance in project performance.

Performance indicators/parameters	Not important	Slightly important	Moderately important	Important	Very important		
1. Cost performance							
Efficient cash flow system	1	2	3	4	5	**V9_1a**	
Within budget	1	2	3	4	5	**V9_1b**	
Efficient cost control	1	2	3	4	5	**V9_1c**	
Measurement & correction	1	2	3	4	5	**V9_1d**	
Project cost outcome	1	2	3	4	5	**V9_1e**	
2. Time performance							
Adequate supervision	1	2	3	4	5	**V9_2a**	
Timely completion	1	2	3	4	5	**V9_2b**	
Timeous communication process	1	2	3	4	5	**V9_2c**	
Reasonable claims for extension of time	1	2	3	4	5	**V9_2d**	
Adequate schedule process	1	2	3	4	5	**V9_2e**	
Schedule change control	1	2	3	4	5	**V9_2f**	
3. Quality performance							
Minimise defects	1	2	3	4	5	**V9_3a**	
Satisfactory quality of work	1	2	3	4	5	**V9_3b**	
Quality of materials used	1	2	3	4	5	**V9_3c**	
Effective quality management plan	1	2	3	4	5	**V9_3d**	
4. Safety/health performance							
Safety/health training programs	1	2	3	4	5	**V9_4a**	
Safety/health control measures	1	2	3	4	5	**V9_4b**	
Response to incidents	1	2	3	4	5	**V9_4c**	
Minimise safety/health incident rates	1	2	3	4	5	**V9_4d**	

10 To what extent do the following factors influence risk equity in projects?

Project risk factors	Not significant	Slightly significant	Moderately significant	Significant	Very significant		
1. Technical/operational							
Contract conditions	1	2	3	4	5	**V10_1a**	
Controllability of risk	1	2	3	4	5	**V10_1b**	
Cash flow process	1	2	3	4	5	**V10_1c**	
Improper design	1	2	3	4	5	**V10_1d**	
Availability of labour/materials	1	2	3	4	5	**V10_1e**	
Project location	1	2	3	4	5	**V10_1f**	
Construction default	1	2	3	4	5	**V10_1g**	
Incompetence of supplier	1	2	3	4	5	**V10_1h**	
2. Project design							
Technology transfer process	1	2	3	4	5	**V10_2a**	
Design changes by client	1	2	3	4	5	**V10_2b**	
Unproven engineering techniques	1	2	3	4	5	**V10_2c**	
Job security	1	2	3	4	5	**V10_2d**	
Risk management procedure	1	2	3	4	5	**V10_2e**	
Payment sharing ratio	1	2	3	4	5	**V10_2f**	

Supporting utilities risk	1	2	3	4	5	V10_2g	
Protection of historical objects	1	2	3	4	5	V10_2h	
3. Firm management factors							
Financial stability	1	2	3	4	5	V10_3a	
Corporate culture	1	2	3	4	5	V10_3b	
Labour disputes & strikes	1	2	3	4	5	V10_3c	
Contractual risks	1	2	3	4	5	V10_3d	
Company liability	1	2	3	4	5	V10_3e	
Ownership assets	1	2	3	4	5	V10_3f	
Insolvency of the company	1	2	3	4	5	V10_3g	
4. External factors							
Influential economic events	1	2	3	4	5	V10_4a	
Environment factors	1	2	3	4	5	V10_4b	
Import restrictions	1	2	3	4	5	V10_4c	
Force majeure (forceful events)	1	2	3	4	5	V10_4d	
Government regulations	1	2	3	4	5	V10_4e	
Bank interest rate	1	2	3	4	5	V10_4f	

11 To what extent do the following organisational practices contribute to work productivity of construction employees?

Organisational practices	No effect	Minor effect	Neutral	Moderate effect	Major effect		
1. Distributive justice							
Basic needs	1	2	3	4	5	V11_1a	
Fairness in pay to staff	1	2	3	4	5	V11_1b	
Recognition of merit performance	1	2	3	4	5	V11_1c	
Appropriate rewards/compensation based on productivity	1	2	3	4	5	V11_1d	
Rewarding employee's effort	1	2	3	4	5	V11_1e	
Proportional equity in reward distribution	1	2	3	4	5	V11_1f	
Maximise the employee contributions	1	2	3	4	5	V11_1g	
Reward/compensate for voluntary services	1	2	3	4	5	V11_1h	
2. Procedural justice							
Involvement of employee's opinion before decisions are taken	1	2	3	4	5	V11_2a	
Standard criteria for measuring employee performance	1	2	3	4	5	V11_2b	
Logical decision making	1	2	3	4	5	V11_2c	
Use of appropriate information	1	2	3	4	5	V11_2d	
Appropriate correctability procedure	1	2	3	4	5	V11_2e	
Considering employee's concern in decisions	1	2	3	4	5	V11_2f	
Morality & ethicality	1	2	3	4	5	V11_2g	
3. Interactional justice							
Truthfulness	1	2	3	4	5	V11_3a	
Respect for people	1	2	3	4	5	V11_3b	
Socially appropriate behaviour	1	2	3	4	5	V11_3c	
Taking justifiable actions	1	2	3	4	5	V11_3d	
Effective feedback process	1	2	3	4	5	V11_3e	
Effective communication values	1	2	3	4	5	V11_3f	
Timeous response to feedback	1	2	3	4	5	V11_3g	
Good interactive environment	1	2	3	4	5	V11_3h	

Psychological firmness of employees	1	2	3	4	5	V11_3i	

12 To what extent do the following factors influence organisation performance in the construction sector?

Factors	Not important	Slightly important	Moderately important	Important	Very important		
1. Learning strategy							
Individual motivation	1	2	3	4	5	V12_1a	
Corporate environment	1	2	3	4	5	V12_1b	
Learning environment	1	2	3	4	5	V12_1c	
Innovativeness	1	2	3	4	5	V12_1d	
Management flexibility	1	2	3	4	5	V12_1e	
Training	1	2	3	4	5	V12_1f	
Recognition of knowledge acquisition	1	2	3	4	5	V12_1g	
Organisation culture	1	2	3	4	5	V12_1h	
2. Structure and design							
Project structure	1	2	3	4	5	V12_2a	
Organisation policy	1	2	3	4	5	V12_2b	
Size of organisation	1	2	3	4	5	V12_2c	
Project goals	1	2	3	4	5	V12_2d	
Firm's technology	1	2	3	4	5	V12_2e	
Availability of efficient projects	1	2	3	4	5	V12_2f	
Profitability	1	2	3	4	5	V12_2g	
3. Corporate framework							
Individual competence	1	2	3	4	5	V12_3a	
Transparency	1	2	3	4	5	V12_3b	
Security mechanism	1	2	3	4	5	V12_3c	
Uniformity in job order	1	2	3	4	5	V12_3d	
Integrity	1	2	3	4	5	V12_3e	
Communication process	1	2	3	4	5	V12_3f	
Stability of system	1	2	3	4	5	V12_3g	
Personal values	1	2	3	4	5	V12_3h	
Professional competence of boss	1	2	3	4	5	V12_3i	

13 Based on your previous work experience, to what extent does each performance variable influence compensation/incentive payoff as it relates to construction project performance?

Performance variables	Very low	Low	Moderate	High	Extremely high		
1. Individual/employee performance							
Technical efforts/knowledge	1	2	3	4	5	V13_1a	
Work output	1	2	3	4	5	V13_1b	
Individual talent	1	2	3	4	5	V13_1c	
Attitude to work	1	2	3	4	5	V13_1d	
Work integrity	1	2	3	4	5	V13_1e	
Team spirit	1	2	3	4	5	V13_1f	
Competence	1	2	3	4	5	V13_1g	
2. Organisational performance							
Knowledge/skill transfer process	1	2	3	4	5	V13_2a	

Employee job satisfaction	1	2	3	4	5	**V13_2b**
Organisation competence/capability	1	2	3	4	5	**V13_2c**
Relationship with project participants	1	2	3	4	5	**V13_2d**
Market efficiency	1	2	3	4	5	**V13_2e**
Operational efficiency	1	2	3	4	5	**V13_2f**
Managerial skills	1	2	3	4	5	**V13_2g**
Environmental/social impact assessment	1	2	3	4	5	**V13_2h**

14 To what extent do the following motivational drivers contribute to employee motivation in order to bridge the gap between contractors' objectives and clients' expectations in projects?

Motivational drivers	Least motivating	Slightly motivating	Moderately motivating	Motivating	Highly motivating	
1. Leadership style						
Work leadership	1	2	3	4	5	**V14_1a**
Participation in decision making	1	2	3	4	5	**V14_1b**
Respect for people	1	2	3	4	5	**V14_1c**
Commitment	1	2	3	4	5	**V14_1d**
Recognition, credit & acclaim	1	2	3	4	5	**V14_1e**
Management theories	1	2	3	4	5	**V14_1f**
2. Reward system						
Income increment	1	2	3	4	5	**V14_2a**
Fairness of pay/salary	1	2	3	4	5	**V14_2b**
Timeous payment	1	2	3	4	5	**V14_2c**
Overtime allowance	1	2	3	4	5	**V14_2d**
Benefits/bonus reimbursement incentive	1	2	3	4	5	**V14_2f**
3. Organisational culture						
Flexibility of working hours	1	2	3	4	5	**V14_3a**
Prospect for promotion	1	2	3	4	5	**V14_3b**
Job security	1	2	3	4	5	**V14_3c**
Company's prestige (financial stability)	1	2	3	4	5	**V14_3d**
Consumerism (workers' right)	1	2	3	4	5	**V14_3e**
Training of staff	1	2	3	4	5	**V14_3f**
Creativity	1	2	3	4	5	**V14_3g**
4. Structure of the work						
Working conditions (availability of materials and tools)	1	2	3	4	5	**V14_4a**
Design process efficacy	1	2	3	4	5	**V14_4b**
Working facilities (provision of rest areas and transport)	1	2	3	4	5	**V14_4c**
Good supervision	1	2	3	4	5	**V14_4d**
Completing of challenging tasks	1	2	3	4	5	**V14_4e**
Gaining proficiency	1	2	3	4	5	**V14_4f**
Timeous response to request & inspection	1	2	3	4	5	**V14_4g**
Unrealistic scheduling/performance expectation	1	2	3	4	5	**V14_4h**
Extent of change orders during execution	1	2	3	4	5	**V14_4i**

Section C: Organisational behaviour and competency

15 To what extent do the following situations affect employee/organisational behaviour during project implementation?

Situations	No effect	Minor effect	Neutral	Moderate effect	Major effect		
1. Individual personality							
Personal attitudes	1	2	3	4	5	V15_1a	
Perceived alternative employment opportunities	1	2	3	4	5	V15_1b	
Individual competence	1	2	3	4	5	V15_1c	
Perceptions	1	2	3	4	5	V15_1d	
2. Organisation values/beliefs							
Decision making process	1	2	3	4	5	V15_2a	
Relationship with supervisors	1	2	3	4	5	V15_2b	
Reward system	1	2	3	4	5	V15_2c	
Opportunity for advancement	1	2	3	4	5	V15_2d	
Respect for people	1	2	3	4	5	V15_2e	
Learning process	1	2	3	4	5	V15_2f	
Performance evaluation process	1	2	3	4	5	V15_2g	
Organisational policy	1	2	3	4	5	V15_2h	
3. Work characteristics							
Working conditions	1	2	3	4	5	V15_3a	
Competition	1	2	3	4	5	V15_3b	
Appropriate supervision & inspection	1	2	3	4	5	V15_3c	
Proper management of design changes & variations	1	2	3	4	5	V15_3d	
Lack of construction materials, tools and equipment	1	2	3	4	5	V15_3e	
Technology capability	1	2	3	4	5	V15_3f	
4. Work environment							
Communication process	1	2	3	4	5	V15_4a	
Work relationship	1	2	3	4	5	V15_4b	
Respect for co-workers	1	2	3	4	5	V15_4c	
Employer's involvement	1	2	3	4	5	V15_4d	
Effective conflict management strategy	1	2	3	4	5	V15_4e	

16 To what extent do the following practices influence organisation competency in project performance?

Practices	No effect	Minor effect	Neutral	Moderate effect	Major effect		
1. Knowledge sharing							
Commitment of decision makers	1	2	3	4	5	V16_1a	
Competence of team members	1	2	3	4	5	V16_1b	
Interaction within team members	1	2	3	4	5	V16_1c	
Integrative concept for sharing	1	2	3	4	5	V16_1d	
Easy access to knowledge	1	2	3	4	5	V16_1e	
2. Skill and technology transfer							
Technology transfer method	1	2	3	4	5	V16_2a	
Work ethic	1	2	3	4	5	V16_2b	

	Willingness to transfer technology	1	2	3	4	5	V16_2c	
	Intent to learn technology	1	2	3	4	5	V16_2d	
	Cultural traits of transferor/transferee	1	2	3	4	5	V16_2e	
	Transfer environment	1	2	3	4	5	V16_2f	
	Level of involvement of transferor/transferee	1	2	3	4	5	V16_2g	
	3. Abilities							
	Feedback process	1	2	3	4	5	V16_3a	
	Job mismatch	1	2	3	4	5	V16_3b	
	Lack of clarity	1	2	3	4	5	V16_3c	
	Unrealistic polices & procedures	1	2	3	4	5	V16_3d	
	Poor reward system	1	2	3	4	5	V16_3e	
	4. Personal characteristics							
	Lifestyle	1	2	3	4	5	V16_4a	
	Historic events	1	2	3	4	5	V16_4b	
	Educational background	1	2	3	4	5	V16_4c	

Section D:Incentive performance evaluation

17 To what extent do the following practices contribute to economic benefits of incentive schemes in projects?

Practices	Not significant	Slightly significant	Moderately significant	significant	Very significant		
Substantial cost saving	1	2	3	4	5	V17_1	
Good relationship between parties	1	2	3	4	5	V17_2	
Commitment to improved technological innovation	1	2	3	4	5	V17_3	
Flexibility in reaching project targets	1	2	3	4	5	V17_4	
Better working environment	1	2	3	4	5	V17_5	
Improved customer satisfaction	1	2	3	4	5	V17_6	
Increasing knowledge/skill levels	1	2	3	4	5	V17_7	
Healthy competition	1	2	3	4	5	V17_8	
Improved organisational/employee behaviours and competency	1	2	3	4	5	V17_9	
Expedite construction work	1	2	3	4	5	V17_10	
Encourage quality of work	1	2	3	4	5	V17_11	

18 To what extent do the following situations create economic challenges on the use of incentives in projects?

Situations	No challenge	Minor challenge	Neutral	Moderate challenge	Major challenge		
Schedule difficulties	1	2	3	4	5	V18_1	
Inadequate experience in incentive mechanisms	1	2	3	4	5	V18_2	
Improper allocation of cost savings	1	2	3	4	5	V18_3	
Political market imperfections	1	2	3	4	5	V18_4	
Lack of effective performance oversight	1	2	3	4	5	V18_5	
Moral hazards	1	2	3	4	5	V18_6	
Sacrificing in quality for speed	1	2	3	4	5	V18_7	
Adverse relationships among team members	1	2	3	4	5	V18_8	

Budget difficulties	1	2	3	4	5	V18_9	
Delays in review of specifications/ requirements	1	2	3	4	5	V18_10	
Delays in approving changes	1	2	3	4	5	V18_11	
Policy incoherence	1	2	3	4	5	V18_12	
Collective action challenges	1	2	3	4	5	V18_13	

19 How would you rank the following incentive schemes based on workforce motivation in your organisation?

Incentive schemes	Not efficient	Slightly efficient	Moderately efficient	Efficient	Extremely efficient		
1. Financial							
Premium bonus	1	2	3	4	5	V19_1a	
Profit sharing	1	2	3	4	5	V19_1b	
Schedule incentive	1	2	3	4	5	V19_1c	
Measured day work	1	2	3	4	5	V19_1d	
Technical performance bonuses	1	2	3	4	5	V19_1e	
Simple piece work	1	2	3	4	5	V19_1f	
Geared incentive	1	2	3	4	5	V19_1g	
Group incentive	1	2	3	4	5	V19_1h	
2. Semi-financial							
Health scheme	1	2	3	4	5	V19_2a	
Saving scheme	1	2	3	4	5	V19_2b	
Housing scheme	1	2	3	4	5	V19_2c	
Site welfare provision	1	2	3	4	5	V19_2d	
Pension scheme	1	2	3	4	5	V19_2e	
3. Non-financial							
Recognition	1	2	3	4	5	V19_3a	
Praise of good work	1	2	3	4	5	V19_3b	
Communication	1	2	3	4	5	V19_3c	
Empowerment	1	2	3	4	5	V19_3d	
Job autonomy	1	2	3	4	5	V19_3e	
Enlargement	1	2	3	4	5	V19_3f	
Rotation	1	2	3	4	5	V19_3g	

20 Please indicate the type(s) of payment strategies mostly adopted in performance compensation by your organisation? Tick more than one in the boxes provided, where applicable.

Payment strategies	**Tick**		
Piece-rate systems (based on productivity)		V20_1	
Merit pay		V20_2	
Sales commissions		V20_3	
Awards		V20_4	
Gain sharing		V20_5	
Profit sharing		V20_6	
Employee stock plan		V20_7	
Annual bonuses		V20_8	
One-time incentives		V20_9	
Long-time incentives		V20_10	
Lump sum incentives		V20_11	
Competency-based pay		V20_12	
Pay for quality		V20_13	

Quota-rate incentives		V20_14	
Fixed-rate incentives		V20_15	
Suggest/ proposal program		V20_16	
Team-based pay		V20_17	
Other (please specify)		V20_18	

Do you have suggestions or comments regarding effective implementation of incentive mechanisms in the construction industry? Please indicate
………………………………………………………………………………………………
………………………………………………………………………………………………
.

Thank you so much, I appreciate your contributions

Email:	
Phone:	

Appendix 2: Interview questions

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Department of Construction Economics
Tel: 012-420 4972
Fax: 012-420 3598

Interview protocol

This section is part of an on-going PhD research on "evaluation of incentive mechanisms on performance-based contracting systems in South Africa and Nigeria". This study defines incentive as an inducement given to motivate an organisation or individual in order to place greater emphasis on how to achieve an objective or to act in a certain way. Most construction projects still suffer from time delays, cost overruns, quality defects and much other related causality in the construction industry. Contracting parties are people with diverse perceptions and expectations and these have contributed to challenges relating to misalignment of objectives, fragmented association between parties and risk-averse behaviours during project implementation.

This study is focused on developing an incentive mechanism framework which is targeted towards aligning the performance objectives among contracting parties thereby creating the opportunity for contractors to be rewarded for good performance and also penalised for defaulting. In order to achieve this, this study has evaluated the sociological and operational constructs of performance in relation to incentive mechanisms in construction projects using quantitative data. This interview is focused on addressing the key aspects of the findings and also validates the proposed incentive framework and models. The questions for interview guide are stipulated below.

We will therefore appreciate if you could spare about 30 minutes of your time to share your valuable knowledge and experience through one-to-one interview to be guided by this protocol.

Be assured that your participation is highly valued and absolutely necessary while precautions have been put in place to protect your privacy and anonymity. We will be glad to provide you with a copy of the research outcome if you desire to have it.

Thanks a lot in anticipation for your participation.

Kind regards,

Amaka Ogwueleka	Professor M. J. Maritz
PhD student	Head of Department/Supervisor

Interview guide (South Africa)

1. Does your organisation have any incentive mechanism in place targeted towards improved project performance? Please comment on your answer.

2. What do you think about how these management attributes contribute to the assessment of project improvement? Please rate them using 1 = not influential; 2 = somehow influential; 3 = moderately influential; 4 = influential; 5 = highly influential and comment on your answers.
    - Knowledge/skill transfer process
    - Environment impact
    - Competitive advantage
    - Achieving specified project goals

3. Please rate the criticality of these factors in risk allocation among contracting parties using 1 = not critical; 2 = somehow critical; 3 = moderate; 4 = critical; 5 = highly critical and comment on your answers where possible.
    - Improper design
    - Contract conditions
    - Labour disputes
    - Contractual risks

4. Please rate how these factors influence the assessment of organisational or workforce competencies in project delivery using 1 = not important; 2 = slightly important; 3 = moderate; 4 = important; 5 = very important and comment where necessary.
    - Willingness to transfer technology
    - Educational background
    - Competence of team members
    - Work ethic

5. In assessing the overall project performance, please rate the significance of these performance indicators using 1 = not significant; 2 = slightly significant; 3 = moderate; 4 = significant; 5 = very significant and comment on your answers where possible.
    - Quality of materials used
    - Minimise incident rates
    - Timely completion
    - Efficient cash flow system

Thank you for sparing your time despite the very tight schedule of your workday!

Interview guide (Nigeria)

1. Does your organisation have any incentive mechanism in place targeted towards improved project performance? Please comment on your answer.

2. What do you think about how these management attributes contribute to the assessment of project improvement? Please rate them using 1 = not influential; 2 = somehow influential; 3 = moderately influential; 4 = influential; 5 = highly influential and comment on your answers.

   - Contract policy
   - Organisational culture/commitment
   - Value derived by end users and customers
   - Technological capability
   - Innovation

3. Please rate the criticality of these factors in risk allocation among contracting parties using 1 = not critical; 2 = somehow critical; 3 = moderate; 4 = critical; 5 = highly critical and comment on your answers where possible.
   - Environmental factors
   - Contract conditions
   - Financial stability
   - Risk management procedure

4. Please rate how these factors influence the assessment of organisational or workforce competencies in project delivery using 1 = not important; 2 = slightly important; 3 = moderate; 4 = important; 5 = very important and comment where necessary.
   - Easy access to knowledge
   - Historic events (past activities)

5. In assessing the overall project performance, please rate the significance of these performance indicators using 1 = not significant; 2 = slightly significant; 3 = moderate; 4 = significant; 5 = very significant and comment on your answers where possible.
   - Response to incident rates
   - Measurement and correction of work
   - Minimise defects
   - Reasonable claims for extension of time

Thank you for sparing your time despite the very tight schedule of your workday!

Appendix 3: Framework validation questions

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Department of Construction Economics
Tel: 012-420 4972
Fax: 012-420 3598

Dear Participant,

Request to participate in framework and model validation

Please find attached a copy of the developed framework showing the logical connections between phases of the framework and sub-activities and a copy of the developed model for employee and organisational incentive payoffs in construction projects.

I will appreciate is you could spare about 25 minutes of your time to share your valuable knowledge and experience by providing your assessment of the framework and the model.

Be assured that your participation is highly valued and of great importance while precautions have been put in place to protect your privacy and anonymity.

Kind regards,

Amaka Ogwueleka
PhD student

Professor M. J. Maritz
Head of Department/Supervisor

Framework validation

Please indicate your overall assessment of the framework for incentive mechanisms in construction projects using the scale of 1 = poor; 2 = below average; 3 = moderate; 4 = above average and 5 = excellent.

Attributes

- Logical structure ☐
- Clarity and intelligibility ☐
- Comprehensiveness ☐
- Practicability ☐
- Efficiency ☐
- Applicability ☐

Please identify potential limitations/weaknesses observed in the framework.
……………………………………………………………………………………………
……………………………………………………………………………………………
…………………………………………………………………………………………….
Please identify possible areas of strength and opportunities in the framework
……………………………………………………………………………………………
……………………………………………………………………………………………
…………………………………………………………………………………………....
Kindly provide any other suggestion(s) that may further improve the quality of the incentive mechanism framework.
……………………………………………………………………………………………
……………………………………………………………………………………………
…………………………………………………………………………………………….

Type of organisation: ……………………………………………………………………….
Name of organisation: ………………………………………………………………………
Position in the organisation: …………………………………………………………………
Years of experience: …………………………………………………………………………

Appendix 4: Illustrative example of incentive payoffs in South Africa

Contract agreement for multiple incentives

Client: AAB public sector

Contractor: XXX Construction Company

Project type: Road construction project

Project duration: 18 months

Estimated project cost: R220, 000, 000, 000

Performance assessment metrics	**Bonus sharing**	**Penalty fee**
Cost performance (assumed) Agreed stretching value = 5% of EPC	50:50 [client:contractor]	0:100 [client:contractor]
Time performance (assumed)	Fixed bonus payment per month by client = R 500,000	Fixed penalty fee per month paid by contractor = R 500,000
Quality performance (assumed)	Bonus payment per unit = R 300,000	Penalty fee per unit (excluding cost of re-work) = R 300,000
Safety/health performance (assumed)	Achieving below the average incident rate = Certificate of conformity with safety/health standards	Achieving above the average incident rate = Certificate of poor safety/health standards

Cost performance assessment (assumed)

EPC = R 220, 000, 000
FPC = R 158, 000, 000
Stretching value = 5% of EPC

$$\text{Cost ratio} = \frac{158,000,000 + 11,000,000}{220,000,000} = [1.00 - 0.77] * 220,000,000 = 50,600,000$$

Cost incentive payoff = 50, 600, 000 * ½ = R 25, 300, 000

Time performance assessment (assumed)

ETPC = 18 months
ATPC = 16 months
Time ratio = 18 – 16 = 2 months (positive sign)

Time incentive payoff = 2* 500, 000 = R1, 000, 000

Quality performance assessment

Assume the system metrics being measured are 6 numbers, for example, quality of asphalt, level of compaction and others.

System metrics	Rated score	Threshold value	Final score
1	5	6	-1
2	6	6	0
3	7	6	1
4	4	6	-2
5	7	6	1
6	6	6	0

Quality incentive payoff (negative sign denotes penalty fee) = 1 * 300, 000

= R 300, 000 (excluding cost of re-work)

Safety/health performance assessment (assumed)

Assume the total recordable cases of injuries for 1st and 2nd years are 4.5 and 5.6 respectively and the average score is 5.05.

Number of employees = 200

Working hours for 18 months = 500, 000

Number of injury cases = 12

Actual incident rate = 12 * 200, 000/ 500, 000 = 4.80 (lower than the average incident rate of 5.05)

Safety/health incentive payoff = Certificate of conformity with safety/health standards

Appendix 5: Illustrative example of incentive payoffs in Nigeria

Contract agreement for multiple incentives

Client: ZZZ public sector

Contractor: YYY Construction Company

Project type: Road construction project

Project duration: 24 months

Estimated project cost: N 2, 000, 000, 000

Performance assessment metrics	**Bonus sharing**	**Penalty fee**
Cost performance (assumed)	40:60 [client: contractor]	0:100 [client: contractor]
Time performance (assumed)	Fixed bonus payment per month by client = N 20, 000,000	Fixed penalty fee per month paid by contractor = N 20, 000,000
Quality performance (assumed)	Bonus payment per unit = N 5, 000,000	Penalty fee per unit (excluding cost of re-work) = N 5, 000,000
Safety/safety performance (assumed) Minimum acceptable level of safety/health effort is 7 on a scale of 1 to 10	Achieving minimum acceptable level or above = Certificate of conformity with safety/health standards	Achieving below the acceptable level = Certificate of poor safety/health standards

Cost performance assessment (assumed)

EPC = N 2, 000, 000, 000
APC = N 1, 300, 000, 000
Cost of change order = N 200, 000, 000
Cost of re-work = N100, 000, 000

Net value of variation = 1, 300, 000, 000 – [2, 000, 000, 000 + 200, 000, 000] – 100, 000, 000
= 800, 000, 000

Cost incentive payoff = 800, 000, 000 * 60/100 = N 480, 000, 000

Time performance assessment (assumed)

ETPC = 24 months
EOT = 6 months
ATPC = 26 months

Time ratio = [24 + 6] – 26 = 4 months (positive sign)

Time incentive payoff = 4* 20, 000, 000 = N 80, 000, 000

Quality performance assessment

Assume the system metrics being measured are 6 numbers, for example, quality of asphalt, level of compaction and others.

System metrics	Quality defect recorded	Rework performed	Rated score	Threshold value	Final score
1	0	0	6	6	0
2	2	2	5	6	-1
3	0	0	7	6	1
4	3	3	6	6	0
5	4	4	6	6	0
6	0	0	5	6	-1

Quality incentive payoff (negative sign denotes penalty fee) = 1 * 5, 000, 000

= N 5, 000, 000

Safety/health performance assessment (assumed)

Audit score (1 to 10) = 8
Perception survey rating (1 to 10) = 7
Minimum acceptable level = 7

Safety/health incentive payoff = $\frac{[8 + 7]}{2} - 7$ = 0.4 (positive)

= Certificate of conformity with safety/health standards