# AN APPRAISAL OF PERFORMANCE MEASUREMENT PRACTICE OF CONSTRUCTION FIRMS IN ANIGERIA

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**B.Sc. QS (A.B.U) 2008**

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## DECLARATION

I declare that the work in this thesis entitled 'An Appraisal of performance measurement practice of construction firms in Nigeria' has been carried out by me in the Department of Quantity Surveying. The information derived from the literature has been duly acknowledged in the text and list of references provided. No part of this thesis was previously presented for another degree or diploma at this or any other Institution.

Christiana Ada Paul _____ Signature _____ Date

## CERTIFICATION

This thesis entitled 'AN APPRAISAL OFPERFORMANCEMEASUREMENT PRACTICE OF CONSTRUCTION FIRMS IN NIGERIA' by CHRISTIANA ADA PAUL meets the regulations governing the award of degree of Masters in Project Management of the Ahmadu Bello University, and is approved for its contribution to knowledge and literary presentation.

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## ABSTRACT

Performance measurement is crucial to the construction industry in order to improve the performance of the industry and most importantly achieve continuous improvement. The traditional approach to performance measurement has been criticised severally resulting to an evolution that brought about contemporary performance measurement frameworks. These frameworks have been adopted by several construction industry especially in the UK, US, Chile and Brazil. However, most organisations within the Nigerian Construction industry mostly present their financial reports (which are mainly financial measures) to portray their performance and there are no available research that presents elaborate information on the industry's performance measurement practice. The Nigerian Construction Industry is faced with several problems bordering on poor performance.The study appraised the performance measurement practice of construction firms in Nigeria. A survey questionnaire was conducted on a randomly selected 50 small and medium sized construction firms in Abuja, Nigeria. Data were analysed using the descriptive statistics method including tabulation, percentages and charts. The results of the study revealed that most construction firms are interested in how they perform and do measure their performance. The study also shows that most of the construction firms still rely on financial measures (which has been highly criticised).Findings from the study also indicate a low awareness/implementation of performance measurement and performance measurement concepts. Findings also revealed that the most adopted performance measurement framework is the Balanced Scorecard.

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## LIST OF ABBREVIATIONS

| | |
|---|---|
| BSC | Balanced Scorecard |
| CIM | Computer-Integrated Manufacturing |
| CSFs | Critical Success Factors |
| EFQM | European Foundation for Quality Management Model |
| FMS | Flexible Manufacturing Systems |
| GAO | Government Accountability office |
| GDP | Gross Domestic Product |
| ICT | Information and Communication Technology |
| ISO | International Organization for Standardization |
| JIT | Just In Time |
| KPI | Key Performance Indicator |
| MBNQA | Malcolm Baldrige National Quality Award |
| NCI | Nigeria Construction Industry |
| OPT | Optimized Production Technology |
| PM | Performance Measurement |
| PMPF | Performance Measurement Process Conceptual Framework |
| PMS | Performance Measurement System |
| PMQ | Performance Measurement Questionnaire |
| TQM | Total Quality Management |
| UK | United Kingdom |
| US | United States |

## GLOSSARY OF TERMS

### PERFORMANCE MEASUREMENT

Performance measurement is defined as an assessment of an organisation's performance including the measures of productivity, effectiveness, quality and timeliness (The Government Accountability Office, 1980)

Performance measurement is defined as the quantification of efficiency and effectiveness of past actions by means of data acquiring, collection, sorting, analysing, interpreting and disseminating (Neely et al., 1998)

Performance measurement is a process of assessing progress towards achieving predetermined goals, including information on efficiency with which resources are transformed into goods and services, the quality of those outputs and outcomes, and the effectiveness of organisational operations in terms of their specific contributions to organisational objectives (Amaratunga et al., 2001)

Performance measurement is the use of multi-dimensional set of performance measures. These set of measures includes both financial and non-measures (Bourne et al., 2003)

Performance measurement is a process which determines how successful organisations or individuals are in achieving their objectives (Kulatunga et al., 2005)
Performance measurement is a process of identifying efficiency and effectiveness by undergoing critical evaluation of all aspects of management such as leadership, planning, human resources, financial and workers (Lattifi et al., 2009)

### PERFORMANCE MEASURE

Performance measure is a metric used to quantify the efficiency and/or effectiveness of an action (Tangen, 2004)

### PERFORMANCE INDICATORS

Performance indicators specify measurable evidence necessary to prove that a planned effort has achieved the desire result (Takim and Akintoye, 2002)

**KEY PERFORMANCE INDICATORS**

KPIs are compilation of data measures used to assess the performance of a construction operation (Cox et al., 2003)

**CRITICAL SUCCESS FACTORS**

CSFs are typically four or five issues fundamental to the achievement of a particular strategic objective (Mbugua et al., 1999)

# CHAPTER ONE

# INTRODUCTION

## 1.1 BACKGROUND TO THE STUDY

The construction industry is a fundamental economic sector that permeates most of the other sectors as it transforms various resources into physical, economic and social infrastructure necessary for socio-economic development (Ministry of Works, 2003). In Nigeria, the industry occupies an important position in the economy and has great potentials of becoming one of the biggest construction markets on the planet yet, it contributes less than other industries (Aibinu and Jagboro, 2002; Construction Overview, 2011). The Nigerian Construction Industry (NCI) is growing fast and has outgrown most sectors of the economy yet, its contribution of only 3.2% to the Gross Domestic Product (GDP) is very low (Dantata, 2008; Construction Overview, 2011).

The performance of the construction industry has considerable impact on the economy (Bon-Gang and Fan, 2010). The industry, globally, has been under tremendous pressure to improve its performance and several calls have been made in this regard (Kulatunga et al., 2005).In Nigeria, the NCI is faced with problems such as construction delays, time and cost overruns, abandonment of projects at various stages of completion, lack of skilled local labour, power shortage, unavailability of materials, corruption, unethical practices and lack of capacity to deliver (Aibinu and Jagboro, 2002; Dantata, 2008; Kolo and Ibrahim, 2010; Ayodele et al., 2011; Oyewobi et al., 2011). The industry suffers the problems of inefficient policies and practices, weak institutions and adverse business environment, alongside complex social and cultural practices (Aniekwu and Audu, 2010). The performance of the industry has been a concern to its stakeholders

who have called for improvement in its performance (Okuwoga, 1998; Aibinu and Jagboro, 2002; Kolo and Ibrahim, 2010).

One of the key areas identified for the improvement of the construction industry's performance is the area of performance measurement (PM) (Latham, 1994; Egan, 1998; Bassioni et al., 2004). According to Mbugua et al (1999), Baldwin et al (2001),Wegelius-Lehtonen (2001) and Martinez (2005), Performance measurement (PM) is vital for continuous and progressive improvement in most businesses and organisations. PM isdefined as 'the quantification of efficiency and effectiveness of past actions by means of data acquiring, collection, sorting, analysing, interpreting and disseminating (Neely et al., 1998).

The call for improvement in the construction industry and interest in PM led to itsadoption by several countries. The UK construction industry adoptedPM in its agenda leading to the implementation of PM by several construction firms (Lattifi et al., 2001; Bassioni et al., 2004).In Nigeria, the Public Procurement Act of 2007 was formulated to improve the performance of the NCI.Performance measurement has evolved through the years (Wilcox and Bourne, 2003). PMin its early phase involved the use of financial measures such as profit, return on investment and productivity (also known as traditional measures) and was heavily criticised for been misleading, difficult, confusing and also hindering continuous improvement (Ghalayini and Noble, 1996). Over the last few decades, there was a paradigm shift since it was apparent that the use of financial measures alone was not enough to manage modern organisations (Wilcox and Bourne 2003; Khan and Shan, 2011). Several frameworks containing non-traditional measures were developed to counter the limitations of the traditional measures. They include European Foundation for Quality Management (EFQM), Balance Scorecard and Performance Prism.

Construction firms within the construction industry benefit a lot from PMpractice when they evaluate their current performance andthen identify strategies to maintain good performance in the future. PMalso helps organisations achieve their goals and objectives, be more competitive and successful (Backinsell, 2001; Bassioni et al., 2004). Although construction firms derive several benefits from measuringtheir performance, PM has not been widely implemented and information on the performance of the construction industry is scarce (Costa et al., 2004). Another setback forPM practice is that most construction firms still depend on traditional measures that focuses on profitability, efficiency and return on capital which has been criticised severally (Kagioglou, 2001; Bassioni et al., 2004).

## 1.2 STATEMENT OF THE PROBLEM

The construction industry has embraced PM due to its contribution in the area of improvement/sustainability of business and continuous improvement (Wegelius-Lehtonen, 2001; Lattifi et al., 2009). A significant number of construction firms especially in the UK are implementing PM and are using the existing PM frameworks (Bassioni et al., 2004). The interests in these frameworks are based on the limitations of traditional approach (financial measures) to performance measurement. However, Costa et al (2004), Yu et al (2007) and Bon-Gang and Fan (2010) reported that performance measurement is not widely practiced in the construction industry and most construction firms still rely on financial measures.

What exists in the NCI is the traditional approach to PM which relies on financial indices typically shown in financial reports of construction companies (See some of these reports in Appendix A). This approach has been condemned severally (Kaplan and Norton, 1992; Ghalayini and Noble, 1996; Amaratunga et al., 2001; Denton, 2005;

Kulatunga et al., 2006, Khan and Shan, 2011) for been misleading, cannot lead to continuous improvement, inflexible, too vague, do not fit new business environment and current competitive realities, they do not show true performance and they use financial measures as the sole criteria for PM. Contemporary approaches to PM requires that non-traditional measures such as customer loyalty, employee satisfaction, stakeholder satisfaction and contribution, strategy, processes and other performance areas that are not financial also affect productivity (Ittner and Larker, 2003) and should be the major consideration in PM. The consideration of these measures was initiated by the improvement paradigm championed in the construction industry (in Nigeria, the Public Procurement Act of 2007).

## 1.3 JUSTIFICATION OF THE STUDY

The practice of PM using the contemporary frameworks leads to continuous improvement and helps organisations survive and achieve their goals and objectives (Baldwin et al., 2001 cited in Kulatunga et al., 2005). The great potentials that the NCI has can be realised if the performance of the industry is improved through the practice of PM since the industry has been criticised for poor performance. When organisations measure their performance, they are able to evaluate their performance, manage human resources and formulate strategy.

Although most construction firms use financial measures (financial reports) to portray their performance (which has been highly criticised), this study will be of benefit in the areaof finding out the PM practice (in terms of implementation of existing frameworks, common measures used, acceptability and implementation of PM) of construction firms in Nigeria. This will indicate that construction firms in the NCI will experience continuous improvement and they are at par with their counterparts globally in terms of

meeting up with global trends and standards in PM. The study will also give an insight into current PM practice among construction firms in Nigeria (since literature is silent on this).

## 1.4 AIM AND OBJECTIVES

### 1.4.1 Aim

The aim of this research is to appraise the performance measurement practice of construction firms in Nigeria.

### 1.4.2 Objectives

The research has the following objectives;

i. To explore the understanding of PM concepts in construction firms
ii. To study the implementationand usage of PMin construction firms.
iii. Toassess challenges associated with PM implementation.

## 1.5 SCOPE AND LIMITATIONS

### 1.5.1 Scope

This study focuses on PM practice of only construction firms within the NCI. The construction firms are small-size and medium-size (Odediran et al., 2012) based in Abuja, the Federal Capital Territory of Nigeria. The results of this study may differ in other states of Nigeria hence;research should be carried out in those states to generalise the research result.

PM practice is wide and this study focuses on some aspects such as implementation of PM in construction firms, usage of existing PM frameworks, adopted PM measures peculiar to the NCI and challenges associated with PM practice.

### 1.5.2 Limitations

One of the limitations of this study is the limited research andlimited literature available on the study area in Nigeria. Another limitation is the availability and willingness of respondents to provide information for the study. These constraints were minimised by the type of data collection tool used. The survey approach (using questionnaire as the data collection tool) was used to collect data from substantial number of respondents.

# CHAPTER TWO

# LITERATURE REVIEW

## 2.1 PERFORMANCE MEASUREMENT

### 2.1.1 TheNeedtoMeasure Performance

Globally, the performance of organisations is significant in order to attract future investment, increase share value, attract higher calibre of employees, sustain competitiveness and for survival (Love and Holt, 2000; Backinsell, 2001;Kagioglou et al., 2001). Construction organisations thrive well when they can evaluate their current performance and then identify strategies to maintain good performance in the future (Backinsell, 2001).

The measurement of Performance is essential and is one of the first stepsthat leads to control and eventually to improvement (Chang and Ibbs, 1998; Tan and Platts, 2004). It is critical to business success and communicates an organisation's performance to potential investors, employees and customers (Kagioglou et al., 2001;Bassioni et al., 2004). When organisations measure their performance, they experience progressive and continuous improvement (Alfredo and Alarcon, 1996; Wegelius-Lehtonen, 2001; Yu et al., 2007).

The need to measure business performance is not new but the field of performance measurement has acquired special interestfrom both the academics and practitioners in the last two decades (Tangen, 2003; Gosselin, 2005; Khan and Shah, 2011). The current interest is based on certain factors confronting businesses such as changing nature of work, increasing global competition, specific improvement initiatives, national and international quality awards, changing organisational roles, changing external demands and the power of IT(Neely, 1999 cited in Lee et al., 2000). This current interest is

alsobased on the general dissatisfaction with traditional performance measurement systems expressed by authors in the late 1970's and 1980's. They felt the traditional measurement systems were backward and also identified other shortcomings thereby arguing for change (Bourne et al., 2000).

### 2.1.2 Evolvementof Performance Measurement

PM has its roots in accounting since the middle ages when traders used it to settle transactions (Khan and Shah, 2011). Its evolvement can be grouped into two phases. The first phase began in the late 1880s and went through the 1980s. After the industrial revolution until the late twentieth century, the traditional or financial PM systems were used. The emphasis here was on financial measures such as profit, return on investment and productivity (Khan and Shah, 2011). During this period, PM received lots of criticism for being restricted to financial measures and also for robust accounting methods used in evaluating the performance of organisations and more specifically their profitability (Metawie and Gilman, 2005).

The second phase began in the late 1980s. By the late 1980s, it was apparent that the use of financial performance measures alone was inappropriate for the management of modern organisations due to changes in the global economy (Wilcox and Bourne, 2003; Khan and Shah, 2011). Due to these changes, companies were losing market shares to their overseas competitors who were able to provide higher quality products with lower costs and more variety and realised that in order to be successful in highly competitive markets; they had to focus on strategy (Khan and Shah, 2011). In order to regain a competitive edge, companies not only shifted their strategic priorities from low-cost production to quality, flexibility, short lead time and dependable delivery, but also implemented new technologies and philosophies of production management such as

computer-integrated manufacturing (CIM), flexible manufacturing systems (FMS), just in time (JIT), optimised production technology (OPT) and total quality management (TQM) (Ghalayini and Noble, 1996).This led to a shift in focus thereby changing the orientation from production to strategy(Khan and Shah, 2011). The implementation of these changes revealed that traditional performance measures have many limitations and the development of new performance measurement systems that was balanced and was derived from strategy is required for success (Ghalayini and Noble, 1996; Khan and Shah, 2011).

The evolvement of PM can be summarised thus (Wilcox and Bourne, 2003):

- 1850-1925: The development of cost and management accounting
- 1974-1992: The development of multi-dimensional PM framework
- 1992-2000: The development of strategy maps, business models or cause and effect diagrams

### 2.1.3 Benefitsof PM to theConstruction Industry

The construction industry is vital for the development of any nation, and in many ways, the pace of economic growth can be measured by the development of physical infrastructures such as buildings, roads and bridges (Takim and Akintoye, 2002).The construction industry's core business is undertaking projects in generating new buildings or refurbishing existing ones for a variety of clients (Kagioglou et al., 2001). The industry comprises of organisations (companies and firms) and individuals working as consultants, main contractors, subcontractors, material and component producers, plant and equipment suppliers, builders and merchants (Ministry of Works, 2003). Within the industry, construction firms are considered as firms that undertake construction of civil or building facilities and sometimes design function (Bassioni et

al., 2004). The role of construction firms within the industry cannot be overemphasised and their structure is a function of performance and output in the industry (Odediran et al., 2012). PM plays a vital role in the construction sector (Lattifi et al., 2001).

PM is of significance to construction businesses in the area of control, accountability and strategy formulation (Crowther, 1996). Several authors have investigated the relevance of performance measurement to construction businesses. Mbugua et al (1999), Bassioni et al (2004) and Lattifi et al (2009) pointed out that PM helps in business success and improvement and to also realise business profitability, maintaining a long term competitive advantageand keeping an organisations on track in achieving their objectives and strategy and in the implementation of strategy (Amaratunga et al., 2001).

PM is seen as a tool for continuous improvement and can also be used as a basis for progressive improvement of company productivity (Mbugua et al., 1999; Wegelius-Lehtonen, 2001; Kulatunga et al., 2006).It is an agent of change that provides links between strategies and actions and plays a vital role in maintaining attention on changing customer requirements and competitor actions (Amaratunga et al., 2001). PM is an important part in strategic management process and serves as business tool used for evaluating management performance, managing human resources, and formulating corporate strategy ((Bassioni et al., 2004; Yu et al., 2007).

PM is beneficial to construction firms in the area of (Ammons, 2007):

i. Setting goals and developing objectives: implementing PM enables an organisation to reassess its work group's program or their goals and objectives.
ii. Taking stock: implementing PM gives an organisation the opportunity to access its capacity to undertake and also point out their weaknesses and setbacks in

terms of skills, knowledge, finances and infrastructure. It enables the organisation to know whether their structures and procedures are working effectively and to its strengths and weaknesses.

iii. Collaborating: implementing PM gives an organisation the opportunity to create working arrangement with its groups, programs, departments, agencies, other organizations, and stakeholders. This collaboration can be a stronger approach to meeting goals.

iv. Assigning accountability: implementing PM gives an organisation the opportunity to evaluate and define the types and levels of contributions that can be made to achieve the organisation's goals and thus define and apportion accountability. It also provides an opportunity to assess more pragmatic accountability issues such as evaluating and defining roles and relationships, levels and lines of authority.

v. Improving work quality: implementing PM gives an organisation the opportunity to assess the quality or effectiveness of work done. It also affords the organisation the opportunity to identify those areas that need improvement and to also have ready access tools that can make it happen. It also gives the organisation the opportunity to track changes in quality and effectiveness over time.

vi. Tracking progress: PM enables an organisation to track its progress over time and to assess and improve on practices, processes, activities and system. In summary, it enables an organisation track their progress towards achieving their goals and meeting their objectives. Conducting PM also gives good information to help identify problem areas needing attention and also reveals areas an organisation is having success.

vii. Reporting out: conducting PM gives information for reporting progress to all stakeholders of an organisation and those working in the organisation.

## 2.2 PERFORMANCE MEASUREMENT FRAMEWORKS

PM cannot be done in isolation and is only relevant with a reference framework against which the efficiency and effectiveness of action can be judged (Bourne et al., 2003). The measurement of an organisation's current and past performance involves the development of frameworks upon which performance measures can be developed and implemented so as to identify the degree to which an organisation is able to implement its strategy (Kagioglou et al., 2001).

Although it is apparent from literature that the terms frameworks, models and systems are often used interchangeably, they are not same but are related (Rouse and Putterill, 2003). In their definition, Rouse and Putterill (2003) combined the three by stating that 'frameworks are useful ways of thinking about systems for modelling purposes. Folan and Browne (2005) referred to the term 'framework' as the active employment of a particular set of recommendations. They built on this definition by stating that PM frameworks assist in the process of building PM system by clarifying performance measurement boundaries, specifying PM dimensions or views and may also provideintuitions into relationships among PM dimensions.

Bassioni et al (2004) described PM framework as a general theoretical framework was developed to act as the basis for the company's PM system. While a PM system refers to the measurement system implemented by a company and consists of individual measures (Bititci, 1995).

When choosing a PM framework, factors such as; purpose for measurement, level of details required and time available for measurement ought to be considered (Amaratunga et al., 2001);

### 2.2.1 Evolvementof PM Frameworks

In the late 1980's and early 1990's, dissatisfaction with the traditional performance systems led to the development of multi-dimensional performance frameworks to encourage a balanced view. These multi-dimensional frameworks provide a balanced view by including measures of external success as well as internal performance, and measures designed to give an early indication of future business performance as well as a record of what has been achieved in the past. The new frameworks placed emphasis on non-financial, external and future looking performance measures unlike the traditional PM framework that was solely based on financial measures (Bourne et al., 2000). This present day PMframeworks encourage a holistic outlook for the evaluation of project efficiency (Tennant and Langford, 2008).

The objective of the modern PM framework is to translate broader management ideals into specific measurement achievements (Vukomanovic et al., 2007).Some of the existing performance frameworks (including their strengths and weaknesses) are outlined below.

### 2.2.2 Traditional PM Framework

The traditional PM framework grew out of accounting (Wilcox and Bourne, 2003) and was based on financial metrics alone (Paranjape et al., 2003). Some of the traditional performance measures are return on investment, profit margin, and cash flow (Amaratunga et al., 2001). Othersinclude; various kinds of cost, labour, productivity,

efficiency, employee turnover, inventory, product reliability, scrap and rework, quality, number of complaints, service call rates, retention rates (Denton, 2005).

Several researches have pointed out the weaknesses of the traditional measures as shown the table below.

**Table 2.1 Criticisms of Traditional PM Framework**

| Author and year | Criticism |
|---|---|
| Kaplan and Norton (1992) | They are out of skills and competencies today's companies need |
| | Can give misleading signals for continuous improvement and innovation |
| Ghalayini and Noble (1996) | Have no incorporated strategy and objectives are minimized to financial measures |
| | Often ignored in practice |
| | Requires extensive amount of data which are difficult to maintain |
| | Are inflexible due to their predetermined format |
| Amaratunga et al (2001) | Failure to measure and monitor multiple dimension of performance |
| | May not fit well with new business environment and current competitive realities |
| | Measures are poorly defined |
| Alarcon et al (2001) | Measures are not appropriate for continuous improvement |
| Backinsell (2001) | Too vague and aggregate in nature |
| | Contains past information that managers have no control over |
| | Are lagging rather than leading indicators of success (or failure)<br>Are partial and historic which often disguise or distort current business realities |
| | Largely ignore customer and competitive perspectives thus, failing to generate early warning signals of changes in the market |
| | Focus on outcomes rather processes |
| | Their contribution to the achievement of strategic goals cannot be evaluated |
| Denton (2005) | Do not help in solving problems and add little value in day-to-day decision making |
| | Measures do not show correct performance |
| Kulatunga et al (2006) | The use of only financial measures is a major drawback |
| Tenant and Langford (2007) | Commenting on previous performance without predicting future achievements |
| Khan and Shah (2011) | They are historic in nature and ignore organisation's strategy<br>They are mainly financial measures<br>Have a fixed format<br>Do not change over time<br>Intended mainly for monitoring performance<br>Not applicable for JIT, TQM, CIM, FMS, RPR, OPT, etc.<br>Hinders continuous improvement |

In order to overcome these shortcomings, a number of other frameworks have been developed. In the past decade, several frameworks that do not only consider the financial aspect of organisations, but also the non-financial aspects have been developed (Kulatunga et al., 2006).

### 2.2.3 Performance Measurement Matrix

The PM matrix was developed by Keegan et al (1989) toaddress the weaknesses of the traditional PM framework by including non-financial aspect of organisation's development such as; cost, non-cost, external and internal factors (Kulatunga et al., 2006). In essence, the PM matrix proposes a balance between the internal and external measures and between the financial and non-financial measures (Bourne et al., 2000).

The strength of the PM matrix lies in the way it seeks to integrate the different classes of business performance – financial and non-financial, internal and external (Neely et al., 2000).

One of the shortcomings of the PM matrix is that the link between the costs, non-cost, external and internal factors are not explicitly described (Kulatunga et al., 2006; Neely et al., 2000). And it is not well packaged like the balanced scorecard (Neely et al., 2002).

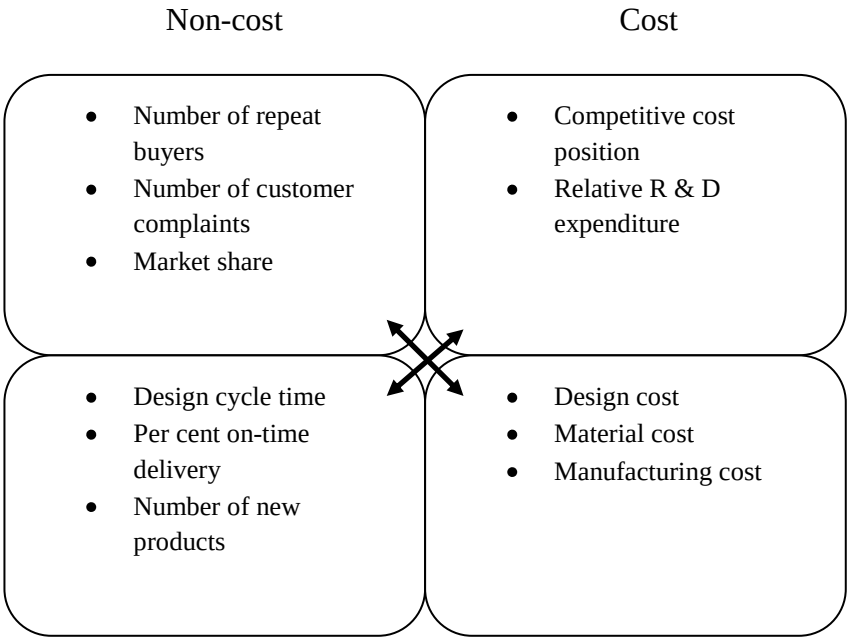



Figure 2.1: The Performance Matrix

Source: Neely et al (2000)

### 2.2.4 Performance Measurement Questionnaire (PMQ)

The PMQ was developed by Dixon et al in 1990 to help managers identify the improvement needs of their organisation, determine the extent to which the existing performance measures support improvements and to establish an agenda for PM improvements. It consist of four parts; the first part provides general data to be used to clarify the respondents while second part assesses the company's competitive priorities and PM system and consist of items named as ''improvement area''. The third part is similar to the second part but focuses on performance measures while the final part asks the respondents to provide performance measures that best evaluate their own performance and any other general comments (Ghalayini and Noble, 1996).

Ghalayini and Noble (1996) highlighted some of the strengths of the PMQ as:

- Provides a mechanism to identify the improvement area of the company and their associated performance measures.
- Tries to determine the extent to which the existing measurement system supports improvement areas.

They also highlighted some of the weaknesses of the PMQ as:

- It cannot be considered as a comprehensive integrated measurement system.
- More work is required to link these areas of improvement and performance measures to the factory shop floor.
- It does not take into account the concept of continuous improvement.

### 2.2.5 Resultand Determinant Matrix

The result and determinant matrix framework was developed by Fitzgerald et al (1991) after a study in the service industry (Kulatunga et al., 2000; Khan and Shah, 2011). The framework classifies measures into two basic categories; results (measures that are outcome of certain actions for example, competitiveness, financial performance) and determinants (measures that measure actions that lead to certain outcomes for example, quality, flexibility, resource, utilisation and innovation) (Neely et al., 2000; Khan and Shah, 2011).

The result and determinant matrix highlights the fact that the result obtained are a function of past business performance with regard to specific determinants (Neely et al., 2000). It also creates a link between present business performances as reflected by results of the past as measured by the determinants. This helps in identifying the performance drivers of future desired success (Khan and Shah, 2011).

**Table 2.2 The Result and determinant Matrix (Fitzgerald et al., 1991)**

| Result and determinant framework | |
|---|---|
| **Dimensions of performance** | |
| **Results**<br>Financial performance | Competitiveness |
| **Determinants**<br>Flexibility<br>Resource utilization | Equality<br><br>Innovation |

| **Dimensions of Performance** | **Measures** |
|---|---|
| **Competitiveness**<br>Sales growth | Relative market shares |
| **Financial performance**<br>Liquidity<br>Capital structure | Profitability |
| **Quality**<br>Courtesy<br>Availability | Reliability |
| **Flexibility**<br>Delivery speed<br>Specification | Volume |
| **Resource utilization**<br>Efficiency | Productivity |
| **Innovation** | Performance of the innovation process |

### 2.2.6 Balance Scorecard (BSC)

The BSC was developed by Kaplan and Norton in 1992 and is the most popular performance measurement framework (Kulatunga et al., 2006; Khan and Shah, 2011). It is a widely used management framework for the measurement of organisational performance and has a conceptual framework for translating an organisation's vision into a set of performance indicators distributed among four perspectives; financial, customer, internal business and processes, learning and growth (Amaratunga et al., 2001; Kulatunga et al., 2006). It supplements the conservative financial viewpoint with the three thinking perspectives that is, customer perspective, internal business perspective and innovation and learning perspective (Tennant and Langford, 2007). The financial and customer perspectives are intended reflect the needs of the stakeholders

and target groups and includes measures such as sales, profitability, market shares and customer satisfaction. The internal business perspective focuses on internal operations important for customer satisfaction and efficiency-measures include cycle time, yield rate and unit cost data. The innovation and learning reflects the ability of the organisation to continue to improve and create value for its customers and stakeholders. The four perspectives of the balanced scorecard answer the following four questions:

i. How do we look to our shareholders? (financial perspective)
ii. What must we excel at? (internal business perspective)
iii. How do our customers see us? (customer perspective)
iv. How can we continue to improve and create value? (innovation and learning perspective

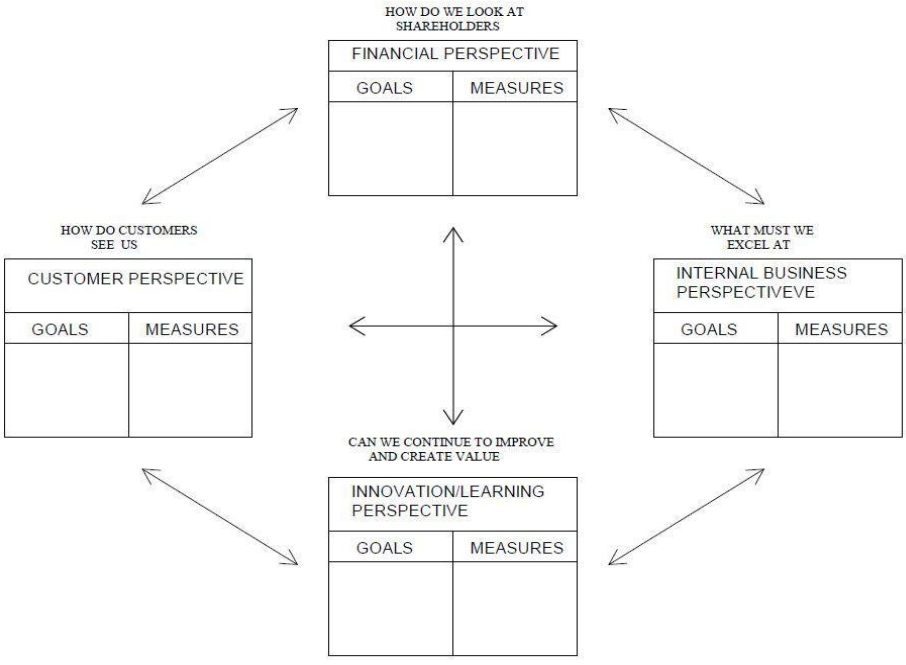



Figure 2.2: The Balance Scorecard

Source: Kaplan and Norton (1992)

Some of the advantages of the balanced scorecard are listed in the table below:

**Table 2.3 Advantages of Balanced Scorecard**

| Author and year | Advantages |
|---|---|
| Kaplan and Norton (1992) | Minimises information overload by limiting numbers of measures used |
| Ghalayini and Noble (1996) | Attempts to four important performance perspectives into one simple and easy-to-use management report |
| Kagioglou et al(2001) | It includes a range of leading and lagging indicators |
| Kulatunga et al (2006) | It represents a single document with series of indicators that gives a complete view |
| | The document is concise and connected to organisation's information system |
| | Indicators tracked by BSC are linked the organisation's vision or ultimate vision |
| | It links PM with organisational strategy |
| | Measures in BSC are balanced |
| Vukomanovic et al (2007) | It favors a clear focus on strategy |
| | It has a wide acceptance in organisations |
| | It could be used as a starting point for setting project/programme objectives |
| Khan and Shah (2011) | It allows organisations to align their business performance with their strategy |

Although the BSC is widely used, several researches pointed out some shortcomings of the BSC as summarised in the table below.

**Table 2.4 Shortcomings of Balanced Scorecard**

| Author and year | Shortcomings |
|---|---|
| Ghalayini and Noble (1996) | It is primarily prepared for senior managers to provide them with an overall view of performance |
| Neely and Bourne (2000) | The four perspectives are insufficient |
| Neely et al (2000) | Provides little guidance on how appropriate measures can be identified, introduced and ultimately used to manage business |
| Kagioglou et al (2001) | Does not attempt to identify the relationship the relationship between measures<br>For large number of organisations in the construction industry, the 'projective perspective' and 'supplier perspective' are divergent |

### 2.2.7 Performance Pyramid

The performance pyramid was developed by Lynch and Cross in 1991 (Neely et al., 2000). It is a four level pyramid that links the corporate strategy with the operations through hierarchy by translating objectives from the top and measures from the bottom (Bourne et al., 2000; Khan and Shah, 2011). At the top of the pyramid is the company's strategy translated into business unit objectives. At the second level is the business level objective which is defined in terms of short term financial performance goals and long term market position and growth goals. At the third level, the business unit goals are linked to day-to-day operations of the business in term of customer satisfaction, flexibility and productivity. While at the lowest level, department and work center operational criteria (quality, delivery, process time and cost) are used; which helps the company to successfully implement its strategy (Khan and Shah, 2011).

The strengths of this framework are:

- It ties together the hierarchical view of business PM between measures that are of interest to external parties (Neely et al., 2000).
- It attempts to integrate corporate objectives with operational performance indicators (Ghalayini and Noble, 1996).

Some of the weaknesses of the performance pyramid are;

- It does not provide any mechanism to identify key performance indicators for quality, cycle time, cost and delivery (Ghalayini and Noble, 1996).
- It does not explicitly integrate the concept of continuous improvement (Ghalayini and Noble, 1996 cited in Metawie and Gilman, 2005).

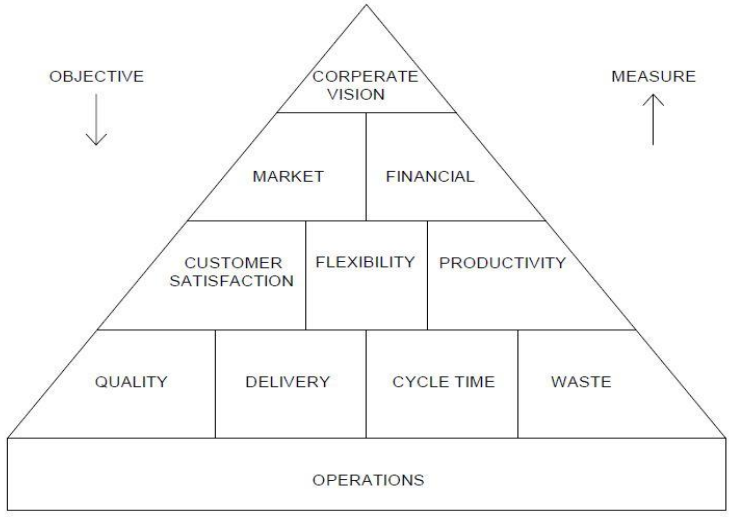



Figure 2.3: The Performance Pyramid

Source: Neely et al (2000)

### 2.2.8 European Foundationfor Quality Management Model (EFQM)

The first EFQM model was created in 1988 and was launched in 1991 by fourteen leading European companies with the objective of promoting corporate excellence as a response to the increasing competitive pressure of global market place (Tennant and Langford, 2007).The EFQM was developed on the basis of two distinctive subsets of performance; determinants (enablers) and result indicators (Neely et al., 2000; Kulatunga et al., 2006). The model consist of five 'enablers' or criteria with which an organisation can manipulate and four 'results' or what an organisation will achieve. The enabler criteria are the levers that management can pull to deliver future result and are also concerned with how the organisation undertakes key activities (Neely et al., 2000; Kulatunga et al., 2006). The results criteria are concerned with what results will be achieved as shown in the table below (Kulatunga et al., 2006).

**Table 2.5 Enablers and Results of EFQM**

| Enablers | Results |
|---|---|
| Leadership | People results |
| People management | Society results |
| Policy and strategy | Customer results |
| Partnership and resources | Key performance results |
| processes | |

Source**:** Tenant and Langford (2007)

The model is based on eight fundamental concept of sustainable excellence (Tennant and Langford, 2007). These are: result orientation, customer focus, leadership and constancy of purpose, management process and facts, people development and involvement, continuous learning, innovation and improvement, partnership development and corporate social responsibility.

One of the strength of the EFQM model is that, it is widely used to carry out quality management and the self-assessment of organisations (Kulatunga et al., 2006). While one of the weaknesses of the EFQM framework is that it is difficult to be put into operation (Neely et al., 2000).

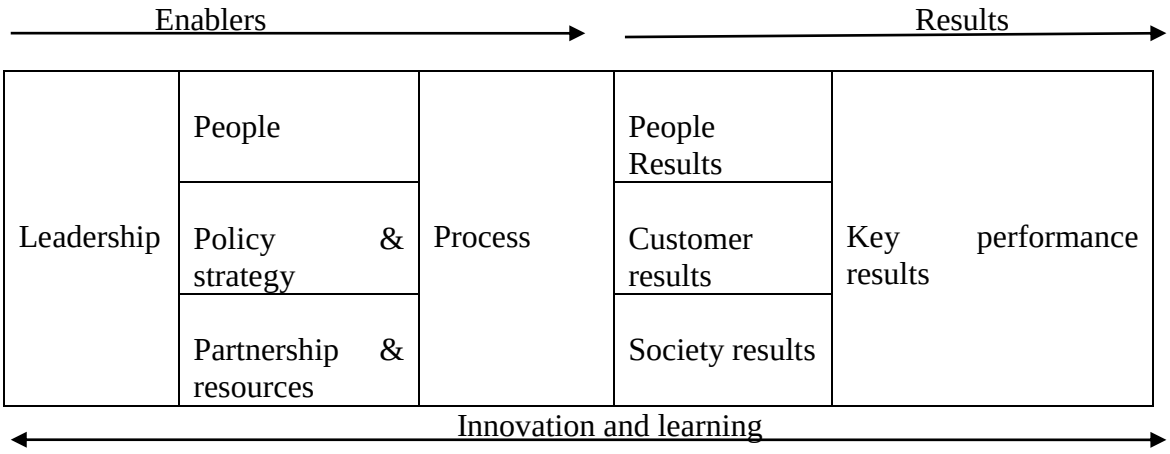



Figure 2.4: The Business Excellence framework
Source: Neely et al (2000)

### 2.2.9 Performance Prism

Performance prism was developed by Adams and Neely in 2000 and is a thinking aid that seeks to integrate five related perspective and provide a structure that allows executives to think through the answers to five fundamental questions. It is structured to throw light on the complexity of an organisation's relationship with its multiple stakeholders within the context of its particular operating environment (Neely et al., 2002). The authors while presenting the framework rejected the widespread believe that the performance measure should be derived from strategy and also suggested that even as designing PM system, stakeholders should be taken into consideration before company's strategy (Khan and Shah, 2011).

Performance prism consists of five interrelated facets or perspectives and each represents a key that determines success (Adams and Neely, 2000). They are:

i. Stakeholder satisfaction: Who are our key stakeholders and what do they want and need?
ii. Stakeholder contribution: What do we need and want from our stakeholders in a reciprocal way?
iii. Strategy: What strategies do we have to place in order to satisfy our stakeholders while satisfying our needs?
iv. Process: What processes do we need to put in place to enable us execute our strategies?
v. Capabilities: What capabilities do we need to put in place to allow us operate our process?

Some of the advantages of the performance prism are highlighted by Kulatunga et al (2006) thus:

- In most PM framework, the measures are derived from the strategy; but in the performance prism, it is the other way round.
- Strategy, process and capability aspects are considered.
- Identifies the reciprocal relationship between the stakeholders and the organisation.
- It focuses on stakeholders' contribution and satisfaction.

However, Metawie and Gilman (2005) pointed out that an appropriate guidance for selection of measures lacking in the performance prism.




Figure 2.5: The five facets of Performance Prism

Source: Adams and Neely (2000)

### 2.2.10 Performance Measurement Process Conceptual Framework(PMPF)

The PMPF was developed by Kagioglou et al (2001).It adopts the balanced scorecard with addition of a number of perspectives; that is, the 'project' and 'suppliers' which can be considered specific for the construction industry. The PMPF illustrates and rationalizes the relationship of the measures used to measure the goals identified by strategy so as to provide indicators for effective project management (Kagioglou et al., 2001).

The PMPF is based on a principle that can be considered generic and hence can be adapted by any organisation or industry. Another advantage of the PMPF is that, it can form the basis for effective performance management/measurement for organisations (Kagioglou et al., 2001).

The limitation of the PMPF is that it lacks validation from extensive empirical evidence (Kagioglou et al., 2001).

## 2.3 CHALLENGES TO EXISTING PM FRAMEWORKS

Kennerly and Neely (2002) from their research observed the following as challenges associated with existing PM frameworks.

i. Willingness of organisations to replace their traditional PM systems with contemporary ones that reflects their current objectives and environment.
ii. Ineffective management of contemporary PM systems whereby, organisations implement new measures to reflect new priorities but fail to discard measures reflecting old priorities resulting in uncorrelated and inconsistent measures.
iii. Failure to effectively manage PM systems.

iv. The support for these frameworks can diminish over time (loss of initial enthusiasm).

v. PM systems failing to change as organisations change.

vi. Organisation's readiness for change.

Four major factors were also identified by Kennerly and Neely (2002) that is affecting the evolvement of PM systems. They are:

- Process- lack of existence of a process for reviewing, modifying and deploying measures.
- People- the availability of the required skills to use, reflect on and modify measures.
- Systems- the availability of flexible systems that enable the collection, analysis and reporting of appropriate data.
- Culture- the existence of a measurement culture within the organisation ensuring that the value of measurement, and importance of maintaining relevant and appropriate measures, appreciated.

  Other challenges lie in the four fundamental processes of PM- PM system design (choosing the right measures), implementations, managing through measurement and 'refreshing' the measurement system (Neely and Powell, 2004).

## 2.4 SYSTEMS APPROACH TO PERFORMANCE MEASUREMENT

### 2.4.1 Organisation's Performance Measurement System

The process of defining an organisation's PM system consist of five stages; define the overall framework, identify the relevant CSFs, select the key performance measures,

integrate CSFs and measures with organisation'sstrategy and lastly, define the continuous improvement and review system (Mbugua et al., 1999).

i. **Definingoverall framework**

This stage has to do with clearly establishing the business objectives of the company. It is necessary to analyse a business and its outcome in a systematic way to allow performance measures to be identified. Once these strategic issues are developed, relevant critical success factors (CSFs) should be identified.

ii. **Identifyingrelevant critical success factors**

Within each core category, there will be a number of sub-categories and CSFs relevant to each identified factor and related to the sub-categories, hence providing an overall framework that can help define the relevant measures.

iii. **Selecting Key Performance Measures**

The next step is for the managers and project/process teams to identify those measures that show achievement of the business goals and strategies. This can be accomplished through: compiling a list of measures covering all aspects of the organization's performance, filtering the list of measures to filter out inappropriate items and checking for completeness and appropriateness by asking several questions relating to the measures.

iv. **Integration of CSFsand measureswith business strategy**

The selected list of key performance measure should be integrated with the CSFs and aligned with corporate strategy and business processes, deleting/creating additional categories of factors as required. Where some measures have greater significance than others, it should be by distributing or

ranking them with relative weighting. It is important to define required information and method of presentation.

**v. Define the continuous improvementand review system**

The purpose for this final phase is to establish a discipline for regular performance review and feedback, based on which specific improvement can be achieved at functional levels and contribute to the business or strategic objectives. Installing this discipline enables the integrated CSFs and measures provide a useful means of ensuring PM is an on-going, evolving process.

### 2.4.2 Selectionof Performance Measurement System (PMS)

Since companies derive their PM systems from existing framework, Tangen (2004) outlined qualities a PMS ought to have.

**i. Support strategic objectives**

A PMS should be derived from the company's strategic objectives. It is also of important to remember that strategies usually change overtime, and when strategies changes, some performance measures must change too. Hence, there is a need for flexibility in the PMS by providing mechanism that ensures that the PMS is coherent at all times with the objectives of the company.

**ii. Have an appropriate balance**

It is vital that performance is not seen solely from a financial point of view. A PMS should consist of performance measures covering all important aspects agreed as representing the success of the company. And there should be a balance between the various performance measures in the PMS.

The PMS should be appropriately focused on short and long-term results, different types of performances (such as cost, quality, delivery, flexibility and dependability), various perspectives (such as the customer, the shareholder, the competitor, the internal and the innovativeness perspective), and various organisational levels (such as global and local performance).

**iii. Guard against sub-optimisation**

The performance measures by which employees are evaluated greatly impacts on their behaviour and an improper set of measurement can lead to dysfunctional behaviour (Fry, 1995). Therefore a PMS must guard against sub-optimisation by establishing a clear link from the top of the company all the way to the bottom, to ensure that employee behaviour is consistent with corporate goals.

**iv. Have a limited number of measures**

In order to create appropriate action, it is necessary to use a limited number of performance measures (Jackson, 2000). This is because more measures demand more analysis time and also increases the risk of information overload.

**v. Be easily accessible**

A PMS's main goal is to give important information at the right time, to the right person. Hence, PMS must be designed in such a way that information can be easily retrieved, usefully presented and easily understood by those whose performance is been evaluated.

**vi. Consist of performance measures with comprehensive specification**

A performance measure should have a clear purpose and be defined in an unambiguous way along with details of who will use the measure. Also target

should be specified for each performance measure and a time frame within that target that should be reached.

## 2.5 ADOPTION IN WORK PLACES

Awareness of PM within the construction industry is notably increasing as the business world undergoes the phenomenon of globalisation (Lattifi et al., 2009). Over the years, there has been considerable investment of resources by organisations to implement measures that reflects all dimension of their performance. Several of these organisations have embarked on projects to design and implement better performance measures. In essence, the PM revolution has prompted many organisations to implement PM systems (Kennerly and Neely, 2002).

There have been several responses to the adoption of PM within the construction industry globally. The UK construction industry especially, formally adopted PM in its agenda (Lattifi et al., 2009). They adopted and implemented KPIs program peculiar to them and also set up a benchmark for performance (Yu et al., 2007). A significant number of construction firms have implemented PM frameworks within the last decade (Bassioni et al., 2004). Countries like US, Denmark, Turkey, Brazil and Chile have implemented several performance strategies to improve their respective construction industry (Costa et al., 2006 cited in Bon-Gang and Fan, 2010).

However, Kagioglou (2001); Bassioni et al (2004), Tangen (2004) reported that even though remarkable progress has been made in the field of PM frameworks and systems, many companies still rely on the traditional financial performance measures such as profitability, efficiency and return on capital.

## 2.6 THEORETICAL FRAMEWORK FOR PM PRACTICE

This theoretical framework provides the basis for the appraisal of performance measurement practice of construction firms in Abuja and was identified from literature. The study will be based on this framework and is shown in the figure below.

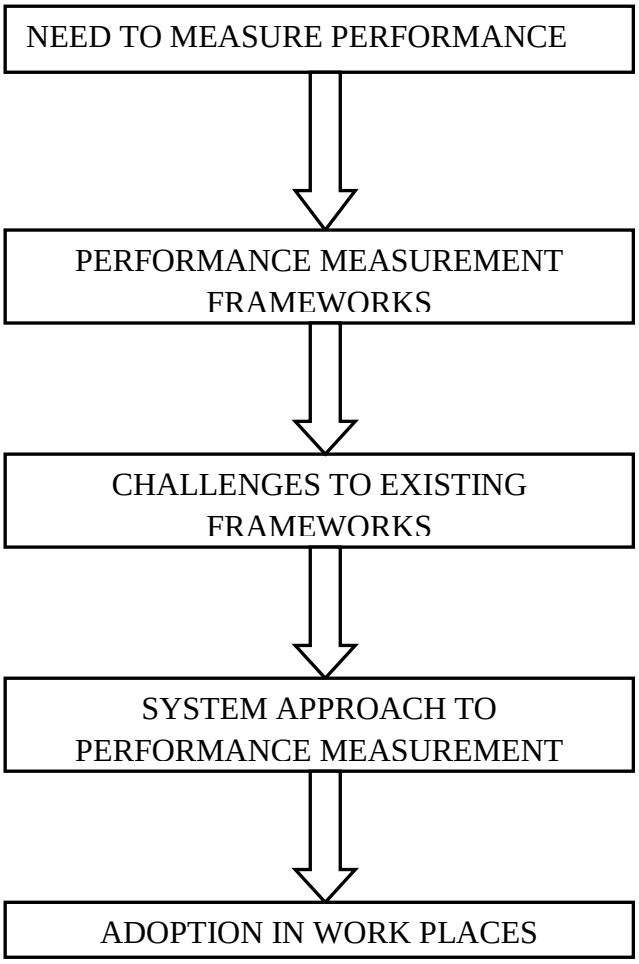



Figure 2.6: Theoretical Framework for the Study

# CHAPTER THREE

# RESEARCH METHODOLOGY

## 3.1 RESEARCH DESIGN

The two approaches to research are; the qualitative approach and the quantitative approach. The quantitative approach using questionnaire survey was used for this study to allow for respondent's convenience and high response rate on PM practice in construction companies.

In order to achieve each of the research objectives, the research method used is explained accordingly as shown below.

Objective one: to explore the understanding of PM concepts in construction firms.This objective was realised by reviewing relevant literature to get information on PM concepts such as PM frameworks, performance measures, and so on. The questionnaire survey covered this aspect as it relates to Nigeria.

Objective two and three: to study the implementation and usage of PM and its tools in construction firms andto assess challenges associated with PM implementation.

These objectives were achieved through the use of questionnaire survey to obtain information from respondents.

## 3.2 DATA COLLECTION INSTRUMENT

There are two approaches to data collection; fieldwork and desk study. The fieldwork approach is classified into three; survey, case study and problem-solving (Fellows and Liu, 1997). Whichever approach adopted for conducting a research depends on the nature of investigation and the type of information required/available (Naoum, 2001).

The survey approach was adopted for this study since it has the advantage of being used to obtain information from large sample of the population (Glasow, 2005). Gathering data on PM practice of construction companies from many respondents will shed more light on PM practice in Nigeria.

### 3.2.1 Survey Design

The Survey approach is made up of asking questions from a representative cross-section of the population (National Open University, 2006). It also entails collecting information in an organised manner about characteristics of interest from some or all units of a population using well-defined concepts, method and procedures. The sample survey usually, entails collecting information from only a fraction (typically a very small fraction)of units of a population (Statistics Canada, 2010).

In order to achieve the research aim of this study, data on the PM practice of significant number of construction companies in Abuja was collected; since previous studies have shown that little is known about the PM practice of the NCI.

## 3.3 DATA COLLECTION TECHNIQUE

The questionnaire survey was the data collection tool used for this research. A questionnaire is a group or sequence of questions designed to obtain information on a subject from a respondent (Statistics Canada, 2010). It is the most widely used and most suitable data collection technique for conducting surveys (Naoum, 2001). Even though questionnaires can be very detailed, covering many subjects or issues, they can also be very simple and focus on one important area. They provide cheap and effective way of collecting data in a structured and manageable form (Wilkinson and Birmingham, 2003).

Questionnaires comprises of several approaches to asking questions; the open-ended questions or unrestricted type, multi-choice or ranking questions, and the closed questions or restricted type (Fellows and Liu, 1997; Naoum, 2001;Wilkinson and Birmingham, 2003). Open ended questions seek to encourage the respondent to provide free response, answer in full, to reply in whatever form, with whatever content and to whatever extent the respondent wishes. Open ended questions impose none of the restrictions of closed and multi-choice questions. Multi-choice questions include questions which provide a number of predefined responses and allow the researcher to hold some control over the responses given. The closed question have a number of responses as determined by the researcher and often requires short response in the form of Yes or No, Agree or Disagree, Important or Not Important, etc. (Fellows and Liu, 1997; Naoum, 2001).

Statistics Canada (2010) outlined some basic methods used in data collection. The two major methods are; self-enumeration and the interviewer-assisted (either through personal or telephone interviews) methods. Others include direct observation, electronic data reporting and the use of administrative data. The self-enumeration method entails the respondent completing the questionnaire without the assistant of an interviewer. Self-enumeration is easy to administer and cheaper than interviewer-assisted methods. It is also useful for sensitive issues since the questionnaire can be completed in private and without an interviewer. However, some of the disadvantages of the self-enumeration is that it requires knowledgeable or well-educated respondents. Also, response rates are usually lower than for interviewer-assisted methods (Statistics Canada, 2010).

This study adopted the questionnaire technique using the self-enumeration method for data collection.The delivery of the questionnaire was personal delivery. The questionnaires were delivered to the various construction companies' addresses and

later picked up after they were completed (Statistics Canada, 2010). The three questioning techniques were adopted in order to gather information that will be useful towards achieving the research aim and objectives.

### 3.3.1 Questionnaire Construction

Naoum (2007) identified three fundamental stages in the construction of questionnaire:

1. Identifying the first thought questions
2. Formulating the final questionnaire.
3. Wording of questions

**Stage 1: Identifying the first thought questions**

This stage comprises of going back to the proposal and literature review so as to formulate 'first thought' list of questions. The order and wording of questions was not crucial at this stage rather, it was all about writing all possible questions relating to the PM practice of the construction firms within the NCI so as to achieve the research aim. This stage helped in the formulation of the final questionnaire.

**Stage 2: Formulating the final questionnaire**

After identifying the first thought questions, several numbers of sections and categories for the questionnaire were introduced in line with the research objectives. Finally, the final questionnaire was constructed.

**Stage 3: Wording of questions**

After deciding on what to ask, the questions were then carefully worded and were short but comprehensive. Furthermore, double question, presumptuous, ambiguous and hypothetical questions was avoided. The questions were then rechecked by the researcher.

### 3.3.2 Structure of the Questionnaire

The questionnaire was divided into three main sections for easy analysis and reporting. The first section was about the general information of the respondents. The general questions were meant to give information on individuals responsible in the measurement of a construction firm's performance. The second section covered generally questions relating to organisations' need to measure performance, company's policy on PM and reasons for measuring performance. The third section covered questions relating to PM practice and challenges to PM practice.

Some of the questions in the study questionnaire were in form of checklist format giving room to respondents to tick as it applies to their firm. Some of the questions require the respondents to tick 'yes' or 'no'.

Upon constructing the questionnaire, a cover letter was then written to accompany the questionnaire. The purpose of the cover letter is to explain the purpose of the questionnaire so as to allow for a high response rate (Naoum, 2007).Once developed and the cover letter was drafted, the questionnaire was ready for testing.

### 3.3.3 Piloting the Questionnaire

It is advisable to complete a pilot study whenever a questionnaire is constructed before the collection of data from the entire sample. This provides an avenue for testing the wording of the questions, identifying and rectifying ambiguous questions, testing the technique used to collect data and also provides an indication of the response rate that can be expected (Eiselen et al., 2005; Naoum, 2007).

The survey sample used was drawn primarily from Abuja business directory online. A total of 4 organisations were sent the questionnaire to complete; out of the

4questionnaires sent, 3 were returned representing a 75% of response rate. The questionnaires returned were analysed and it was found that the questions were not ambiguous and there was no need to revise the questions. The average time taken to complete a questionnaire was 15 minutes.

### 3.3.4 Sampling

The population for this study is construction firms (mainly small-size and medium-size as outlined by Odediran et al., 2010) in Abuja, the Federal Capital Territory of Nigeria. Abuja was selected due to the on-going development and unprecedented growth that has led to massive construction work and influx of people from all over Nigeria and the entire world in the last 36 years (Jubril and Garba, 2012). The sample used for the survey was drawn randomly from the list of registered construction firms in Abuja. A total of 50 construction firms were selected for the study through the simple random sampling method.

### 3.3.5 Administration of the Questionnaire

A total of 50 questionnaires with cover letters were administered at the selected construction firms' offices in Abuja. The respondents were followed up through calls and visits to their offices to hasten completion of questionnaires and collection.

## 3.4 QUESTIONNAIRE RATE OF RESPONSE

A total of 50 questionnaires were administered to construction firms and 23 construction firms completed the survey. The 23 completed questionnaire survey represents a response rate of 46%. The response rate of 46% is acceptable and is a little above what is obtainable based on the opinions of Chinyio et al (1999); Akintoye (2000); Dulami et al (2003) and Takim et al (2004). They all reported that in the

construction industry, the response rate of 20-30% is what is usually obtainable for questionnaire survey (Akadiri, 2011). The table below summarises this questionnaires issued and the responses got.

**Table 3.1 Questionnaire rate of response**

| Respondents | Questionnaires issued | Number of Responses | % Response |
|---|---|---|---|
| Construction firms | 50 | 23 | 46% |

## 3.5 RECORDING THE DATA

Recording the data obtained is an important step in research process. Before the researcher starts any form of analysis, there is the need to devise a data summary sheet for the data. The process of transferring the data from the questionnaire or data collection form (after the data have been collected) into a data summary form is called 'the recording scheme' or 'production coding' (Naoum, 2007). After recording the data, the field of statistics was then be applied to the raw data so that some interpretation and discussion can be made on the result.

The data summary sheet for this research can be found in Appendix C.

### 3.5.1 Coding forAnalysis

Since the questionnaire combined closed-ended questions, open-ended questions with multi-choice questions, the data were analysed according to question type. Naoum (2007) and Statistics Canada (2010) suggested that best way to analyse open-ended question is to code the information in terms of ideas and themes. The purpose of coding such questions is to reduce large number of individual responses to a few categories of

answers that can be assigned a numerical code. The following steps are to be follow when analysing open-ended questions;

i. Place all similar answers in a general category and assign them a code.
ii. After establishing the general categories, divide them into 2-4 sub-categories and assign them a code.
iii. After establishing the coding, choose the method of analysis suitable for the data.

The close-ended questions and multi-choice questions were also coded to allow for easy analysis (see Appendix D for all the coding).

## 3.6 METHOD OF DATA ANAYLYSIS

Upon collecting data, the next phase is the analysis of the data so as to determine the direction of the study. Data analysis involves summarising data collected and interpreting their meaning in a way that provides clear answers to the questions that initiated the survey. It oftentimes consists of examining tables, charts, and various summary measures, such as frequency distributions and averages, means and ranges, and more sophisticated analyses may be performed (Statistics Canada, 2010). The descriptive statistics method was used to analyse the data using tables to present the results. The descriptive statistics method is the simplest method of analysis that provides a general overview of the results and also gives an idea of what is happening. The descriptive statistics method analyses surveyin percentages, actual numbers (totals), averages and proportions and are classified into frequency distribution, measurement of central tendency and measurement of dispersion (Naoum, 2007; Statistics Canada, 2010).The frequency distribution can be presented using graphs and charts (such as pie

chart, column chart, bar chart, line chart, and box plot). The data were analysed in percentages and actual numbers and were then presented in tabulation and charts.

# CHAPTER FOUR

# DATA ANALYSIS, PRESENTATION AND DISCUSSION

## 4.1 NATURE OF RESPONDENTS

Questionnaires were administered with clear instructions that those involved in PM of each firm should be the ones to respond to the questions outlined in the questionnaire. Out of the twenty three (23) respondents, four (4) are Quantity Surveyors, six (6) are Engineers, two (2) are Builders, one (1) is an Architect, one (1) a lawyer, two (2) are accountant/Economists, two (2) are technician/Supervisor, while five (5) respondents did not give their details only their years of experience (see Appendix E)

## 4.2 DATA ANALYSIS

In analysing the data collected from respondents using the descriptive statistics method, data on PM practices of construction firms were analysed in percentage and actual numbers based on the similarities and number of responses to each question and presented in tabulation format.

### 4.2.1 Construction Firms' interest in Performance

Table 4.1 shows number of construction firms that measure their performance and those that do not. 22 construction firms representing 96% responded that they are interested in measuring their performance; while 1 construction firm representing 4% responded that they are not interested in measuring their performance. When further probed, the respondent responded by saying 'the organisation is only interested in profit and nothing else'. Profit (a financial measure) is a performance measure; meaning, that organisation relies on only financial measure.

**Table 4.1 Construction firms' interest in measuring performance**

| | Respondents Yes | Respondents No |
|---|---|---|
| Interest in evaluating company's performance | 22 (96%) | 1 (4%) |

The construction firms further responded that they are interested in measuring performance due to various reasons as shown in Table 4.2. Responses show that construction firms measure their performance due to two major factors; to improve future performance (26.6%) and to sustain competitiveness (20.3%) as shown in Table 4.2 below.

**Table 4.2 Reasons for organisations' interest in performance**

| Reasons for interest in performance | Frequency | Percentage |
|---|---|---|
| In order to survive | 7 | 10.9% |
| Improved future performance | 17 | 26.6% |
| Attract future investment | 8 | 12.5% |
| Increase share value | 8 | 12.5% |
| Attract higher calibre of employees | 3 | 4.7% |
| Sustain competitiveness | 13 | 20.3% |
| Survive in national and international markets | 8 | 12.5% |

### 4.2.2 Performance measurement practice

Table 4.3 shows that 91% of construction firms do measure their performance while 9% responded that they do not measure their performance. However, out of the two organisations that do not measure their performance; one said the organisation is only interested in profit. It is possible that those firms who responded 'no' do measure their performance (since profit is a performance measure) but rely mainly on financial measures such as profit, quality and specification.

**Table 4.3 Measurement of performance**

| | Respondents Yes | Respondents No |
|---|---|---|
| Construction firms that measure or evaluate their performance | 21(91%) | 2 (9%) |

When construction firms were asked if their organisation have performance measurement in their policy or mission statements, 78% of respondents say they do even though this cannot be proven by this researcher based on the research instrument used. This is shown in Table 4.4 below.

**Table 4.4 Performance measurement in company's policy or mission statement**

| | Respondents Yes | Respondents No |
|---|---|---|
| Construction firms that have PM in their policy or Mission Statement | 18(78%) | 5 (22%) |

Globally, several factors led the construction industry to begin to measure its performance. In this research, one of the major factor that led construction companies to measuring their performance is 'increasing global competition' (31.25%) as shown in Table 4.5. Other notable ones are; changing nature of work (18.75%) and power of information technology (18.75%).

**Table 4.5 Factors responsible for measuring performance**

| Factors | Frequency | Percentages | Rank |
|---|---|---|---|
| Changing nature of work | 9 | 18.75% | 1 |
| Increasing global competition | 15 | 31.25% | 2 |
| Changing organisational roles | 8 | 16.67% | 3 |
| Changing external demands | 7 | 14.58% | 4 |
| Power of Information Technology | 9 | 18.75% | 1 |

### 4.2.3 Performance Measures and adoption

Several researchers have identified performance measures and have been adopted by several construction industries. In this research, construction firms responded that they adopted performance measures such as quality (13.24%), turnover (11.03%), delivery (11.03%), profit margin (7.35%), cash flow (7.35%) and very few non-financial measures like client satisfaction (10.29%). The result is summarised in Table 4.6 below.

**Table 4.6 Performance measures used by construction companies**

| Performance measures | Frequency | Percentages | Rank |
|---|---|---|---|
| Quality | 18 | 13.24% | 1 |
| Cash flow | 10 | 7.35% | 4 |
| Employee satisfaction | 7 | 5.15% | 6 |
| Specification | 7 | 5.15% | 6 |
| Leadership | 3 | 2.21% | 8 |
| Capabilities (Technology, Infrastructure) | 4 | 2.94% | 7 |
| Cost | 9 | 6.62% | 5 |
| Turnover | 15 | 11.03% | 2 |
| Market share | 4 | 2.94% | 7 |
| Innovation | 7 | 5.15% | 6 |
| Customer satisfaction | 14 | 10.29% | 3 |
| Profit margin | 10 | 7.35% | 4 |
| Customer loyalty | 7 | 5.15% | 6 |
| Number of customer complaint | 3 | 2.21% | 8 |
| Stakeholder satisfaction | 3 | 2.21% | 8 |
| Delivery | 15 | 11.03% | 2 |

Construction firms responded that 52.4%get their measures from existing PM frameworks, 23.8%get theirs from strategy and policy and 23.8% also get theirs from both frameworks and strategy/policy as shown in Table 4.7 below.

**Table 4.7 Sources of Construction Firms' Measures**

| Sources of Performance Measure | Frequency | Percentages |
|---|---|---|
| From the organisation's strategy/policy | 5 | 23.8% |
| From existing performance frameworks | 11 | 52.4% |
| From both organisation's strategy/policy and existing frameworks | 5 | 23.8% |

In order to consider a performance measure adoptable by a construction firm, it must possess certain attributes. The two most common attributes a performance measure based on the response from this study are; reliability (22.8%) and credibility (21.5%) as shown in the Table4.8 below.

**Table 4.8 Attributes of Performance Measures**

| Attributes of Performance Measures | Frequency | Percentage | Rank |
|---|---|---|---|
| Validity | 12 | 15.2% | 4 |
| Responsiveness | 9 | 11.4% | 5 |
| Abuse-proof | 4 | 5.0% | 7 |
| Reliability | 18 | 22.8% | 1 |
| Credibility | 17 | 21.5% | 2 |
| Functionality | 13 | 16.5% | 3 |
| Availability | 6 | 7.6% | 6 |

Construction firms were asked if their performance measures adopted. 81% of respondents responded that performance measures used in their organisation do undergo periodic review as shown Table 4.9 below.

**Table 4.9 Periodic review of Performance Measures**

| | Respondents Yes | Respondents No |
|---|---|---|
| Periodic review of performance measures | 17(81%) | 4 (19%) |

The time frame for this periodic review is quarterly (47.1%) as shown in Table 4.10 below.

**Table 4.10 Time frame for review**

| Periodic review of Performance Measures | Frequency | Percentage |
|---|---|---|
| Monthly | 4 | 23.5% |
| Quarterly | 8 | 47.1% |
| Yearly | 5 | 29.4% |

### 4.2.4 Benefits of measuring performance

The major benefits of measuring performance according to respondents are in accountability (14%), control (14%) and improvement in productivity (15%). This is summarised in the Table 4.11 below.

**Table 4.11 Benefits of measuring Performance**

| Benefits of measuring Performance | Frequency | Percentage | Rank |
|---|---|---|---|
| Accountability | 13 | 14% | 2 |
| Profitability | 12 | 13% | 3 |
| Achievement of objectives and strategy | 10 | 11% | 4 |
| Control | 13 | 14% | 2 |
| Track progress | 12 | 13% | 3 |
| Strategy formulation | 9 | 10% | 5 |
| Long term competitive advantage | 9 | 10% | 5 |
| Improvement in productivity | 14 | 15% | 1 |

### 4.2.5 Performance Measurement Frameworks

The awareness of existing PM frameworks is important in order to select the most appropriate ones to use. 71% of construction firms responded that they are aware of existing PM frameworks (even though awareness may not imply usage of same). This is summarised in Table 4.12 below.

**Table 4.12 Awareness of existing PM frameworks**

| | Respondents Yes | Respondents No |
|---|---|---|
| Awareness of existing PM Frameworks | 15(71%) | 6 (29%) |

Respondents were asked to tick the frameworks they know and mention other ones not listed in the questionnaire. The three most popular frameworks used by construction companies are performance measurement matrix, balanced scorecard and the performance pyramid as shown in Table 4.13.

**Table 4.13 Known existing PM framework**

| Existing framework | Frequency | Percentage | Rank |
|---|---|---|---|
| Performance measurement matrix | 10 | 35.7% | 1 |
| Balanced scorecard | 8 | 28.6% | 2 |
| Performance pyramid | 8 | 28.6% | 2 |
| Performance prism | 0 | 0% | 4 |
| European Foundation for Quality Management Model (EFQM) | 2 | 7.1% | 3 |

In terms of the adoption of these existing PM frameworks, 79% construction firms responded that they've been able to adopt them while 21% are yet to adopt them. This is shown in Table 4.14 below.

**Table 4.14 Adoption of PM frameworks**

| | Respondents Yes | Respondents No |
|---|---|---|
| PM Framework adoption | 15(79%) | 4 (21%) |

The most adopted PM framework by construction firms is the balanced scorecard representing 40%. Next to the balanced scorecard is the performance measurement matrix with 35% representation. The result is shown in Table 4.14 below.

**Table 4.15 PM frameworks adopted**

| Adopted PM Framework | Frequency | Percentage | Rank |
|---|---|---|---|
| Performance measurement matrix | 7 | 35% | 2 |
| Balanced scorecard | 8 | 40% | 1 |
| Performance pyramid | 5 | 25% | 3 |
| Performance prism | 0 | 0% | 4 |
| European Foundation for Quality Management Model (EFQM) | 0 | 0% | 4 |

### 4.2.6 Challenges associated with PM implementation

When asked to outline the challenges associated with PM implementation in their organisation, some of the construction firms outlined the below as some of the challenges associated with PM implementation as summarised in the table below. Some of the firms did not outline any challenge.

**Table 4.16 Challenges associated with PM implementation**

| Challenges associated with PM implementation |
|---|
| Inconsistent profit margin<br>customer disloyalty<br>Lack of adequate cash flow<br>Employee dissatisfaction<br>Type of organisation's leadership |
| Difficulty in data collection for evaluation,<br>Time involved in evaluating performance,<br>Lack of skilled personal who can measure performance |
| Lack of reliable structure in place |
| Inability to deliver<br>Uniqueness of clients/clients' needs and<br>Lack of technical know-how among personnel |
| Lack of proper documentation and malpractices |
| Client's demands and meeting up with global trend |
| Data collection |
| Diversity in customers/clients need<br>High competition |
| Inefficient information system |
| Collection of data needed for excellent evaluation |
| Difficulty in collection of data |
| Lack of interest in measuring performance |
| Lack of proper sourcing of data<br>Improper recording of information<br>Communication problem |

## 4.3 DISCUSSION

The study appraised the performance measurement practice of construction firms in Nigeria. The result of the research shows that most construction firms are interested in their performance and the most common reason for this interest is to improve future performance. This result agrees with Love and Holt (2000) and Backinsell (2001) who pointed out there is so much interest in performance especially within the construction

industry. On whether the construction firms measure their performance or not, 91% of them do measure their performance and the major reason for measuring performance is due to increasing global competition. This also agrees with some of the reasons for PM outlined by Lee et al (2000). The study also established that most of the construction firms still relied on traditional or financial performance measures as earlier established by Kagioglou (2001) and Bassioni et al (2004). The most common measures adopted are; quality and delivery. The study also shows that the two most common attributes a performance measure must possess is reliability and credibility and one of the benefit of measuring performance is improved productivity. In the area of awareness of existing PM frameworks, about 71% of construction firms are aware of them and the most known framework is the performance measurement matrix while the most used or adopted framework is the Balanced Scorecard. This result agrees with what Kulatunga et al (2006) and Khan and Shah (2011) stated in their works that the Balanced Scorecard is the most popular PM framework in terms of adoption. Some of the challenges construction firms face in the implementation of PM are; difficulty in data collection, lack of reliable structure in place, lack of proper documentation, communication problem and uniqueness of clients' need. Some of these challenges agree with Costa et al (2004) assertion in the area of scarcity of information. The study concluded that a lot still needs to be done in the area of PM practice among construction firms in Nigeria.

# CHAPTER FIVE

# SUMMARY, CONCLUSION AND RECOMMENDATION

## 5.1 SUMMARY

In summary, the study appraised the performance measurement practice of construction firms in Nigeria and the following as major findings:

i. Majority of the construction companies are interested in how they perform and actually measure their performance.
ii. Only a few of the construction firms have understanding on PM concepts.
iii. The most used performance measures are the traditional measures (which has been highly criticised) with few adopting the non-traditional measures.
iv. The most popular and most used framework is the Balanced Scorecard.
v. Most construction firms are faced with certain challenges when implementing performance measurement. Some of these challenges are; lack of proper documentation, lack of reliable structure in place and lack of technical know-how among personnel.

## 5.2 CONCLUSION

This study therefore concluded that:

i. There is a high interest in how construction firms perform.
ii. Most construction firms do measure their performance.
iii. Awareness of PM concepts among construction firms is low.
iv. There is no structure on ground to guide in performance measurement within the Nigerian Construction Industry.

vi. There is a lack of proper documentation of PM practice among construction firms.

vii. Construction firms still rely on financial measures

viii. The most adopted PM framework is the Balance Scorecard.

## 5.3 RECOMMENDATIONS

i. The Nigerian Construction industry needs to take performance measurement seriously and the Government needs to formulate policies on PM practice and set up departments that will be in charge of bringing in global trends and making sure the industry adopts them.

ii. There should be a general awareness and orientation on the importance of implementing PM within the NCI.

iii. The culture of formal keeping of data and easy access of same should be encouraged within the NCI.

iv. The NCI needs to adopt global trends such as PM like other countries' construction industry.

v. Nigerian researchers should carry out more researches in PM peculiar to the NCI.

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## APPENDIX A

## FINANCIAL REPORT OF A CONSTRUCTION COMPANY

| UNAUDITED PROFIT AND LOSS ACCOUNT FOR THE PERIOD ENDED DECEMBER 31 | Note | 2010 N´000 | Audited 2009 N´000 |
|---|---|---|---|
| Turnover | 2 | 171,874,300 | 148,426,196 |
| Cost of Sales | | (137,612,502) | (121,864,264) |
| Gross Profit | | 34,261,798 | 26,561,932 |
| Other Income | 3 | 2,075,380 | 2,337,703 |
| | | 36,337,178 | 28,899,635 |
| Administrative Expenses | | (28,528,550) | (19,530,489) |
| Profit before Taxation | 4 | 7,808,628 | 9,369,146 |
| Taxation | 5 | (5,325,984) | (6,110,025) |
| Profit after Taxation | | **2,482,644** | **3,259,121** |
| Earnings per share: (kobo) | | | |
| Basic | | 207 | 272 |
| Diluted/adjusted | | 207 | 272 |

**APPENDIX B**

**COVER LETTER FOR QUESTIONNAIRE SURVEY**

**COPY OF QUESTIONNAIRE**

Department of Quantity Surveying,
Ahmadu Bello University,
Samaru, Zaria,
Nigeria

Dear Sir/Ma,

RE: Dissertation – MSc Project Management

I am currently undertaking a M.Sc. Degree in Project Management at Ahmadu Bello University, Zaria. In fulfilment of this degree, I am required to research a topic area and produce a dissertation. The topic I have chosen is ***AnAppraisal of Performance Measurement Practice of Construction Firms in Nigeria***

Your contribution to this research is by way of providing information on the experience of your organization with regards to performance measurement. Attached is a short questionnaire that has been developed and is to be completed by competent personnel in your firm who has extensive knowledge of your company's performance. The information provided will be treated with strict confidentiality and not handled carelessly. Once the questionnaire is returned, the information you provide and that of other questionnaires returned will be aggregated and used for data analysis only.

Kindly respond to the questionnaire promptly as the completed questionnaire will be required to complete this study. In case of any query or further clarification, please do contact the researcher based on the information provided below.

Thank you very much for your time and prompt response.

Yours Faithfully

Paul Christiana Ada

MSc/ENV-DES/2462/2009-2010

Mobile Tel.: +2348137220690

Email: paulad_4@yahoo.com

**A questionnaire for appraising the performance measurement practice of selected construction firms in Nigeria**

**SECTION A:** General information of respondent

**1** Position in organisation/firm:.……

**2** Professional title: …….

**3**Years of working in organisation/firm……

**SECTION B**: Questions related to organisation's interest in how it performs

**4** Does your company have interest in evaluating or measuring how it performs?

Yes ☐ No ☐

**5** Why is your organisation interested in how it performs? (Tick those that applies to you)

In order to survive ☐
Improved future performance ☐
Attract future investment ☐
Increase share value ☐
Attract higher calibre of employees ☐
Sustain competitiveness ☐
Survive in national and international markets ☐
Mention others:
…….
……

……

**SECTION C**: Questions related performance measurement

**6** Does your company measure or evaluates its performance?

Yes ☐ No ☐

**7** Does your organisation have performance measurement or evaluation in its policy or mission statement?

Yes ☐ No ☐

**8** what were the factors that made your organisation to be interested in measuring or evaluating its performance? (Tick those that applies to you)

Changing nature of work ☐
Increasing global competition ☐
Changing organizational roles ☐
Changing external demands ☐
Power of Information Technology (IT) ☐
Mention others:
……

……

……

**9** What are the measures your organisation use in measuring or evaluating its performance?(Tick those that applies to you)

Quality ☐ Cost ☐ Profit margin ☐
Cash flow ☐ Turnover ☐ Customer loyalty ☐
Employee satisfaction ☐ Market share ☐ Number of customer complaint ☐
Specification ☐ Innovation ☐ Stakeholder satisfaction ☐
Leadership ☐ customer satisfaction ☐ Delivery ☐
Capabilities (Technology, infrastructure) ☐
Mention others: …… …… ……
: …… …… ……
: …… …… ……

**10** How is your organisation's measures derived?
From the organisation's strategy/policy ☐
From existing performance measurement framework ☐
Mention others:
……
……

……

**11** For a performance measure to be used by your organisation, what are those attributes it must possess?(Tick those that applies to you)

Validity ☐ Reliability ☐ ctionality ☐

Responsiveness ☐ Credibility ☐ Availability ☐

Abuse-proof ☐

Mention others: …… …… ……

: …… …… ……

: …… …… ……

**12** In the course of measuring performance, what has your organisation been able to achieve? (Tick those that applies to you)

Accountability ☐ Control ☐ Strategy formulation ☐

Profitability ☐ Track progress ☐ Long term competitive advantage ☐

Achievement of objectives and strategy ☐ Improvement in productivity ☐

Mention others: …… …… ……

: …… …… ……

: …… …… ……

**13** Do the performance measures used in your organisation undergo periodic review?

Yes ☐ No ☐

**14** If yes to question 14, what period?

Monthly ☐

Quarterly ☐

Yearly ☐

**15** Are you familiar with existing performance measurement framework?

Yes ☐ No ☐

**16** If yes to Question 16, tick the ones you are familiar with

Performance measurement matrix ☐

Balance scorecard ☐

Performance pyramid ☐

Performance prism ☐

European Foundation for Quality Management Model (EFQM) ☐

Mention others:

……

……..

……..

**17** Has your organisation adopted any of the performance frameworks?

Yes ☐ No ☐

**18** If yes to question 17, which of the framework?

Performance measurement matrix ☐
Balance scorecard ☐
Performance pyramid ☐
Performance prism ☐
European Foundation for Quality Management Model (EFQM) ☐
Mention others:

……
……
……..

**19** What are the challenges faced when measuring your organisation's performance?
Mention: …….
…….

……
……
……
……
……
……
……

## APPENDIX C

## DATA SUMMARY SHEET 1

| Construction Company | Q.4 Code No 1 2 | Q. 5 Code No 1 2 3 4 5 6 7 | Q. 6 Code No 1 2 | Q. 7 Code No 1 2 | Q. 8 Code No 1 2 3 4 5 | Q. 9 Code No 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 |
|---|---|---|---|---|---|---|
| 1. | 1 | 2 6 7 | 1 | 2 | 1 4 | 3 4 8 13 |
| 2. | 1 | 2 | 1 | 1 | 1 | 1 |
| 3. | 1 | 5 | 1 | 1 | 3 | 8 |
| 4. | 1 | 1 2 3 6 7 | 1 | 2 | 1 2 4 5 | 1 4 6 7 8 10 11 12 16 |
| 5. | 1 | 6 | 2 | 2 | 2 | 1 3 |
| 6. | 1 | 2 4 | 1 | 1 | 1 2 3 5 | 1 2 11 12 13 16 |
| 7. | 1 | 2 | 1 | 2 | 1 | 1 7 11 16 |
| 8. | 1 | 2 3 7 | 1 | 1 | 2 5 | 1 8 11 16 |
| 9. | 1 | 1 2 3 4 6 7 | 1 | 1 | 1 2 3 4 5 | 1 3 4 5 6 7 8 10 11 12 13 16 |
| 10. | 1 | 2 3 6 | 1 | 1 | 1 3 5 | 1 2 4 7 10 12 16 |
| 11. | 1 | 1 2 3 5 6 | 1 | 1 | 1 2 3 5 | 1 2 4 7 8 10 11 12 15 16 |
| 12. | 1 | 3 | 1 | 1 | 2 | 1 7 16 |
| 13. | 1 | 2 | 1 | 1 | 2 | 3 8 11 16 |
| 14. | 1 | 2 4 6 | 1 | 1 | 2 4 | 1 2 7 8 9 11 12 13 16 |
| 15. | 1 | 1 2 3 4 5 6 7 | 1 | 1 | 2 3 4 5 | 1 4 5 6 7 8 9 10 11 12 14 15 16 |
| 16. | 1 | 1 2 3 4 5 6 7 | 1 | 1 | 2 3 4 5 | 1 2 3 5 6 7 8 11 12 14 16 |
| 17. | 1 | 1 2 7 | 1 | 1 | 2 | 8 |
| 18. | 1 | 4 6 | 1 | 1 | 2 | 12 |
| 19. | 1 | 1 6 7 | 1 | 1 | 1 5 | 1 2 7 8 11 12 13 14 |
| 20. | 2 | | 2 | 2 | | |
| 21. | 1 | 2 6 | 1 | 1 | 2 3 | 1 2 3 8 9 10 11 12 13 16 |
| 22. | 1 | 2 4 | 1 | 1 | 2 4 | 1 2 4 8 11 16 |
| 23. | 1 | 2 4 6 | 1 | 1 | | 1 2 3 7 8 9 10 11 12 13 15 16 |

## DATA SUMMARY SHEET 2

| Construction Company | Q.10 Code No 1 2 | Q. 11 Code No 1 2 3 4 5 6 7 | Q. 12 Code No 1 2 3 4 5 6 7 8 | Q. 13 Code No 1 2 | Q. 14 Code No 1 2 3 | Q. 15 Code No 1 2 | Q. 16 Code No 1 2 3 4 5 | Q.17 Code No 1 2 | Q. 18 Code No 1 2 3 4 5 |
|---|---|---|---|---|---|---|---|---|---|
| 1. | 2 | 1 4 5 | 1 2 3 4 6 8 | 1 | 1 | 1 | 1 3 | 1 | 1 3 |
| 2. | 2 | 5 | 8 | 1 | 3 | 2 | 1 | 1 | 1 |
| 3. | 2 | 4 | 8 | 1 | 2 | 1 | 3 | 2 | |
| 4. | 2 | 1 4 5 6 | 1 2 3 4 5 6 8 | 1 | 1 | 1 | 1 2 5 | 1 | 1 2 |
| 5. | 2 | 4 | 5 | 2 | | 2 | | 2 | |
| 6. | 2 | 1 2 3 4 5 6 7 | | | | | | | |
| 7. | 2 | 4 6 | 5 7 | 2 | | 2 | | 2 | |
| 8. | 1 | 1 4 5 6 | 4 5 8 | 1 | 1 | 1 | 2 3 5 | 1 | 2 |
| 9. | 1 2 | 1 2 4 5 6 7 | 1 2 4 5 6 7 8 | 1 | 2 | 1 | 1 2 3 | 1 | 1 2 3 |
| 10. | 1 2 | 1 4 5 6 | 1 2 3 4 6 7 8 | 1 | 2 | 1 | 1 3 | 1 | 3 |
| 11. | 1 2 | 1 2 4 5 6 | 1 2 3 4 5 7 8 | 1 | 2 | 1 | 1 3 | 1 | 3 |
| 12. | 1 | 2 4 6 | 3 4 5 | 1 | 1 | 1 | 1 | 1 | 1 |
| 13. | 1 | 4 5 | 1 4 | 1 | 2 | 1 | | 1 | |
| 14. | 2 | 1 3 4 5 | 1 2 5 8 | 1 | 2 | 1 | 2 | 1 | 2 |
| 15. | 2 | 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 8 | 1 | 2 | 1 | 1 2 3 | 1 | 1 2 3 |
| 16. | 2 | 1 2 4 5 6 7 | 1 2 3 4 5 6 7 8 | 1 | 2 | 1 | 2 | 1 | 2 |
| 17. | 1 | 5 | 3 | 1 | 3 | 2 | | | |
| 18. | 2 | 5 | 2 | 1 | 3 | 2 | | | |
| 19. | 1 | 2 4 5 6 | 1 2 3 4 5 6 7 8 | 1 | 3 | 1 | 1 2 | 1 | 2 |
| 20. | | | | 2 | | 2 | | 2 | |
| 21. | 1 2 | 1 2 4 5 6 7 | 1 2 3 4 6 7 8 | 1 | 3 | 1 | 2 3 | 1 | 2 |
| 22. | | 1 2 3 4 5 6 7 | 1 2 4 5 6 7 8 | 2 | | 1 | 1 | 1 | 1 |
| 23. | 1 2 | | 1 | | | | | | |

## APPENDIX D

## CODING FOR ANALYSIS

| Question | Concepts | Code |
|---|---|---|
| 4 | Yes | 1 |
| | No | 2 |
| 5 | In order to survive | 1 |
| | Improved future performance | 2 |
| | Attract future investment | 3 |
| | Increase share value | 4 |
| | Attract higher calibre of employees | 5 |
| | Sustain competiveness | 6 |
| | Survival in national and international markets | 7 |
| 6 | Yes | 1 |
| | No | 2 |
| 7 | Yes | 1 |
| | No | 2 |
| 8 | Changing nature of work | 1 |
| | Increasing global competition | 2 |
| | Changing organizational role | 3 |
| | Changing external demands | 4 |
| | Power of Information Technology | 5 |
| 9 | Quality | 1 |
| | Cash flow | 2 |
| | Employee satisfaction | 3 |
| | Specification | 4 |
| | Leadership | 5 |
| | Capabilities (Technology, infrastructure) | 6 |
| | Cost | 7 |
| | Turner | 8 |
| | Market share | 9 |
| | Innovation | 10 |
| | Customer satisfaction | 11 |
| | Profit margin | 12 |
| | Customer loyalty | 13 |
| | Number of customer complaint | 14 |
| | Stakeholder satisfaction | 15 |
| | Delivery | 16 |
| 10 | From the organization's strategy/policy | 1 |
| | From existing performance measurement framework | 2 |
| 11 | Validity | 1 |
| | Responsiveness | 2 |
| | Abuse-proof | 3 |
| | Reliability | 4 |
| | Credibility | 5 |
| | Functionality | 6 |

| | | |
|---|---|---|
| | Availability | 7 |
| 12 | Accountability | 1 |
| | Profitability | 2 |
| | Achievement of objectives and strategy | 3 |
| | Control | 4 |
| | Track progress | 5 |
| | Strategy formulation | 6 |
| | Long term competitive advantage | 7 |
| | Improvement in productivity | 8 |
| 13 | Yes | 1 |
| | No | 2 |
| 14 | Monthly | 1 |
| | Quarterly | 2 |
| | Yearly | 3 |
| 15 | Yes | 1 |
| | No | 2 |
| 16 | Performance measurement matrix | 1 |
| | Balanced scorecard | 2 |
| | Performance pyramid | 3 |
| | Performance prism | 4 |
| | European Foundation for Quality Management Model | 5 |
| 17 | Yes | 1 |
| | No | 2 |
| 18 | Performance measurement matrix | 1 |
| | Balanced scorecard | 2 |
| | Performance pyramid | 3 |
| | Performance prism | 4 |
| | European Foundation for Quality Management Model | 5 |

## APPENDIX E

## DETAILS OF RESPONDENTS

| Construction Company | Position in Organization | Professional title | Years in Organization |
|---|---|---|---|
| 1. | QS | Chief QS | 2 |
| 2. | Supervisor | Supervisor | 10 |
| 3. | QS | QS | 7 |
| 4. | Forman | Engineer | 3 |
| 5. | Site Supervisor | Technician | 5 |
| 6. | Admin Manager | | 15 |
| 7. | Site Supervisor | Builder | 4 |
| 8. | Project Supervisor | Architect | 1+ |
| 9. | Civil Engineer ii | Engineer | 1 |
| 10. | | | 14 |
| 11. | | | 7 |
| 12. | Quality control Officer | Builder | 3 |
| 13. | QS | MNIQS | 10 |
| 14. | Accountant | Economist | 3 |
| 15. | Project Manager | Engineer | 12 |
| 16. | Administrative Officer | | 1 |
| 17. | Company Lawyer | Lawyer | 5 |
| 18. | QS | MNIQS | 6 |
| 19. | Store Keeper | Accountant | 5+ |
| 20. | Accountant | | 10+ |
| 21. | Project Manager | Engineer | 6 |
| 22. | Project Coordinator | Engineer | 15 |
| 23. | Project Manager | Engineer | 5 |