

DEVELOPMENT OF COMPETITIVENESS INDICES FOR INDIGENOUS CONSTRUCTION FIRMS IN NIGERIA

BY

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Dedication

This thesis is dedicated to Jesus, the Wisdom and Power of God.

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It was Isaac Newton who said “If I have seen further it is by standing on the shoulders of giants”. Several ‘giants’ were instrumental to the successful completion of my PhD programme and I express my profound gratitude to them.

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Table of Contents

Certification	i
Declaration	ii
Dedication	iii
Acknowledgment	iv
Table of Content	v
List of Tables	xii
List of Figures	xiii
Abstract	xiv
CHAPTER ONE	1
INTRODUCTION	1
1.1 Overview	1
1.2 Background to the Research	1
1.3 Statement of the Research Problem	5
1.4 Aim and Objectives of the Research	5
1.5 Significance of the Study	5
1.6 Scope and Delimitation of the Study	8
CHAPTER TWO	10
LITERATURE REVIEW	10
2.1 Overview	10
2.2 Indigenous Construction Firms in Nigeria	10
2.3 Foreign Construction Firms in Nigeria	12
2.4 Competitiveness	13
2.4.1 National Competitiveness	14
2.4.2 Competitiveness at the Industry Level	16

2.4.3	Firm Competitiveness	17
2.5	Competitiveness in the Context of Construction Firms	18
2.6	Competitiveness of Construction Firms Globally	19
2.7	Factors Affecting Competitiveness of Indigenous Construction Firms in Nigeria	20
2.8	The Construction Industry System	22
2.8.1	Munificence	23
2.8.2	Dynamism	24
2.8.3	Complexity	24
2.9	Strategy	25
2.10	Strategic Management	26
2.10.1	Phases in Strategic Management	27
2.10.1.1	Strategy Formulation	27
2.10.1.2	Strategy Implementation	28
2.10.1.3	Strategy Evaluation	28
2.10.2	Models of Strategy Formulation in Organisations	28
2.10.2.1	Linear Strategic Models	29
2.10.2.2	Adaptive Strategic Models	29
2.10.2.3	Interpretative Strategic Models	30
2.10.3	Making Strategic Decisions	30
2.10.3.1	Rationality and Bounded Rationality	31
2.10.3.2	Politics and Power	31
2.10.3.3	Garbage Can	32

2.10.4	Strategic Paradigms	32
2.10.4.1	Quinn's Logical Incrementalism	33
2.10.4.2	Mintzberg's Deliberate and Emergent Concept	33
2.10.4.3	Miles and Snow's Organizational Typology	34
2.10.4.4	Porter's Generic Strategy	35
2.10.4.5	Ansoff's Organizational Styles	36
2.11	Theories of Firms' Competitiveness	36
2.11.1	Porter's Competitive Theories of the Firm	37
2.11.1.1	Porter's Five Forces Framework	37
2.11.1.2	Porter's Theory of Competitive Strategies	40
2.11.1.3	Porter's Value Chain Analysis	41
2.11.2	Resource-Based View (RBV) on Competitiveness	42
2.12	Assessing Competitiveness in Organisations	45
2.12.1	Identifying Parameters for Competitiveness	45
2.12.2	The Global Competitiveness Report (GCR) Assessment Model	47
2.12.3	The World Competitiveness Year Book (WCY) Model	49
2.13	Identifying Competitiveness Parameters in the Construction Industry	51
2.13.1	Critical Success Factors (CSFs)	52
2.13.2	Key Performance Indicators (KPIs)	53
2.14	Empirical Studies on Competitiveness and Competitive Advantage in Construction Firms	54
2.15	Gaps Identified in the Literatures Reviewed	58

2.16	Summary	58
CHAPTER THREE		60
CONCEPTUAL FRAMEWORK		60
3.1	Overview	60
3.2	The Conceptual Framework	60
3.2.1	Similarities and Differences between the RBV and Porter's Theories	61
3.3	Competencies and Resources of a Construction Firm	64
3.3.1	Project management competencies	64
3.3.2	Resources	65
3.3.3	Reputation	65
3.3.4	Relationships	65
3.3.5	Bidding techniques	66
3.4	Summary	69
CHAPTER FOUR		70
RESEARCH METHOD		70
4.1	Overview	70
4.2	Research Design	70
4.3	Study Population	71
4.4	Sampling Frame	72
4.5	Determining the Sample Size	72
4.6	Sampling Technique	73
4.7	Questionnaire Development and Operationalisation	

	of the Research Constructs	73
4.7.1	Operational Definition of Research Constructs	74
4.7.1.1	Strategies for Gaining Competitive Advantage	74
4.7.1.2	Parameters for Competitiveness	76
4.8	Reliability of the Research Instrument	79
4.9	The Survey Process	80
4.10	Method of Data Analysis	80
4.10.1	Ranking Analysis	81
4.10.2	Weighted Summation	82
4.10.3	Correlation	83
4.11	Means of Achieving Research Objectives	83
4.12	Summary	84
	CHAPTER FIVE	85
	DATA ANALYSIS AND DISCUSSION OF RESULTS	85
5.1	Overview	85
5.2	Response Rate	85
5.3	Firms' Characteristics	86
5.3.1	Firms' Size	86
5.3.2	Jobs Bidded For	87
5.3.3	Jobs Secured	87
5.3.4	Turnover in =N= Billion	88
5.4	Relationship between Firms' Turnover and Firms' Workforce	88

5.5	Significant Parameters for Competitiveness of Indigenous Construction Firms	89
5.6	Competitiveness Indices for Indigenous Construction Firms in Nigeria	92
5.7	Practical Applications of the Competitiveness Indices	97
5.8	Strategies for Gaining Competitive Advantage	98
5.9	Relationship between Firms' Turnover and Firms' Strategies	99
5.10	Determining Significant Relationships between Strategies adopted by Indigenous Construction Firms for Gaining Competitive Advantage	101
5.11	Discussion of Major Findings	103
5.11.1	Significant Competitiveness Parameters	103
5.11.2	Significant Strategies for Gaining Competitive Advantage	106
5.11.3	Correlation between Firms' Turnover and Firms' Strategies	108
5.11.4	Correlation between Firms' Strategies	109
5.12	Summary	110
	CHAPTER SIX	112
	SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS	112
6.1	Overview	112
6.2	Summary of Research Findings	112
6.2.1	Competitiveness Parameters	112
6.2.2	Strategies for Gaining Competitive Advantage	113

6.3	Conclusion of the Research	113
6.4	Contributions of the Research	114
6.4.1	Indigenous Construction Firms	114
6.4.2	Researchers	115
6.4.3	Other Construction Industries	115
6.4.4	Existing knowledge on competitiveness	115
6.5	Recommendations	116
6.6	Areas of Further Studies	117
	REFERENCES	118
APPENDIX A:	QUESTIONNAIRE SURVEY	144
APPENDIX B:	RELIABILITY OF THE SURVEY ITEMS	149
APPENDIX C:	DESCRIPTIVE STATISTICS: STRATEGIES FOR GAINING COMPETITIVE ADVANTAGE	155
APPENDIX D:	DESCRIPTIVE STATISTICS: COMPETITVENESS PARAMETERS	157
APPENDIX E:	CALCULATING THE RELATIVE WEIGHTS BY MEANS OF WEIGHTED SUMMATION	161
APPENDIX F:	CORRELATION RESULTS	175

List of Tables

Table 1.1	Volume of contract awarded under the Nigerian Federal Ministry of Works between 2010- 2013	3
Table 2.1	Definition of national competitiveness	15
Table 2.2	GCR competitiveness parameters	48
Table 2.3	WCY competitiveness factors	51
Table 2.4	Key performance indicators	53
Table 4.1	Operationalization of research constructs	78
Table 4.2	Reliability of survey items	79
Table 4.3	Means of achieving research objectives	84
Table 5.1	Number of workforce	86
Table 5.2	Number of jobs bidden for	87
Table 5.3	Average number of jobs secured yearly	87
Table 5.4	Turnover in Billions	88
Table 5.5	Correlation between firms' turnover and firms' workforce	89
Table 5.6	Parameters that determine competitive advantage of indigenous construction firms in Nigeria	90
Table 5.7	Classification of significant competitiveness parameters	93
Table 5.8	Relative weights of significant competitiveness parameters	95
Table 5.9	Ranking of strategies for gaining competitive advantage	98
Table 5.10	Spearman's rank correlation between firms' turnover and firms' strategies	100
Table 5.11	Correlation between strategies adopted by indigenous construction firms For gaining competitive advantage	101

List of Figures

Figure 2.1	Porter's five forces of competitive framework	38
Figure 2.2	Multiple hierarchy structure of competitiveness parameters	46
Figure 3.1	Conceptual framework	67

ABSTRACT

Competitiveness of indigenous construction firms plays a vital role in the economic development of any nation. The significance of competitiveness to economic development lies in the fact that it increases the level of profits earned by indigenous construction firms, thereby contributing to a nation's Gross Domestic Product (GDP). However, foreign construction firms dominate the Nigerian construction market on account of managerial and technological capabilities in which foreign construction firms have a significant comparative advantage. This research, therefore, aimed at developing a set of indices which can be used as a benchmark for evaluating the competitiveness of indigenous construction firms in Nigeria. The study adopted a quantitative research design. Questionnaire was used to elicit information from indigenous construction firms registered with the Nigerian Institute of Building (NIOB). Data obtained from the survey were analyzed using bar charts, tables, ranking analysis and correlation. Competitiveness indices were developed by means of the 'weighted summation' a statistical tool for evaluating multi-criteria concepts. Forty significant competitiveness indices were developed in this research. The five most significant competitiveness indices for indigenous construction firms in Nigeria were: effectiveness of cost controlling methods, effectiveness of site management, method of procurement, effectiveness of time controlling methods and client relationship. Finally, this study recommended that indigenous construction firms should allocate sufficient resources to the competitiveness indices developed in this study in order to increase their chances of winning more jobs and ultimately significantly bridge the gap between them and their foreign counterparts.

CHAPTER ONE

INTRODUCTION

1.1 Overview

This chapter provides the general introduction to the research. It begins with a background to the research which ends with statements of the research problem. A definition of the purpose of the research is given in the form of aim and objectives of the research. This is followed by the significance of the study which provides logical reasons why the study should be undertaken. The chapter ends with the scope of the research which gives the geographical and theoretical area in which the study is confined.

1.2 Background to the Research

The benefits of the construction industry to every economy cannot be overemphasized. The construction industry contributes significantly to the Gross Domestic Product (GDP) and the Gross Fixed Capital Formation (GFCF) of many nations. The contributions of the construction industry to GDP in both developed and developing countries range from 7% to 10% and 3% to 6% respectively (Lowe, 2003).

In Nigeria, the construction industry contributed about 2.86%, 2.08%, 2.20% and 2.35% to GDP in 2010, 2011, 2012 and 2013 respectively (First Securities Discount House, 2014). Although there is an obvious decline in the industry's percentage contribution to GDP in 2011, it could be attributed to the low implementation of capital budget by the Nigerian government (Isa, Jimoh and Achuen, 2013). Moreover, the Nigerian construction industry contributed approximately

\$63 billion, \$66 billion, \$68 billion and \$75 billion to GFCF in 2010, 2011, 2012 and 2013 respectively (World Bank, 2014).

The Nigerian construction market has been described as vibrant and among the largest in Africa (Odediran, Adeyinka, Opatunji and Morakinyo, 2012) consisting of indigenous and foreign firms. An indigenous construction firm is one established under the Enterprise Promotion Decree of 1972 and has no other home base but Nigeria. Their entire capital and any other proprietary interests in the enterprise are owned and controlled by Nigerian citizens or associations and most or all of its technical and managerial undertakings are manned by Nigerians (Olateju, 1991).

Around 95% of all the construction firms operating in Nigeria are indigenous, while the remaining 5% of construction firms are foreign in origin (Ibrahim, Githae and Stephen, 2014).

However, the volume of construction work awarded to indigenous construction firms in Nigeria is significantly lower than contracts awarded to foreign construction companies. For instance, Table 1.1 indicates the volume of construction work carried out under the Nigerian Federal Ministry of Works between 2010 and 2013 in billions of naira. From Table 1.1 it is evident that foreign construction firms are the major beneficiaries of the Nigerian construction market because the volume of contracts awarded to them is significantly greater than that awarded to their indigenous counterparts. Although indigenous construction firms struggle to survive in a harsh business environment characterized by intense competition and relatively low profit margin; they operate in the same business environment as their foreign counterparts. However, the latter has a significant comparative advantage over the former.

Table 1.1 Volume of contract awarded under the Nigerian Federal Ministry of Works between 2010 and 2013 (2nd Quarter Report)

FIRM	2010 Contracts in Billions of Naira		2011 Contracts in Billions of Naira		2012 Contracts in Billions of Naira		2013 Contracts in Billions of Naira	
	ICF	FCF	ICF	FCF	ICF	FCF	ICF	FCF
D&S	2.560		2.870		0.594			
B	0.450						1.500	
T		4.540				0.990		0.750
CCECC		3.000						
G		0.246						
RCC		0.851		2.250		2.300		
MC		1.220		1.000				
JB		0.400						1.500
CG		0.450						
PC				0.253				
GCG		0.900				0.900		1.500
S		0.500						
EK								1.500
E								0.725
Total	3.010	12.077	2.870	3.503	0.594	4.298	1.500	5.975

Source: Budget Office of the Nigerian Federation (2010-2013)

Legend

ICF-Indigenous construction firms
 FCF-Foreign construction firms
 D&S-Dantata & Sawoe
 B-Bulletine International Limited
 T- Tricata Nigeria Limited
 CCECC –China Civil Engineering Construction Company
 G-Gomene Nigeria Limited
 RCC-Roads Construction Company
 MC- Mother Cat
 JB – Julius Berger
 CG- Constructioni Generali
 PC- Piccolo Bruneli
 GCG-Gitto Constructioni Generali
 S- Setraco
 EK- Eksiohullari
 Enerco Nigeria Limited

Moreover, globalisation and the deregulation of markets on account of technological and managerial constraints have aggravated the conditions of indigenous construction firms (Raftery, Pasadilla, Chiang, Hui and Tang, 1998). Globalisation heightens the lopsidedness between countries and firms that have greater capital, better skills and more mobility to grow in the international market and those that do not have these advantages (Mbamali and Okotie, 2012). This condition only spells immense competition for indigenous construction companies especially because indigenous construction firms in Africa and Nigeria in particular do not represent a strong source of competition (Chen, Chiu, Orr and Goldstein, 2007).

Therefore, how can indigenous construction firms in Nigeria achieve competitiveness? Competitiveness in the context of construction refers to the ability of a construction firm to bid successfully for construction projects, provide construction services with superior quality, lower costs and with shorter time than its competitors, so as to attain superior performance (Lu, 2006). The question of competitiveness leads to the key issues of strategy and competitive advantage. Competitive advantage is simply the edge that a firm gains over its competitors (Porter, 1980; Armstrong, Kotler, Brown and Adam, 2004) while strategy refers to decisions that have medium to long term impact on the activities of an organization by the use of its resources to create value for key stakeholders and to outperform competitors (Hubbard, Rice and Beamish, 2008). Hence, this thesis sets out to identify significant parameters that determine the competitiveness of indigenous construction firms and key strategies by which indigenous construction firms in Nigeria can gain competitive advantage.

1.3 Statement of the Research Problem

Low competitiveness of indigenous construction firms in Nigeria is a problem, which is as a result of reported cases of poor work quality (Oke and Abiola-Falemu (2009), cost over run (Omoregie and Radford, 2005), frequent delays (Aibinu and Jagboro, 2002), increased rework (Oyewobi, Ibronke, Ganiyu and Ola-Awo, 2011) and low productivity (Adenikinju, 2005).

1.4 Aim and Objectives of the Research

The aim of this research is to develop indices which can be used as a benchmark for evaluating the competitiveness of indigenous construction firms in Nigeria.

The specific objectives of the research were to:

- a. identify the parameters that determine the competitiveness of indigenous construction firms in Nigeria;
- b. determine the weighting of competitiveness parameters for indigenous construction firms in Nigeria;
- c. determine the significant competitiveness parameters for indigenous construction firms in Nigeria; and
- d. identify and assess strategies for indigenous construction firms in Nigeria to gain competitive advantage.

1.5 Significance of the Study

Competitiveness holds great benefits for indigenous construction firms and the Nigerian economy at large. As noted earlier, foreign construction firms dominate the Nigerian construction market and enjoy greater profits than their indigenous counterparts. Profits earned by foreign construction firms contribute significantly to the Gross National Income (GNI) of their home countries. Moreover, a greater percentage of the profits earned by foreign construction firms are sent to their respective home countries and invested in their respective economies. However, competitiveness of indigenous construction firms in Nigeria would lead to increase in market share for local construction firms and consequently increase the level of profits earned by indigenous construction firms. Furthermore, profitability of indigenous construction firms, as a result of improved competitiveness, would contribute significantly to Nigeria's GDP through the interaction between the construction industry and other industries in a demand and supply relationship. Competitiveness of indigenous construction firms in Nigeria could also lead to export of construction expertise to other African countries thereby contributing to Nigeria's GNI. Profitability of indigenous construction firms, on account of competitiveness, would bring about growth and sustainability of indigenous construction firms and the Nigerian construction industry at large.

Having noted the above significance of this research to the construction industry and the Nigerian economy, it should be noted that there is a collection of literature on competitiveness of construction firms in many countries of the world including Nigeria. Notable among this literature is the work of Kale and Arditi (2002) who explored competitive positioning in the United States construction industry. Lu (2006) also carried out a study aimed at devising a method for Chinese contractors to better understand their competitiveness.

In Nigeria Olademeji and Ojo (2012) surveyed indigenous construction companies with the aim of predicting their survival in the highly competitive environment in which they operate. Mbamali and Okotie (2012) studied the effect of globalisation on building practice in Nigeria and found that trade liberalisation, construction market boom, development in IT, scarcity of competent local technological and managerial manpower are major threats to the competitiveness of indigenous construction firms in Nigeria. Mosaku (2008) identified the factors militating against competitiveness of indigenous contractors in Nigeria as poor and wasteful methods of construction, use of poor and unspecified materials, resistance to the use of qualified skilled workers, financial extravagance and diversion of funds appropriated for construction to other personal uses, patronage of non-professionals and quacks, lack of management expertise, lack of construction management skills and vision of continuity among others.

However, an observable gap in literature on competitiveness in construction firms is the scanty evidence of studies focusing on how indigenous construction firms in Nigeria can achieve competitiveness and gain competitive advantage. Competitiveness is a means to an end-competitive advantage. Most of the research on competitiveness and competitive advantage were studied separately. Little evidence exists to show how construction firms can attain competitiveness and achieve competitive advantage at the same time.

1.6 Scope and Delimitation of the Study

This study limited its investigation to two major cities in Nigeria namely: Lagos and Abuja. The choice of these two major cities is based on certain reasons: Lagos has been identified as the 7th fastest growing city in the world (City Mayors' Statistics, 2012) while Abuja is the nation's capital. A major characteristic of growing cities and city centers is the high demand for infrastructure (Ogunlana, Li and Sukhera, 2003). Hence, these two cities have been chosen as the study areas for this research.

Construction firms operating in Nigeria are registered with several bodies. These bodies include: the Corporate Affairs Commission (CAC), the Nigerian Institute of Building (NIOB) and the Federation of Construction Industry (FOCI). However, the research focused only on indigenous construction firms registered with the NIOB. The major reason for using the sample frame from the NIOB is that, the research is on competitiveness and there is a need to identify a group of indigenous construction firms within the Nigerian construction industry that have the potentials of competing on an international level. The NIOB list of construction firms meets such specification. Indigenous construction firms in the NIOB list of construction firms are also registered with CORBON (Council for Registered Builders of Nigeria), an organization that is recognized by law to regulate building production practice in Nigeria (Federal Republic of Nigeria, 2006). This suffices the researcher to say that firms registered with the NIOB would meet all the requirements for building production practice. Hence, the study made use of the list of construction firms registered with the NIOB. However, it is important to note that in Nigeria several indigenous construction firms still operate outside bodies like NIOB and FOCI. For instance, some indigenous construction firms in Nigeria are registered with the Federal and State Ministries of Work. Most of the firms registered with the Federal and State Ministries of Work

exist only on paper and can be best described as ghost construction firms. Such firms are used by politicians for siphoning funds which is an evidence of the fraudulent practices in the Nigerian construction industry.

Competitiveness is a multi-leveled concept that can be looked at from the country, industry and firm level. However, this thesis focused on competitiveness of the firm rather than that of a country or an industry. Firm level competitiveness is defined as the ability of a firm to produce and market products that are superior to those offered by competitors (D'Cruz, 1992). The respondents were limited to owners of indigenous construction firms or senior personnel in such firms who are expected to be knowledgeable about the strategic choices of their firms with regard to competitiveness and competitive advantage.

CHAPTER TWO

LITERATURE REVIEW

2.1 Overview

This chapter begins with a discussion on indigenous and foreign construction firms in Nigeria. A review of the competitiveness of construction firms globally is also presented. This is followed by a discussion on the construction industry system including internal and external influences affecting a firm. A review of literature on strategic management and competitiveness including a detailed review of the two major theories of firms' competitiveness namely: Porter's theories of competitiveness and the Resource – Based View (RBV) on competitiveness are presented. Parameters for assessing competitiveness as given by two global competitiveness reports: The Global Competitiveness Report (GCR) and the World Competitiveness Year book (WCY) are also discussed. The Chapter also reviews the Critical Success Factors (CSFs) and the Key Performance Indicators (KPIs) approaches to identifying parameters for competitiveness in construction firms. Moreover, empirical studies on competitiveness in construction firms are presented and the gaps in existing literature are identified. The Chapter concludes with a summary.

2.2 Indigenous Construction Firms in Nigeria

An indigenous construction firm is one established under the enterprise promotion decree of 1972 and has no other home base but Nigeria. Their entire capital and any other proprietary interests in the enterprise are owned and controlled by Nigerian citizens or associations and most or all of their technical and managerial undertakings are manned by Nigerians (Olateju, 1991).

Ogunbanjo (2010) defined an indigenous Nigerian firm as one that is registered under the Companies and Allied Matters Act and having not less than 51% Nigerian shareholding. According to (Ibrahim *et al.*, 2014) indigenous construction firms in Nigeria are construction firms that are fully-owned and managed by Nigerians.

Mbamali and Okotie (2014) narrated that organized construction work in Nigeria dates back to the 1930s when few important construction projects in the country were carried out by the Public Works Department (PWD) and the Royal Army Engineers which later metamorphosed into the Nigerian Army Engineers. After independence in 1960, Nigeria witnessed an upward surge in construction activities. Moreover, the oil boom of the 1970s brought about a great expansion in construction projects which attracted indigenous and foreign construction firms into the Nigerian construction market.

Ninety five percent of all the construction firms operating in the Nigerian construction market are indigenous while the remaining 5% construction firms are foreign in origin (Ibrahim *et al.*, 2014). However, there are reports of very wide margin in market share between the two categories of construction firms (Adams, 1997; Idoro, 2007; Aniekwu and Audu, 2010).

For instance, Ibrahim *et al* (2014) reported that foreign firms which constitute just 5% of the total number of construction firms in Nigeria's formal sector control 95% of major projects in the construction market, leaving indigenous construction firms with just 5% share of the market.

The dominance of foreign construction firms in the Nigerian construction market is attributed to reported cases of poor work quality (Idoro, 2007), delays (Aibinu and Jagboro, 2002), cost over run (Omoreigbe and Radford, 2005), increased rework (Oyewobi *et al.*, 2011) and low productivity (Adenikinju, 2005). Consequently, there is a problem of low competitiveness of

indigenous construction firms which ultimately leads to low profit margin (Aniekwu and Audu, 2010).

Indigenous construction firms in Nigeria have certain peculiarities. For instance, most of the indigenous construction firms in Nigeria fall within the Small and Medium Enterprise (SME) category of firms (Adebayo, 2004; Kehinde and Mosaku, 2006; Odediran, *et al.*, 2012). Moreover, greater percentage of indigenous construction firms in Nigeria engage more in building construction than other areas of construction (Odediran, *et al.*, 2012). This may be because most of the civil engineering projects including roads and bridges are handled by foreign construction firms. Furthermore, most indigenous construction firms have poor financial management skills (Adams, 1997 and Idoro, 2007), are rarely able to obtain bank loans to finance projects, and they do not have share capital which means they are not quoted on the Nigerian Stock Exchange (Odediran, *et al.*, 2012)

2.3 Foreign Construction Firms in Nigeria

Foreign construction firms are firms jointly owned by Nigerians and foreigners, but are mostly or fully managed by foreigners (Ogbu, 2011). Foreign construction firms in Nigeria make up only 5% of all the construction firms in Nigeria (Ibrahim, *et al.* 2014). However, the Nigerian construction market is dominated by foreign construction firms in terms of volume of contract award (Adams, 1997; Aniekwu and Audu, 2010).

Idoro (2010) revealed that Nigerian clients give foreign construction firms preference over their indigenous counterparts in the award of contracts. This may be because of some desirable traits exhibited by foreign construction firms. For example, Idoro (2010) noted that foreign construction firms deliver high quality work than their indigenous counterparts and are relatively

honest in their dealings. Idoro and Akande – Subar (2008) compared the quality performance of indigenous and foreign contractors. The study showed that projects executed by indigenous contractors recorded greater magnitude of defective work and that the amount of retention fee spent to rectify defects that occurred during the defect liability period was higher than their foreign counterparts. Jimoh (2012) also found out that better site management practices by foreign construction firms is responsible for the substantial chunk of work awarded to them. Simkoko (1992) noted that the quest to master, adapt and further develop acquired design and construction technologies and management techniques by foreign construction firms justifies the increased patronage of foreign construction firms in Nigeria.

Some of the notable foreign construction firms in Nigeria include: Julius Berger Nigeria Plc, Reynolds Construction Company (RCC) Ltd, Costain West Africa Plc, Cappa & D'Alberto, Stabilini Visinoni, Bi-Courtney Limited, Setraco Nigeria Limited, Piccolo-Brunelli Eng. Ltd, Enerco Limited, Arab Contractors Limited, Triacta Limited and China Civil Engineering Construction Company (C.C.E.C.C).

2.4 Competitiveness

The Longman's American Dictionary defines competitiveness as the ability of a company or a product to compete with others and the desire to be more successful than other people. Ambastha and Momaya (2004) defined competitiveness as the ability of firms and industries to stay competitive which, in turn, reflects their ability to improve or protect their position in relation to competitors which are active in the same market. It can simply be referred to as the ability to compete. Competitiveness has been described severally in the literature as a multi-defined concept because its indicators are multi-dimensional and multi-faceted. Nowadays,

competitiveness has become the buzz word for describing the economic strength of countries, industries and firms (Murths, 1998).

Competitiveness has a long history and stems from the thoughts of classical and modern economists like Adam Smith, David Ricardo, Max Weber, Joseph Schumpeter, Nicholas Negroponte etc. (Lu, 2006). Competitiveness originates from the Latin word, *competer*, which means involvement in a business rivalry for markets (Ambastha and Momaya, 2004).

Competitiveness can be viewed from different levels namely: national (country), industry and firm levels (Flanagan, Lu, Shen, Jewell, 2007; Ambastha and Momaya, 2004). Depperu and Cerrato (2005) noted that the different levels of competitiveness are strongly related: for example, a country's competitiveness factors are determinants of its firms' international competitiveness. The level of analysis at which the concept of competitiveness may be considered complicates the formulation of a univocal definition of competitiveness both at a theoretical and political level (Testa, 2010).

2.4.1 National Competitiveness

At the national level, competitiveness has been defined by several bodies and authors. Porter (1990) defined competitiveness as the ability of a nation to innovate in order to achieve or maintain an advantageous position over other nations in a number of key industrial sectors. Depperu and Cerrato (2005) highlighted some country-specific factors that affect the performance of firms located in each country. These include: resource endowments, cost of labour and production inputs, financial and technological infrastructure and access to markets.

Porter (1980) further asserted that the productivity of a country is determined by the productivity of the firms operating in that country. In other words, a nation can be said to be competitive if

firms (indigenous and foreign) operating there are competitive. Therefore, firms must constantly seek means of improving their competitiveness in order to boost the competitiveness of their respective nations.

Other definitions of national competitiveness are given in Table 2.1

Table 2.1 Definition of National Competitiveness

Definition of National competitiveness	References
The collection of factors, policies and institutions which determine the level of productivity of a country and that determine the level of prosperity that can be attained by an economy	(World Competitiveness Yearbook, 2007)
The ability of the economy at the sub-national level to attract and maintain firms with stable or rising market activities, while maintaining or improving living standards of all those living in the region	(Cooke, 2004)
The ability of an economy to provide its residents with a high living standard and a high employment level for all those who want to work on a sustainable basis	(Porter and Ketels, 2003)
The ability of a country to create, produce and distribute service products in international trade while earning returns on its resources	(Scott and Lodge, 1985)

2.4.2 Competitiveness at the Industry Level

Competitiveness at the industry level is the extent to which a business sector offers potential for growth and attractive return on investment (World Competitiveness Yearbook, 2006). It is also defined as the collective ability of firms in a particular sector (industry) to compete internationally (D’Cruz, 1992). Momaya (1998) further defined industry competitiveness as the extent to which an industry satisfies the needs of its customers from the appropriate combination of price, quality and innovation.

Porter (1980) explained that a key strategy for developing competitive strategy is to relate a company with its environment. Although the environment in which a firm operates is broad, consisting of social, economic and political forces, the industry in which a firm operates represents a major aspect of its environment. Porter (1980) used the five force framework to explain the industry forces that affect competitiveness of firms. These forces include: rivalry among existing competitors, bargaining power of suppliers, bargaining power of buyers, threat of new entrants, and threat of substitute products or services.

According to WCY (2006), competitiveness at the industry level is important for the following reasons:

- i. Public policy designed to facilitate industrial growth is often focused at the industry level
- ii. International trade agreements are frequently specific to certain industries

2.4.3 Firm Competitiveness

Ivancevich, Lorenzi and Skinner (1997) defined firm competitiveness as the degree to which a firm can under free and fair market conditions, produce goods and services that meet the test of international markets while simultaneously maintaining or expanding the real incomes of its employees and owners. It is also defined as the ability to design, produce and market products superior to those offered by competitors (WCY, 2006). Firm level competitiveness is of great interest to practitioners because nations can only compete if their firms are competitive (Ambastha and Momaya, 2004).

There are two major schools of thought on the source of firms' competitiveness. These schools are the industrial school on competitiveness and the strategic management school on competitiveness. Proponents of the industrial school on competitiveness believe that a firm's competitiveness is a function of the external dynamics in the environment in which the firm operates. A major proponent of the industrial school on competitiveness is Michael Porter. He introduced the five forces framework: rivalry among existing firms, bargaining power of suppliers, bargaining power of buyers, threat of new entrants, and threat of substitute products or services that determine the competitiveness of firms. The strategy management school on competitiveness is based on the belief that firms' competitiveness lies in the unique competencies that firms possess and are able to control (Wernerfelt, 1984; Prahalad and Hamel, 1990; Barney, 1991).

In striving for competitiveness firms adopt different strategies. Aiginger (2006) noted that firms in low income countries strive for price competitiveness, i.e., the ability to produce at low cost while richer countries compete on the basis of quality and innovation.

2.5 Competitiveness in the Context of Construction Firms

Competitiveness in the context of construction firms is the extent that a construction firm can compete at the company level and supply products and services in a more efficient manner than its competitors (Enright, 1995). It is also defined as the ability of a firm to bid successfully for construction projects, to produce construction services with superior quality, lower costs, and with shorter time than its domestic and international competitors, and in the long -run to consistently achieve superior performance (Lu, 2006). Simply put it is the ability of a construction firm to compete, win and successfully execute a project (Shair, 2011).

The construction industry is project –based. Hence, construction firms must seek ways of securing jobs. To secure construction projects firms in the construction industry need to possess good bidding skills. Moreover, it is important that construction firms acquire project management competencies like cost, time and quality management in order to deliver superior quality work, at a shorter time and lower price than their rivals. Like every other business, managers of construction firms should also strive to maintain good relationship with existing and prospective clients. Good client relationship creates opportunities for future jobs for a construction firm. Lu (2006) highlighted three key issues from his definition of firm competitiveness. Firstly, construction firms must be proficient in competitive bidding because competitiveness entails that they win contracts. Secondly, construction firms can only achieve competitiveness through the services they provide. Hence, construction services should be of superior quality, with lower costs, and of shorter duration than local and international counterparts. Finally, competitiveness would be achieved when a firm takes into consideration the needs of its stakeholders like client and employees.

2.6 Competitiveness of Construction Firms Globally

The high rate of inefficiency and ineffectiveness in construction industries worldwide has branded the global construction industry as the worst among all other industries (Alinaitwe, Mwakali and Hansson, 2009). Reports from the global construction scene indicate that the performance of the industry has been less than satisfactory. In the UK, these reports date back to 1944 where the Simon report emphasized the need for improvement in construction process especially in UK construction firms (Banwell, 1964). By the 1990s these calls for improvement had grown considerably. For instance, the Latham (1994) report called for improvement in competitiveness of construction firms by reforming the processes of contracting, tendering, designing, quality management, productivity, training and education (Bassioni, Price and Hassan, 2004). Egan (1998) advocated for improvements in productivity, profits, quality and safety which could bring about increased competitiveness of UK construction firms. Moreover, the International Council for Building Research (1999) revealed that the Council was created deliberately to improve the capacity and effectiveness of construction firms in order to meet the demand for quality building and engineering products in a highly competitive business environment.

In the US, there are some unsatisfactory reports of issues in its construction industry which inhibit competitiveness. For instance, frequent rework is beginning to take a significant chunk of the total cost of construction. Hwang, Thomas, Haas and Caldas (2009) reported that the direct cost of construction caused by reworks averages 5% of the total cost of construction in the US. Although China has one of the largest construction industries in the world (Ling, Low, Wang and Egbelakin, 2008), there are also reports of problems occurring within its construction firms that

impede competitiveness. Some of these problems according to Wang, Ahmad and Raymond (2006) include cost overruns, schedule delay, low quality and stakeholders' dissatisfaction.

Construction firms in developing countries face more serious problems that hamper competitiveness and these problems are accentuated by inadequate resources and frameworks to address them (Gyandu – Asiedu, 2009). In India for instance, contractors are still grappling with on-schedule performance i.e. timely completion of projects. Iyer and Tha (2006) reported that 40% of construction projects in India face problems of time overruns. Abbas (2006) revealed that ineffective time control is a common problem in the Malaysian construction industry which results in extra expenses, disputes and litigations to both clients and contractors.

In South Africa, poor contractor capacity, low productivity and low profit margin for contractors are common problems faced by construction firms (Department of Public Works, 1999) which hamper competitiveness. The common occurrence of contract administration problems, complex and lengthy payment procedures and delayed payments are common occurrence in Ghanaian construction firms (Anvuur, Kumaraswamy and Male, 2006; Gyandu – Asiedu, 2009). These also inhibit competitiveness of its construction firms.

2.7 Factors Affecting Competitiveness of Indigenous Construction Firms in Nigeria

Literature from the Nigerian construction industry reveals many problems which negatively affect the competitiveness of construction firms. These problems are mostly in the form of poor quality of constructed facilities, delays, cost overruns, low client satisfaction, increased rework and low productivity. Oyewobi *et al.* (2011) noted that the Nigerian construction industry is an ailing one because its performance curve is abnormal. For example, the performance problem of time overrun in the Nigerian construction industry has become common place. Seven out of ten

projects carried out in Nigeria suffered delay in their execution which ultimately leads to extra cost to the client (Odeyinka and Yusif, 1997). Ayodele and Alabi (2011) found out that poor scheduling of project operations is a major cause of project delay in Nigeria. Cost overrun is another performance problem that is prevalent in the Nigerian construction industry (Elinwa and Buba, 1993; Omoregie and Radford, 2005). Contractor related causes of cost over run include: incorrect planning, wrong method of estimation and poor contract management (Tunji-Olayeni, Lawal and Amusan, 2012).

Poor quality of materials and workmanship is another factor affecting competitiveness of indigenous construction firms in Nigeria. For instance, Idoro and Akande-Subar (2008) compared client assessment of the quality performance of indigenous and expatriate contractors in Nigeria. The results indicated that the quality of materials used for construction and the standard of workmanship of expatriate contractors are better than those of indigenous contractors while the magnitude of defective work and the amount of retention fee spent to rectify defects that occur during defect liability period are higher in projects executed by indigenous contractors than those of expatriate contractors.

Furthermore, Oke and Abiola-Falemu (2009) investigated the effects of poor quality materials and workmanship on building collapse. The study showed that the quality of materials and standard of workmanship used by indigenous contractors in Nigerian is not satisfactory and that the problem lies in the use of inappropriate materials supplied to site and inefficient supervision of workmen. Oyewobi *et al.* (2011) carried out a research aimed at enhancing efficient project delivery by evaluating the cost of rework for building projects in Niger State, Nigeria. It was discovered that cost of rework was about 5% of the total cost of construction.

All these problems have resulted into substantial increases observed in the cost of construction projects. According to Mbachu and Nkado (2004), this substantial increase has negative implications for major stakeholders in the industry which includes loss of client confidence in consultants, added investment risks, inability to deliver value to clients, and disinvestment in the construction industry; thereby undermining the viability and sustainability of construction firms and the construction industry at large.

Low productivity is also another factor affecting the competitiveness of indigenous construction firms in Nigeria. Adenikinju (2005) graded the productivity performance in the Nigerian construction industry to be below average and noted that technical efficiency was on the decline in the Nigerian construction industry.

These problems have created a ‘Pareto principle scenario’ where foreign construction firms consisting only 5% of all construction firms operating in Nigeria dominate the construction market. The Pareto Principle is used to describe the phenomenon in which a relative few in a given population, account for the bulk of effect in that population (Juran, 1994).

Therefore, indigenous construction firms contend more with threats emanating from the business environment than they maximize the opportunities therein and, thus struggle to survive in a harsh business environment that is characterized by high competition and low profit margin.

2.8 The Construction Industry System

Gyandu –Asiedu (2009) described the construction industry as a system. Hall and Fagen (1956) described a system as consisting of objects, attributes and relationship between objects and attributes. Gyandu –Asiedu (2009) further explained that objects are components of a system. For example, the components of the construction industry system include clients, consultants,

projects and firms while attributes refer to the properties of the object. For instance, success or failure is an attribute of construction projects. The properties of the components are linked together in a cause and effect relationship such that a change in one component results in a significant change in another. According to Gyandu –Asiedu (2009), the construction industry system can be represented at three levels namely: the system level, the sub-system level and the super system level. The system level refers to the construction industry. The sub system refers to all the components of the construction industry system for example construction firms, clients, personnel and projects while the super system covers everything that does not belong to the construction industry system but interacts with the system, or produces influences upon functioning of the system, for example the natural, social, economic and political environment. Hamsal and Agung (2007) revealed that the environment can affect a firm in three basic ways: by munificence, dynamism and complexity.

2.8.1 Munificence

Munificence is the extent to which an environment can sustain a business and enable it to grow and succeed (Randolph and Dess, 1984). Munificence is also described as the extent to which an environment can provide sufficient resources for its firms (Aldrich, 1979; Starbuck, 1976). However, resources are scarce and firms compete with each other for scarce resources. As a result, the definition of munificence also include the degree of competition among existing firms for available resources (Mintzberg, 1989) and the presence or absence of entry barriers (Randolph and Dess, 1984). Jogaratnam, Tse and Oslen (1999) explained that an environment must possess abundant critical resources required by a firm before it can support sustained growth of the firm. Firms generate more profit in a highly munificent environment. However,

when munificence is low as a result of slow market growth and increase in the number of entrants into the market, resources will become scarce and firms' performance would be negatively affected. Castrogiovanni (1991) identified financial capacity as a critical resource derived from the environment that affects the growth of a firm. Financial capacity is used to acquire or improve on other resources (human, equipment, materials).

2.8.2 Dynamism

Dynamism is a factor of the environment that describes the degree of a market's instability over time and the turbulence caused by interconnectedness between organizations (Aldrich, 1979; Gyandu-Asiedu, 2009). According to Scott (2003), dynamism reflects the extent to which environmental entities undergo change. However Lester, Certo, Dalton, Dalton and Cannella (2006) noted that change that is predictable is not a source of uncertainty. Bluedorn (1993) noted that managers in highly turbulent environments face intense levels of dynamism and must develop strategies to adapt to constant change (Pearce, 1997). Dynamism include rate of innovation within the industry, the frequency of changes in construction industry policies, the impact of government intervention and technological instability.

2.8.3 Complexity

Scott (2003) described complexity as the extent to which managers deal with environmental entities that are similar to, or different from the internal environment of their firms. Firms possess distinct characteristics like firm size (by employment), firm age, firm ownership (sole proprietorship, partnership, limited liability) geographical location, quality of personnel and quality of leadership (Duncan, 1972; Starbuck, 1976; Gyandu-Asiedu, 2009). Managers in

highly complex environment contend with conflicting demands of multiple stakeholders (Jogarathnam and Wong, 2009). High complexity is common in industries that are highly fragmented while industries with less competition are described as less complex industries.

From the foregoing, it is important that firms devise strategies for combating all the internal and external influences confronting them if they must survive.

2.9 Strategy

According to Naismith (2007), strategy is derived from a Greek word 'strategia'. Pamulu (2010) narrated that the root of strategy can perhaps be traced to as early as 320BC to the work of Sun Tzu on military strategy. It has been argued that the concept of strategy has no universal definition (Channon, 1978; Mintzberg, Quinn and Ghosal, 1998). This may be because of the multifaceted contributions to the concept (Hakansson and Snehota, 2006). For example, there are contributions from the field of industrial economics (Chandler, 1962; Porter, 1980), construction (Channon, 1978; Ramsay, 1989; Hillebrandt and Cannon, 1990), the schools of organisational (Miles and Snow, 1978; Pfeffer, 1994) and management (Ansoff, 1965; Hofer and Schendel, 1978) theories.

Chandler (1962) defined strategy as determination of the basic long-term goals and objectives of an enterprise, and the adoption of courses of action and the allocation of resources necessary for carrying out set goals. Recently, strategy has also been defined by Hubbard *et al* (2008) as the decisions that have medium to long term impact on the activities of an organisation by the use of its resources to create value for key stakeholders and to outperform competitors. Moreover, strategy is used by organizations to deal with changes in the environment (Junnonen, 1998).

According to Besanko, Dranove, Shanley and Schaefer (2009), there are four critical questions that a firm must answer in order to successfully formulate and implement strategy. These questions are:

- i. Firm's boundaries – What is the boundary within which a firm should operate? What good or service should a firm sell? How large should the firm be?
- ii. Firm's market – What is the nature of the market in which a firm operates? How intense is the rivalry among existing firms in the market?
- iii. Firm's competitive positioning - How should a firm position itself in the competitive space in order to gain advantage over rivals?
- iv. Firm's internal organization - How should a firm organize its structure, system and resources in order to gain competitive advantage?

Mintzberg *et al.* (1998) identified ten approaches to strategy. These approaches are: The design approach, the planning approach, the positioning approach and the entrepreneurial approach. Others are the cognitive approach, the learning approach, the power approach, the culture approach, the environmental approach and the configuration approach.

2.10 Strategic Management

Schendel and Hofer (1979) defined strategic management as a process that deals with the entrepreneurial work of an organisation, including its renewal, growth and more particularly, developing and utilizing strategy, which guides the operations of the organization. In recent times, strategic management has been defined as the major intended and emergent initiatives taken by managers on behalf of owners involving utilization of resources to enhance the performance of firms in their external environment (Nag, Corley and Gioia, 2007). According to

Abubakar, Tufail, Yusof and Virgiyanti (2011), strategic management involves the use of corrective actions to achieve long term goals of a firm. It also involves the use of a firm's structure, resources, capabilities and strategic positioning to create and sustain advantage over competitors (Mahoney, 2012).

As posited by David (2005), strategic management involves formulating, implementing and evaluating cross-functional decisions that enable an organisation to achieve its objectives. These processes: strategy formulation, implementation and evaluation have been described as the phases of strategic management (Sharpin, 1985; Certo and Peter, 1991; Stahl and Grigsby, 1992; David, 1997 and Abubakar *et al.*, 2011).

2.10.1 Phases in Strategic Management

2.10.1.1 Strategy Formulation

The aim of strategy formulation is to ensure that an organisation achieves its objectives by developing a mission statement, which provides the framework within which business strategies are formulated (Certo and Peter, 1991; Hill and Jones, 2008). However, scanning an organisation's external environment to identify threats and opportunities, and its internal environment to identify strengths and weaknesses should precede strategy formulation (Hunger & Wheelen, 2003). Strategy formulation include deciding which business to pursue, developing a mission statement, establishing long-term objectives, generating alternative strategies, and choosing the best strategy to be implemented (Abubakar, 2011).

2.10.1.2 Strategy Implementation

This requires firms to establish objectives, devise policies, motivate employees, and allocate resources to execute formulated strategies (Abubakar *et al.*, 2011). Strategy implementation also involves managing the changes that occur in organisations as a result of the introduction of a particular strategy (Johnson and Scholes, 2002). Changes may be physical including any change to the organisation's structure, management systems, policies and procedures, budgets and resources allocations, and information systems or behavioural such as changes to communication systems, managing and developing quality and excellence, as well as innovation (Thompson, 1997). It is the effective implementation of strategy that enables organisations to reap the benefits of organisational analysis, organisational direction, and organisational strategy (Certo and Peter, 1991).

2.10.1.3 Strategy Evaluation

Evaluation is done by reviewing current strategies, measuring performance and taking corrective actions. According to Certo and Peter (1991) strategy evaluation is needed because success today is no guarantee of success tomorrow and strategic evaluation demands that strategic performance be compared with existing standards.

2.10.2 Models of Strategy Formulation in Organisations

Mintzberg and Waters (1985) presented several methods of performing strategic management within organisations. These methods have been classified into three and are frequently referred to as the models of strategy formulation. They include linear strategic models, adaptive strategic models and interpretative strategic models (Edum – Fotwe, 1995).

2.10.2.1 Linear Strategic Models

According to Edum – Fotwe (1995), linear model of strategic management involves goal setting and decision making with the aim of achieving desired goals. Moreover, decision making in linear strategic model is viewed as analytical, systematic and involves the selection of appropriate option from a range of alternative options. Linear strategic models are based on certain assumptions: (1) that firms' can make plan and expect only minor changes because the environment is predictable and has little impact on the firms' strategies (2) That employees are ready to implement the strategies developed by top management. (3) That goals can be achieved by changing products or markets to suit clients' needs. (4) That top management is rational. (5) That strategic management process is clearly defined and each phase is separated from the other by time frames.

2.10.2.2 Adaptive Strategic Models

The central theme of adaptive strategic models is the recognition of the environment as the major motivator of firms' actions. Proponents of the adaptive strategic school believe that there is a strong and complex relationship between the environment and the firm. Hofer and Schendel (1978) suggested that firms' strategies should consist of firms' resources and the opportunities and threats that emanate from the environment. Bowman and Asch (1993) also noted that environmental trends and competitors also influence the performance of firms as much as customers do.

Chaffee (1985) identified two major differences between the adaptive model and the linear model: (1) monitoring the environment and making necessary changes are simultaneous and

continuous functions in the adaptive models (2) The adaptive models does not place emphasis on firms' goals but rather it focuses on the means by which firms' goals are achieved.

2.10.2.3 Interpretative Strategic Models

Interpretative strategic model is a hybrid form of the adaptive strategic model. It integrates the concepts of corporate culture and frames of reference that determine the attitudes of stakeholders towards the firm (Edum-Fotwe, 1995). With interpretative strategic models, top management is careful to give instructions that would convey positive meanings to their stakeholders who would in turn act favourably towards the firm. Although interpretive strategy like adaptive strategy view organisation and its environment as an open system, Chaffee (1985) highlighted some major differences between both models including (1) in interpretive strategy managers shape the attitudes of participants and potential participants toward the organisation and its outputs (2) interpretive strategy emphasizes attitudinal and cognitive complexity among diverse stakeholders in the firm and (3) in interpretive strategy, organisational representatives convey meanings that are intended to motivate stakeholders in ways that favor the organisation.

2.10.3 Making Strategic Decisions

Eisenhardt and Zbaracki (1992) defined strategic decisions as those important and infrequent decisions made by senior managers of a firm that significantly affect the growth and survival of that firm. There are basically three approaches to making strategic decisions. They include: rationality and bounded rationality approach, politics and power approach and the garbage can approach.

2.10.3.1 Rationality and Bounded Rationality

In rationality and bounded rationality approach to decision making it is believed that decisions are made after appropriate information have been gathered, alternatives have been generated and optimal option selected (Eisenhardt and Zbaracki, 1992). However, it has been noted that rationality and bounded rationality does not necessarily provide the best results (Mintzberg, Raisinghani and Theoret, 1976; Nutt, 1984; Frederickson, 1985; Dean and Sharfman, 1993) because of the following reasons:

- i. Strategic decisions depend on pressures from the environment, size and structure of the firm (Mintzberg and Waters 1982)
- ii. Managers search for information and alternatives in a haphazard and opportunistic manner (Cyert and March, 1963)
- iii. Top managers make strategic decisions based on their own rationality which in most cases is governed by intuition (Stahl and Grigsby, 1992).
- iv. Goals are inconsistent across people and time (Anderson, 1983, Pinfeild, 1986)

2.10.3.2 Politics and Power

The firm has been described as a political system consisting of people with competing interests (Quinn, 1980; Eisenhardt, 1989 and Pettigrew, 1992). The competing interests stem from the different individual views and biases which bring about clashes of interest from which the interest of the most powerful person emerges. Usually the most powerful person in an organisation is the Chief Executive Officer. Hence, politics and power approach to decision making is thought to be the reflection of the inclinations of the most powerful person or people in an organisation. March (1994) regards this approach as political because decision makers have

inconsistent preferences or identities. Eisenhardt and Zbaracki (1992) highlighted three basic assumptions of the politics and power approach to decision making:

- i. Firms are political systems consisting of diverse conflicts due to different interests and talents.
- ii. Decisions are the preferences of the powerful.
- iii. People at least sometimes engage in politics.

2.10.3.3 Garbage Can

Cohen, March and Oslen (1972) first used the term 'garbage can' to describe strategic making process in a complex, unstable and ambiguous environment. The garbage can approach to decision making emphasizes the fuzzy nature of decisions (Cohen *et al.*, 1972). Decision making process in firms is regarded as organised anarchies consisting of participants with varying views, problems, solutions and choices. The major theme of the garbage can approach to decision making is that firms are subject to ambiguities in certain ways:

- i. Goals are discovered through inconsistent and ill-defined choices of decision makers.
- ii. Through trial and error managers gain knowledge.
- iii. The decision making process is influenced by people who are changing all the time.

2.10.4 Strategic Paradigms

Five strategic paradigms have been identified in literature. They include: Quinn's logical incrementalism, Mintzberg's deliberate and emergent concept, Miles and Snow's organisational typology, Porter's generic strategy and Ansoff's organisational styles. These paradigms are explained below.

2.10.4.1 Quinn's Logical Incrementalism

According to Quinn (1989), many successful firms do not have any clear-cut idea of the direction in which they are headed, but roll-out their plans for change gradually as events unfold, keeping their options open and steering their firms incrementally towards a consensus view of the most important organisational goal to be accomplished. Quinn (1989) further asserted that firm structure, style of management and the content of individual decisions vary from one to another as such it is difficult to describe strategy formulation in organisations by a single paradigm. Quinn's logical incrementalism is based on the belief that managers move towards their goals in a step-by step manner and on a piecemeal basis, moving forward incrementally when making decisions especially on the quality of information utilized, changing external factors and internal subsystems and the quality of persons involved in decision making.

Although this is an excellent approach which tends to focus more on measurable factors of firms' strategy, its major demerit is that it de-emphasizes the use of qualitative and behavioral factors in determining firm's strategy.

2.10.4.2 Mintzberg's Deliberate and Emergent Concept

Mintzberg (1989) noted that a firm's strategy could be as a result of a deliberate action or it could emerge as a response or reaction to certain situations. Traditionally, strategy is believed to be the result of deliberate actions by setting desired goals and providing mechanisms to fulfill such goals (Stahl and Grigsby, 1992). However, at other times a firm's strategy may emerge for example, from its process of implementation. Perfectly deliberate strategies would require the following conditions:

- i. There must be a clear-cut and proper articulation of firms' intention.

- ii. There must be a consensus view on firms' intention.
- iii. The intention must be realized as intended without any influence from external forces
(politics, technology, market)
- iv. For a strategy to be perfectly emergent actions must be consistent over time.

Mintzberg and Waters (1989) however noted that perfectly deliberate and emergent strategies are difficult to come by in reality. But that some strategies do come rather close, in some dimensions if not all like planned, entrepreneurial, ideological, umbrella, process, unconnected, consensus, or imposed strategies.

2.10.4.3 Miles and Snow's Organizational Typology

Miles and Snow (1978) postulated the organizational typology view on strategy with the belief that a firm's strategy depends on the firm's typology. According to Miles and Snow (1978) firms in an industry can be classified into four groups, i.e. defenders, prospectors, analyzers and reactors, depending on a firm's response to the three major problems encountered by firms: entrepreneurial, engineering, and administrative problems. Miles and snow (1978) defined the entrepreneurial problem as problem associated with a firm's product-market domain; the engineering problem as problems associated with a firm's choice of technologies and process for production and distribution; and the administrative problem as problems associated with formulating, rationalizing and innovating a firm's structure and policy processes. The four categories of firms are explained below:

i. Defenders

Firms in this category maintain a position in their external environment. They strive towards maintaining stability within their firms and their market niche. They also protect their market by competing on the basis of high production standards. Their watch words include efficiency, high employee productivity, and low direct costs.

ii. Prospectors

Prospectors seek new market opportunities. They also seek to spear head new developments and do not like to depend on a single product, market, or technology. They are known for high research and development and marketing expenditures.

iii. Analyzers

These firms adopt a mixed strategy as those of defenders and prospectors i.e. they are inclined towards achieving high production standards as well as incorporating changes in their product, market and technology.

iv. Reactors

Reactors do not develop formal strategies or policies. They identify new opportunities only after other rival firms have successfully implemented them. Firms in this category generally perform poorly in comparison to those in the first three categories.

2.10.4.4 Porter's Generic Strategy

Porter (1985) developed a generic strategy with which firms can gain competitive advantage. He argued that a firm's position in the market can determine its profitability. He also noted that certain forces in the environment determine the degree of competition among firms in a particular market. These forces include: customers, suppliers, potential entrants, substitute

products or services and jockeying for position among current competitors. Consequently, Porter (1985) advanced three generic strategies that firms can employ in order to gain competitive advantage. These strategies include cost leadership, differentiation and focus.

2.10.4.5 Ansoff's Organizational Styles

Ansoff (1972) identified two typical cultures found in an organisation. These culture types are incremental and entrepreneurial cultures. The incremental culture is geared towards maintaining equilibrium within the organisation, and between organization and the external business environment. Firms that adopt the incremental style of culture view change as a negative development which should be minimized. Ansoff (1972) revealed that incremental style leads to long-term survival if the firm possesses an efficiency driven attitude within a stable market. On the other hand, entrepreneurial organisations strive for continuous change in their organizations. They do not react to problems but instead they anticipate future threats and opportunities.

2.11 Theories of Firms' Competitiveness

There are two dominant theories of firms' competitiveness namely Porter's theories of firms' competitiveness and the Resource –Based View (RBV) on competitiveness. Porter's theories of competitiveness are based on the belief that a firm's competitiveness is determined by the external forces in a firm's environment. The Resource – Based View focuses on the internal resources and competencies of a firm in achieving competitiveness.

2.11.1 Porter's Competitive Theories of the Firm

Porter's theories of competitiveness were developed by Michael Porter in 1980 and 1985. Porter's competitiveness theories consist of three other theories namely: Porter's five forces framework, Porter's theories on competitive strategy and Porter's value chain analysis. These theories are explained below.

2.11.1.1 Porter's Five Forces Framework

The framework was developed by Micheal Porter in 1980. It is based on the belief that a firm's competitiveness is determined by the structure of the market in which the firm operates. Pamulu (2010) explained that the structure of the firm determines the conduct of the firm and the conduct of the firm impacts on the firm's performance.

Porter's (1980) framework is made up of five forces that determine the profitability of the firm as depicted in Figure 2.1. These forces are: Threat of new entrants, threat of substitution, bargaining power of buyers, bargaining power of suppliers and rivalry among existing firms.

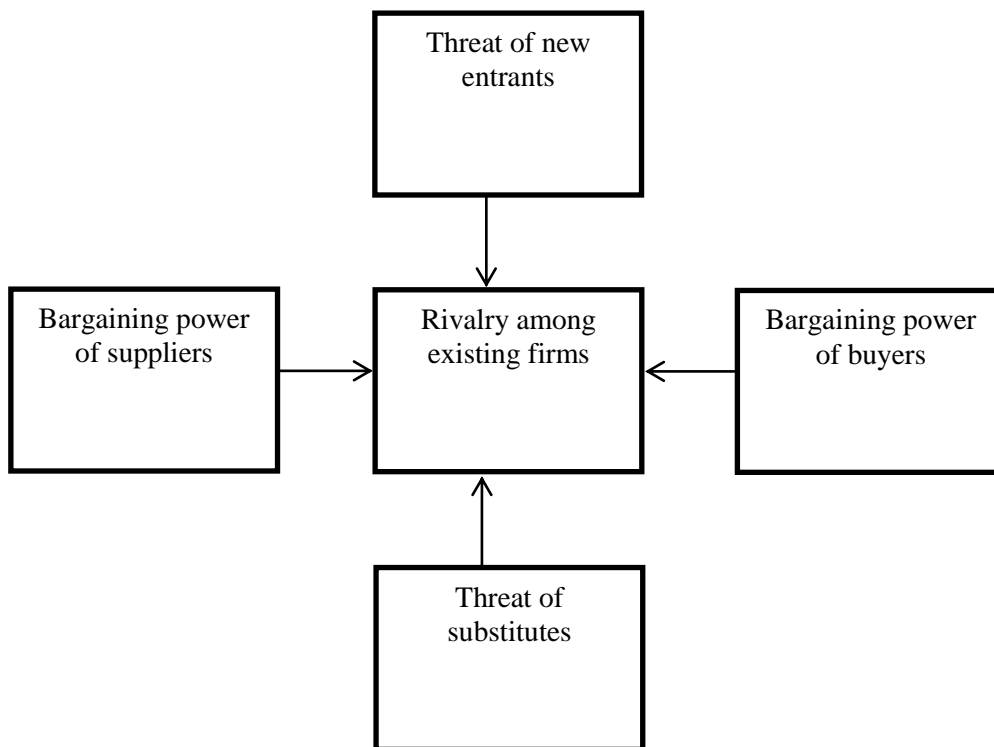


Fig. 2.1 Porter's Five Forces Framework

Source: Porter (1980)

The forces in Figure 2.1 are further explained thus:

Threat of New Entrants - New entrants are new competitors entering a market (an industry). They aim to gain a share of the market, thereby reducing the level of profits earned by existing firms. Pamulu (2010) noted that the seriousness of the threat of entry depends on the existence of barriers to entry and the reaction that entrants can expect from existing competitors. Several actions can be taken by both industry players and government to discourage new entrants into an industry. Suzuki (1999) identified actions that can be taken by industry players and government to discourage new entrants. Intervention from industry players against new entrants include economies of scale, proprietary product differentiation, brand identification, switching cost,

access to distribution channels, capital requirements, access to latest technology, experience and learning effects. Government action against new entrants includes industry protection, industry regulation, consistency of policies, custom duty, and foreign exchange.

Bargaining Power of Buyers- The customer is a very powerful stakeholder whose power can have significant effect on the industry. Suzuki (1999) explained that buyers' power include the number of important buyers who are able to force down prices or bargain for higher quality or more services. Like Pamulu (2010) noted that buyers' power depend on the characteristics of the market and the relative importance of purchases to the industry compared with its overall business.

Bargaining Power of Suppliers- As expressed by Pamulu (2010), suppliers can exert bargaining power on the industry. This power is exhibited by the number of important suppliers that are able to demand for extremely high profits (Suzuki, 1999).

Threat of Substitutes – Firms offering substitute goods and services also affect the competitiveness of the industry. Substitute goods or services can limit the potential returns of an industry by placing a ceiling on the prices firms in the industry can profitably charge (Pamulu, 2010).

Rivalry Among Existing Firms – Industry profits is significantly affected by the degree of competition among existing firms in a particular industry (Pamulu, 2010). The major determinants of rivalry among existing firms are industry growth, share of fixed cost to the total value added of the business, the depth of product differentiation and concentration among competitors (Suzuki, 1999).

It is the strength of a firm's defence position against these five forces that will determine whether the firm will have competitive advantage or disadvantage (Porter, 1980). A firm's

strength may be in the area of experience, access to latest technology or economies of scale. The ability of a firm to access latest technology and the experience of the firm in a particular market or industry can enhance its advantage over competitors or new entrants. Moreover, economies of scale can make a firm to gain competitive advantage and also enable it to enjoy more profits than competitors.

2.11.1.2 Porter's Theory of Competitive Strategies

Porter (1980) advanced the three generic competitive strategies – cost leadership, differentiation and focus. Cost leadership approach to competitiveness implies that a firm becomes the lowest cost producer in order to outperform rivals without losing any potential profits (Pamulu, 2010). Such an approach calls for a strong emphasis on cost reductions by adopting tight cost and overhead control, minimizing cost across the departments, and conducting operations and activities in an efficient manner (Kale and Ardit, 2002).

Differentiation strategy requires the firm to have unique or different products or services perceived by customers which enables the firm to command higher prices than industry average (Kale and Ardit, 2002; Pamulu, 2010). This strategy calls for differentiating aspects of the business such as the products or services offered, the technology used, the delivery system offered, the marketing approach adopted, and a wide range of other aspects, depending on a particular industry's characteristics (Kale and Ardit, 2002)

Focus enables a firm to efficiently serve a particular segment or niche within the market (Pamulu, 2010). It could be a narrow approach which implies concentrating on certain markets, clients, customers, and geographical location, and offering narrow range of products/services; or a broad approach which means undertaking works in several different market segments for a

variety of different clients in many different geographical locations and offering a wide variety of products/services (Kale and Ardit, 2002).

2.11.1.3 Porter's Value Chain Analysis

Porter (1985) introduced the value chain as a tool for assessing business activities and identifying competitive advantage. The value chain is made up of two major activities: primary and support activities. Porter describes these activities as the building blocks of competitive advantage, where firm performance in each activity determines overall success of the firm. The primary activities include: inbound logistics, operations, outbound logistics, marketing, sales and services. The primary activities can be thought of as the classical managerial functions of the firm, where there is an organisational entity with a manager in charge of a very specific task, and with full balance between authority and responsibility (Suzuki, 1999). Support services include: procurement, technology development, human resource management and firm's infrastructure. Support services are much more pervasive and they provide support not only to the primary activities, but to each other (Suzuki, 1999).

Porter's value chain seeks to answer two major questions:

How can firms offer value to customers?

At what cost can this value be offered?

Porter's theories of competitiveness have received several criticisms despite its remarkable contributions. Pamulu (2010) highlighted four criticisms to porter's theories of competitiveness. For instance, Porters five forces framework is based on the assumption that the markets are stable. However, Prahalad and Hamel (1994) and D'veni (1994) provided evidences that markets are unstable. Secondly, the framework is not exhaustive. For example, Gordon (1997) introduced

a sixth force that determines the competitive advantage or disadvantage of a firm which he refers to as government. Hunger and Wheelen (2001) also suggested the inclusion of stakeholders such as local communities, shareholders, trade associations, creditors etc. as a sixth force that can determine the competitive advantage or disadvantage of a firm. Thirdly, the framework emphasizes competition at the expense of cooperation. Brandenburger and Nalebuff (1996) used games theory to show how firms can create value and larger markets by cooperating with customers and suppliers. Finally, the framework is based on the belief that competitiveness can only be achieved by overcoming forces from the external environment.

2.11.2 Resource-Based View (RBV) on Competitiveness

The RBV is based on the belief that firm-specific resources are the fundamental determinants of firms' competitiveness. The Resource-Based View became popular in the late eighties with increasing dissatisfaction with the Porterian emphasis on industry structure as the major source of competitiveness. During the late 80s and early 90s there were empirical evidences (Cubbin, 1988; Prahalad and Hamel, 1990; Barney, 1991; Williams, 1992 and Peteraf, 1993) that proved that firms in the same industry had differences and these differentials accounted for their varying performances. It was found out that firms having particular skills and capabilities outperformed their competitors.

Generally, firms' resources refer to inputs into a production process (Grant, 1991). Dunning (1998) defined firms' resources to include: financial resources, tangible resources like equipment and buildings, intangible resources including patents, reputation, experience and organisational routines. Barney (1991) grouped firms' resources into 1) physical capital resources which include: plant and buildings 2) human capital resources including: training experience and

relationships and 3) organisational capital resources for instance, formal planning, informal planning and coordinating systems of a firm. Douma and Schreeuder (1991) classified resources as tangible including buildings and machinery; and intangible resources such as patents, know-how, brand and experience.

Not all resources in a firm can be a source of a firm's competitiveness. Therefore, a key question is 'which set of resources are significant to a firm's competitiveness'? Or 'which set of resources can enable a firm earn above-normal profits'? Barney (1991) highlighted four characteristics of resources that are significant to a firm's competitiveness. These characteristics are: value, rareness, inimitability and non-substitutability. Grant (1991) added that the degree of durability, transparency, transferability and replicability are important characteristics of firms' resources that determine firms' competitiveness. Moreover, Amit and Schoemaker (1993) identified eight attributes of firms' resource that make resources a source of competitiveness. These attributes are complementarity, scarcity, low tradability, inimitability, limited substitutability, appropriability, durability and overlap with strategic industry factors.

Peteraf (1993) proposed four basic assumptions necessary for the creation of competitive advantage. One, it is assumed that firms' resources are heterogeneous. This implies that firms' resources are not the same because no two firms can have the same set of experiences or the same set of skills. Consequently, firms are able to identify the resource that can create competitive advantage and that is worth protecting and developing. Two, a firm can create competitive advantage by the ex post limit to competition. This means that a firm should be able to create barriers to new entrants by acquiring resources that are inimitable and not substitutable. Three, resources should be imperfectly mobile. Imperfectly mobile resources are resources that are tradable but are more valuable within the firm that currently employs them than they would

be in other firms (Montgomery and Wernerfelt, 1988). For firms to create competitive advantage they must invest in the resources they have so that such resource can be of more value to them than to some other firm. Finally, firms must ensure an ex-ante limit to competition. According to Pamulu (2010), ex-ante limits to competition ensure that the costs incurred to establish a superior resource position does not offset the profits earned.

Lu (2006) highlighted the major propositions of the RBV as:

- i. A firm is a collection of resources
- ii. Competitiveness does not depend on market and industry structures but on firms' internal resources.
- iii. Only firm - specific resources which are valuable, rare, non-substitutable, imperfectly imitable and imperfectly immobile can bring about firms' competitiveness.
- iv. Firms must concentrate and develop those firm - specific resources in order to achieve competitiveness.

2.12 Assessing Competitiveness in Organisations

Lu (2006) explained that measurement enables human beings to understand their world. He further asserted that measurement can be done for simple things like height, weight and even more complex things like competitiveness. Shen *et al.* (2003) abstracted competitiveness as follows:

$$CI = f(I_1, I_2, \dots, I_i, \dots, I_n) \dots\dots\dots \text{equation}$$

Where,

CI = competitiveness index,

I_i ($i=1 \dots n$) denote the multiple competitiveness parameters.

The two key tasks for assessing competitiveness are: to identify a set of competitiveness parameters and to explore the calculation procedures for deriving competitiveness index from the multiple parameters (Lu, 2006).

2.12.1 Identifying Parameters for Competitiveness

Lu (2006) explained that the main source of firms' competitiveness is from the dominant theories of competitiveness: Porter's competitive theory of the firm and the resource-based view on competitiveness. Hu (2001) suggested that parameters for competitiveness should cover 'perceivable and 'potential' competitiveness. Measures of perceivable competitiveness include market share, market coverage, reputation, marketing ability, asset status, profit status and debt status. Potential competitiveness is assessed through information ability, innovation ability, organizational structure, human resource and enterprise culture. Hu (2001) further explained that perceivable competitiveness measures the present competency of a firm when its internal factors react with its external environment while potential competitiveness is the ability of a firm to

sustain future development. Furthermore, Hitchens, Clausen, Thankappan and Marchi (2003) suggested the use of output and input measures as parameters for assessing competitiveness. The output parameters include profitability, productivity and labor growth while the input parameters include resources, research and development capability.

Lu (2006) also suggested that parameters for competitiveness be organized in a multiple-level hierarchy structure because firms' competitiveness is an integral system comprising of many factors that interact with each other. Hierarchy is used to abstract the structure of a system and to study the relationships between the components of the system and the impact of the components on the whole system (Saaty, 1980). Figure 2.2 shows a multi hierarchy structure of competitiveness parameters.

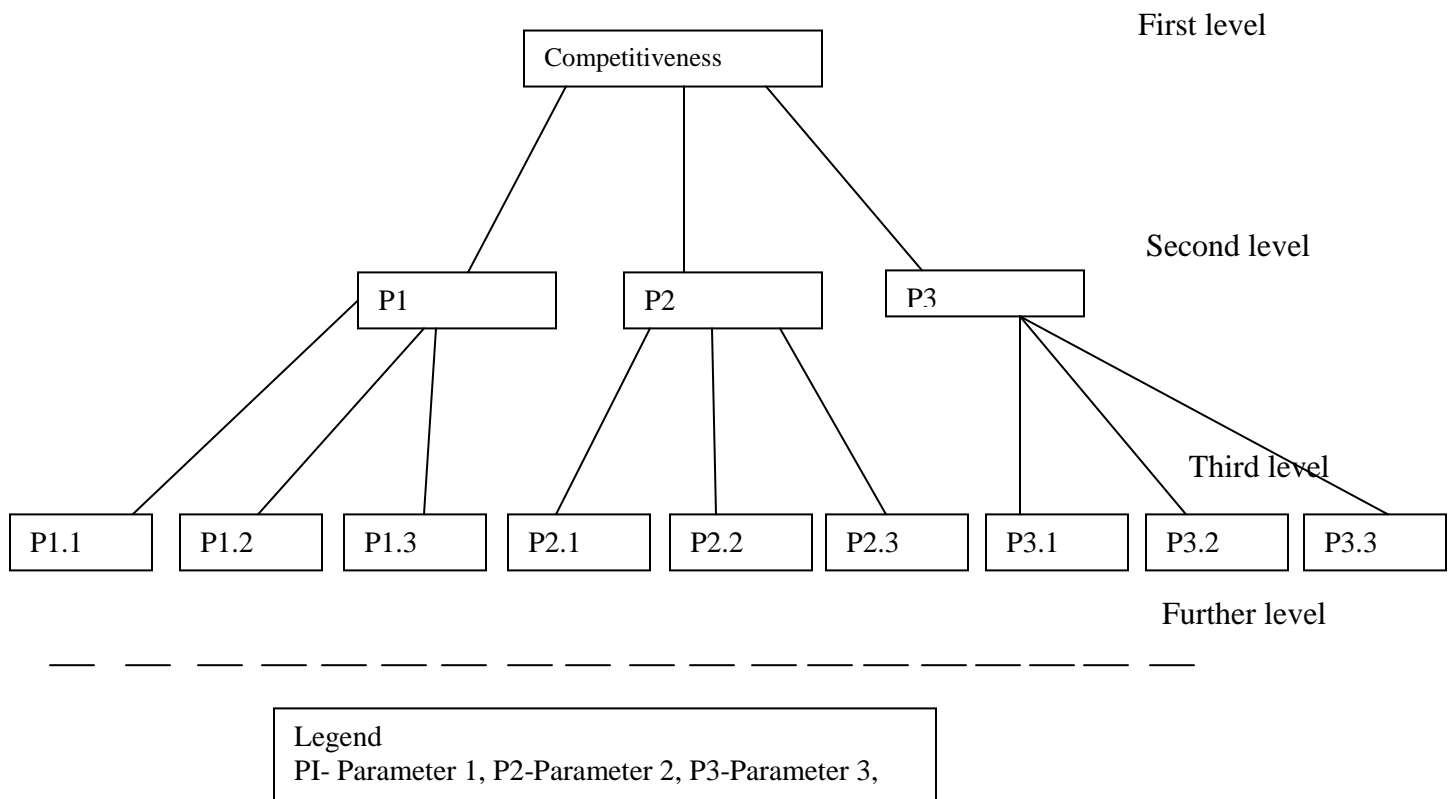


Fig.2.2 Multiple hierarchy structure of competitiveness parameters

Source: Lu (2006)

2.12.2 The Global Competitiveness Report (GCR) Assessment Model

The Global Competitiveness Report (GCR) is probably the oldest, annually updated index of countries competitiveness published by the World Economic Forum since 1979 (Lalinsky, 2005). The GCR assesses competitiveness of nations based on 12 major pillars namely: well-developed infrastructure, stable macro-economic environment, well-functioning public and private institutions, healthy workforce with at least basic education, higher level of education and training, efficient goods market, well-functioning labour markets, ability to harness the benefits of existing techniques, large domestic and foreign markets, the volume of new goods made from the most sophisticated production processes, the volume of different goods made from the most sophisticated production processes and the rate of innovating new products (GCR 2011-2012). However, these parameters have been found to affect countries in different ways. Hence, nations are classified into three major categories depending on their stage of development. Table 2.2 provides the competitiveness parameters for each category of nation.

Table 2.2 GCR competitiveness parameters

Category	Characteristics	Competitive pillar/ parameter
Factor driven countries	Firms compete based on their factor endowments mainly unskilled labour and natural resources. Firms are characterized by low productivity and wages.	Well-developed infrastructure, Stable macro-economic environment, well-functioning public and private institutions, healthy workforce with at least basic education
Efficiency driven countries	Firms possess more efficient production processes. Firms' products/ services are of high quality. Firms are characterized by increased wages	Higher level of education and training, efficient goods market, Well-functioning labour markets, ability to harness the benefits of existing techniques, large domestic and foreign market
Innovation driven countries	Firms are characterized by high wages, very high standard of living	The volume of new and different goods made from the most sophisticated production processes, the rate of innovating new products.

Source: GCR (2011-2012)

In the GCR, competitiveness is assessed by attributing higher relative weights to those pillars that are more relevant for an economy given its particular stage of development. To achieve the weights, each pillar is further sub-divided into 3 sub- indexes. Weights are assigned to each sub-index pertaining to nations in a particular category - factor, efficiency and innovation driven countries (table 2.2). These weights are established by running a regression of GDP per capita against each sub-index for several years and taking into consideration different coefficients for each category of nation.

2.12.3 The World Competitiveness Year Book (WCY) Model

The World Competitiveness Yearbook (WCY) is a publication of the Swiss Institute for Management Development (IMD). It is a thorough and comprehensive annual report on competitiveness of nations, published without interruption since 1989 (WCY, 2013). It analyzes and ranks how nations and enterprises manage their competencies in order to achieve prosperity. The WCY is an invaluable benchmark for major stakeholders. It is used by the business community to determine and validate investment plans. Governments find important indicators to benchmark their policies against those of other countries and academics use the WCY to better understand and analyze how nations compete in world markets (WCY, 2013).

The WCY is made up of four main competitiveness factors: economic performance, government efficiency, business efficiency and infrastructure. Each of these factors is broken down into five sub- factors. Although each sub-factor does not have the same number of sub-factor, each sub-factor has the same weight in the overall results i.e. 5 % ($5 \times 20 = 100$). This approach improves the reliability of the results and helps to ensure a high degree of compatibility with past results.

The WCY contains 333 criteria for competitiveness. However, 246 are used to calculate the overall competitiveness rankings. The remaining 87 criteria are used for background information. Since most of the criteria are scaled differently, the Standard Deviation Method (SDM) is used to reduce all competitiveness criteria into the same scale. Moreover, the SDM measures the relative difference between the economic performances so that each country's relative position in the final rankings is more accurately assessed.

The standard deviation as employed in the WCY is calculated with the formula:

$$S = \sqrt{\frac{\sum (x - \bar{x})^2}{N}} \dots\dots\dots \text{equation}$$

STD (standardized) value for criteria i is calculated as follows:

$$(\text{STD value}) i = \frac{x - \bar{x}}{S}$$

Where \bar{x} = original value of the economy

x = average value of the 60 economies captured in the WCY

N= number of economies

S= standard deviation

Since all of the statistics are standardized, they can be aggregated to compute indices. The index values or scores are used to compute the rankings for four major competitiveness factors given in table 2.3

Table 2.3 WCY Competitiveness factors

Major Factors	Sub- factors
Economic performance	Domestic economy, international trade, international investment, employment, prices
Government efficiency	Public finance, fiscal policy, institutional framework, business legislation, societal framework
Business efficiency	Productivity, labour markets, finance, management practices, attitudes and values
Infrastructure	Basic infrastructure, technological infrastructure, scientific infrastructure, health and environment, education

2.13 Identifying Competitiveness Parameters in the Construction Industry

Literature from the construction industry reveals two major approaches to identifying competitiveness parameters. One approach is to identify Critical Success Factors (CSFs) while the other approach is to identify Key Performance Indicators (KPIs). Neither of the two approaches identified above has an advantage over the other. The choice of a particular approach depends on the preference of the user. Both words (success and performance) only convey the major goal of a business.

2.13.1 Critical Success Factors (CSFs)

The concept of CSFs was first introduced by Ronald Daniel in 1961. He described CSF as the three to six factors that determine success that is, key jobs that must be done exceeding well for a company to be successful. However, the concept of CSFs was made popular by John Rockart in 1979. He defined CSFs as the limited number of areas in which results if satisfactory will ensure successful competitive performance for the organization. Lu, Sheng and Yam (2008) explained two major situations where CSFs approach is used 1) When there is a need to reduce numerous factors into limited ones so as to make a complex system manageable and 2) When there is a need to identify vital factors among a list of several factors competing for limited resources.

Large numbers of competitiveness parameters have been identified for construction firms. For example, Shen, Lu, Shen and Li (2003) identified 98 parameters for assessing the competitiveness of construction firms. Tan *et al.* (2007) identified 88 parameters for assessing competitiveness of firms in the construction industry. Hence, the CSFs approach is adopted to reduce large number of parameters to some manageable few but critical ones. Although there is no fixed procedure for identifying CSFs, Lu *et al.* (2008) highlighted the following steps for identifying CSFs:

Identify a full set of selected success factors (SSFs).

Conduct a survey to investigate each factor's importance by referring to a given goal

Calculate each factor's importance index value based on the survey data

Extract CSFs from the pool of SSFs according to the value of importance index

Interpret and analyze the extracted CSFs.

Moreover, in most cases statistical analysis like factor analysis is used to reduce or categorize the parameters into clusters. Major clusters (parameters) for assessing competitiveness of

construction firms identified in the literature are project management competencies, organizational structure, organization's resources, relationships, bidding and marketing techniques, technology (Lu, 2006); corporate image and strength of human resource (Tan *et al.*, 2007); social influence (Shen *et al.*, 2003); health and safety (Hatush and Skitmore, 1997).

2.13.2 Key Performance Indicators (KPIs)

KPIs are measures of the performance processes that are critical to the success of a construction project or firm (Takim and Akintoye, 2002). They could also be defined as a compilation of data measures used to assess the performance of construction operations. Some KPIs identified in the literature are given in Table 2.4.

Table 2.4 Key Performance Indicators

KPI	Author
Client satisfaction, planning period, staff experience, communication, safety, closeness to budget, profitability, claims	Jastaniah (1997)
Predictability- time, cost, construction cost, construction time, productivity, safety, defects, client satisfaction	Egan (1998)
Benefit, risk, project status, decision effectiveness, production, cost effectiveness, customer commitment, stakeholders, project management	Pillai, Joshi and Rao (2002)
People, cost, time, quality, safety, client satisfaction, communication, environment	Cheung, Sun and Cheung (2004)
Staff experience, resources, site management, safety, contractor experience, time, cost, quality	Wong (2004)
Cost, time, quality, safety, scope, innovation, sustainability, client satisfaction	Rankin, Fayek, Meade, Haas and Manseau (2008)
Construction cost, construction time, predictability of cost and time, defects, client satisfaction	Skibniewski and Ghosh (2009)
On time, under budget, specifications, efficiency, effectiveness, safety, defects, stakeholders, dispute resolution	Toor and Ogunlana (2010)

Source: Ali, Ai-Sulaihi and Al-Gahtani (2013)

KPIs provide an approach for assessing performance, which is one of the main tasks in measuring firms' competitiveness and KPIs provide important references for identifying parameters useful for assessing contractors' competitiveness (Lu, 2006).

2.14 Empirical Studies on Competitiveness and Competitive Advantage in Construction Firms

Several studies have been carried out on competitiveness and competitive advantage in construction firms across the nations of the world. Betts and Ofori (1992) confirmed that Porter's three generic strategies have relevance in construction firms. For instance, traditional procurement practices have driven many construction firms to adopt cost leadership strategy; differentiation strategy in construction firms come in the form of design and build packages, construction and facilities management while focus strategy include partnering, operating within fixed geographical regions, the provision of high value added skills by downsizing to core competencies and focus on specific construction sector.

Venegas and Alarcon (1997) proposed a simplified model of factors affecting strategic decisions in construction firms and employed a mathematical model to predict the impact of the decisions. The study identified the macroeconomic environment, competitive environment, socio-political environment, legal environment and technological environment as external factors affecting the strategic decisions of a firm.

Ngowi, Iwisi and Rwelamila (2001) studied ways by which construction firms in Botswana can create and sustain market position. The study however revealed a lack of inability of construction firms in Botswana to acquire large quantities of resources and capabilities that can enable them create and sustain competitive advantage.

Gomolski (2001) studied businesses in the real time and found out that responsiveness to clients is a source of competitive advantage for many businesses.

Kale and Arditi (2002) employed Porter's models in exploring the competitive positioning of US construction firms. Findings from the study revealed that construction firms in the United States adopt a number of competitive positioning alternatives including cost, differentiation, innovation and focus. Moreover, the study found out that construction firms which adopted the narrow and broad strategy also gained competitive advantage against Porter's (1980) assertions that firms with a 'stuck in the middle' strategy possess no competitive advantage.

Maloney (2002) studied the relationship between construction client satisfaction and construction service delivery. The studied found out that on-schedule construction service delivery is a factor that promotes client satisfaction and ultimately brings competitive advantage.

Karna (2004) analyzed customer satisfaction and quality in construction and noted that achieving quality of constructed facilities and quality of service are important tools for obtaining client satisfaction in the construction industry.

Egemen and Mohammed (2005) studied strategies for contractors' selection and discovered that clients and consultants in Cyprus would be willing to continue working with the same contractor in the future provided they are satisfied with quality of the contractor's previous work.

Ling and Chong (2005) studied the service quality of design and build contractors in Singapore and found out that quality of contracting services is antecedent to client satisfaction which ultimately enhances the competitiveness of contractors in Singapore.

Lu (2006) carried out a study aimed at devising a method for Chinese contractors to better understand their competitiveness. A framework which enables Chinese contractors to determine and compare their competitiveness was developed.

In Hong Kong, Chan (2006) studied the role of finance in the competitiveness of indigenous contractors. The aim of this study was to establish a conceptual model that shows the correlation between indigenous contractors' finance and competitiveness. The study revealed a positive correlation between construction firms' finance and competitiveness.

Cheah, Kang and Chew (2007) combined Porter's theory and the resource-based approach to competitiveness of construction firms and found out that differentiation and diversification strategy contributes directly to competitiveness of Chinese construction firms.

Moreover, Green, Larsen and Chung-Chin (2008) revealed that the long-term strategies of UK construction firms are extremely good at reconfiguring their operating routines to deal with shifting business environment within the construction industry. They also found out that UK construction firms have capabilities to manage their reputation and relationship in sustaining their competitive advantage.

Al-Shorafa (2008) analyzed clients' needs and satisfaction in the construction industry in Gaza. The study revealed that client satisfaction with quality of construction work and construction services gives the contractor an opportunity to remain as a potential partner of the client in the future thereby securing future jobs for the contractor.

In Turkey, specialization on different project types through joint venture companies established by partners is a major strength of many construction firms while the unstable nature of the political and economic structure of Turkey poses a very significant threat as a result, many construction firms prefer private sector investment (Kazaz and Ulubeyli, 2009).

Wethyavivorn, Charoenngam and Teerajetgul (2009) identified excellent reputation, strong bargaining power and financial stability as strategic assets that enhance the competitiveness of construction firms in Thailand.

Shrair (2011) carried out a study which sought to improve and enhance bidders' competitiveness in construction projects in Gaza Strip, Palestine. A model was developed that enables contractors to evaluate their level of competitiveness in order to increase their chances of winning contracts.

Ocen, Alinaitwe and Tindiwensi (2011) analyzed the competitiveness of local construction contractors in Uganda. The study found out that inadequate technical and managerial capabilities contribute to low level of competitiveness among local construction contractors.

Wang and Yang (2011) proposed a business strategy model for Australian construction companies based on Porter's generic strategies. The study also recommended strategic alliance through market expansion overseas as differentiation strategy for Australian construction companies.

In Nigeria some authors have also looked at the issues bedeviling indigenous construction firms and factors affecting their competitiveness. Mbamali and Okotie (2012) studied the effect of globalization on building practice in Nigeria. The study revealed that trade liberalisation, construction market boom, development in IT, scarcity of competent local technological and managerial manpower as major threats to the competitiveness of indigenous construction firms in Nigeria. Olademeji and Ojo (2012) surveyed indigenous construction companies in Nigeria with the aim of predicting their survival in the highly competitive environment in which they operate. The study revealed profit and gross income as significant determinants for survival of indigenous construction companies. The study also showed a linear, positive and significant relationship between profit and gross income of indigenous construction firms.

2.15 Gaps Identified in the Literatures Reviewed

A lot of research has been carried out on competitiveness of construction firms. However, the following gaps were identified:

Most of the research on competitiveness and were carried out outside the Nigerian context.

The few research on competitiveness of construction firms within the Nigerian context focused on issues affecting indigenous contractors and factors inhibiting competitiveness of indigenous construction firms.

There is little evidence of studies focusing on how indigenous construction firms in Nigeria can achieve competitiveness and gain competitive advantage.

Competitiveness is a means to an end- competitive advantage. Most of the research on competitiveness and competitive advantage were studied separately. Little evidence exists to show how construction firms can attain competitiveness and achieve competitive advantage at the same time.

2.16 Summary

Competitiveness is necessary for the survival and growth of firms. Even though the effect of competitiveness has been downplayed in the construction industry in times past, nowadays globalisation, trade liberalisation and technology are forcing many construction firms to become interested and allocate resources to the task of competitiveness. Review of relevant literature has revealed certain factors militating against competitiveness of indigenous construction firms.

In order to gain insights on how to improve competitiveness of indigenous construction firms, a review was done on the major theories of competitiveness namely Porter's theories of

competitiveness and the resource-based view on firms' competitiveness. There was also a review of the competitiveness parameters by two major global reports on competitiveness: Global Competitiveness Report (GCR) and World Competitiveness Yearbook (WCY). Critical Success Factors (CSFs) and Key Performance Indicators (KPIs) approach to identifying competitiveness parameters for construction firms were also reviewed. Furthermore, a review of empirical studies on competitiveness and competitive advantage in construction firms was done. Finally, gaps in the literature reviewed were identified.

CHAPTER THREE

CONCEPTUAL FRAMEWORK

3.1 Overview

This chapter provides the conceptual framework of the study. The chapter is structured along the following lines: a brief comparison of the two main theories of competitiveness – Porter’s theories of competitiveness and the Resource-Based View (RBV) on competitiveness, appropriateness of the RBV paradigm for this study, explanation of the concepts of resource, competencies and capabilities, typical resources and competencies of a construction firm and a diagrammatic representation of the concept upon which the study is based. The chapter concludes with a summary.

3.2 The Conceptual Framework

There are two major theories of firms’ competitiveness namely: Porter’s theories of competitiveness and the Resource-Based View (RBV) on competitiveness. As earlier stated, Porter’s theories on competitiveness is centered on external forces in a firm’s environment that affect its competitiveness. The RBV on the other hand is based on the belief that firms’ resources and competencies are the major determinants of firms’ competitiveness.

3.2.1 Similarities and Differences between the RBV and Porter's Theories

Spanos and Lioukas (2001) identified two conceptual similarities between the RBV and Porter's framework.: (i) both views on competitiveness have a common interest which is - how to gain competitiveness (ii) the RBV and Porter's frameworks are based on the belief that economic rents i.e. above normal returns are possible.

However, some differences exist between both views on competitiveness. First, Porter's theories and the RBV do not have the same unit of analysis. The unit of analysis for Porter's theories is industry factors that affect firms' competitiveness while the unit of analysis for the RBV is firms' resources and competencies that determine competitiveness.

The second major difference between both theories on competitiveness is that the RBV is based on the belief that the resources possessed by a firm determine the strategy that it adopts in gaining competitiveness. Porter's theories on the other hand postulate that resources are used to implement a firm's competitive strategy as dictated by factors in its environment. Moreover, the RBV uses Ricardian rents and Quasi rents to gain advantage over competitors, while Porter's framework makes use of market power and monopoly - type rent as the source of competitive advantage over rivals. Ricardian rents are rents (earnings) from the use of production factors while Quasi-rents are rents (earnings) that come as a result of scarcity of production factors (Dagnino, 1996).

This research adopts the resource-based view on firms' competitiveness i.e. the view that the resources and competencies of a firm are its major sources of competitiveness. This research is based on the RBV because of the following reasons:

(i) The central theme of the RBV is that a firm's resources are its basic source of competitiveness (Barney, 1991 and Teece, Pisano and Shuen, 1997). According to Wenerfelt (1984), a firm's

competitiveness is mainly determined by the resources it possesses and is able to control. Porter's theories focus on the external dynamics of firms' environment that affect their competitiveness (Porter, 1980).

Whilst Porter's theories of firm's competitiveness have been widely accepted because of its several benefits including being able to properly analyze the competitive environment in which businesses operate, most businesses especially in the construction industry operate in a dynamic environment characterized by low profit margin, low entry barriers, economic and political instability which are beyond the control of the firm.

(ii) Some studies (Rumelt, 1984 and Hawawini, Subramanian and Verdin, 2003) have provided evidence which reveal that firms' resources have higher impacts on performance than influences emanating from outside the firm. Proponents of the RBV believe that firms' resources are heterogeneously distributed and imperfectly mobile. This means that firms' resources differ one from another and these differences persist over time. Therefore, a firm would achieve competitiveness if its resources are valuable and rare. Moreover, the competitiveness achieved would be sustained if firms' resources are inimitable and non-substitutable.

Resources are assets and capabilities (competencies) that a firm possesses, is able to control and that enable the firm to create and implement strategies that improve its efficiency and effectiveness (Daft, 1983 and Barney, 1991). According to Wernerfelt (1984), resources include: in-house knowledge of technology, employment of skilled personnel, brand names, machinery, efficient procedures, capital and trade contacts. Fahy and Smithee (1999) noted that the term resource is ambiguous hence, they classify resources into three groups: tangible assets, intangible assets and capabilities. Wernerfelt (1989) defined tangible assets as the fixed and current assets of a firm that have a fixed long term capacity. Tangible assets include land, equipment, stocks

and debtors. Hall (1989) also explained that tangible assets are relatively easy to measure. Grant (1999) further noted that tangible assets are relatively weak at resisting imitation efforts by rivals.

Williams (1998) asserted that intangible assets include intellectual property such as trademarks and patents as well as brand and company reputation, company networks and databases. According to Wernerfelt (1984) intangible assets have relatively unlimited capacity and organisations can take advantage of their value by selling them as in the case of selling a brand, renting them like in the case of a license or using them in-house.

Capabilities on the other hand refer to organizational routines as regular and predictable patterns of activities which are made up of a sequence of coordinated actions by individuals (Grant, 1991). He then defined capabilities as a number of interacting routines. He gave the example of the sequence of routines which govern the passage of raw materials and components into the production process and top management routine which include routines for monitoring business unit performance, capital budgeting, and strategy formulation.

The primary task of the resource based approach to competitiveness is to maximize profits over time with the use of firm's resources and its most important resources and capabilities are those which are durable, imperfectly transferable, not easily replicated and in which the firm possess clear ownership and control (Grant, 1991).

3.3 Competencies and Resources of a Construction Firm

A construction firm can possess several resources and develop a number of competencies. However, common competencies and resources possessed by most construction firms include: project management competencies, financial and human resources, public image, relationships and bidding techniques. Typical competencies and resources found in construction firms are explained in the next paragraphs.

3.3.1 Project Management Competencies

Isik, Arditi, Dikmen and Birgonul (2009) noted that the construction industry is a project-based industry since contractors survive and grow based on the success they achieve in their projects. They further asserted that each construction project is unique but the managerial process is normally uniform across projects in a company. Since the project is at the core of the construction business, project management competencies cannot be dissociated from company performance. Moreover, project success is closely linked and highly related to skills, expertise and know-how of managers. Project management competencies identified in literature include cost management (Mansfeild, Ugwu and Doran, 1994; Love, Waang, Sing and Tiong, 2013), time management (Ogunlana, Promkuntong and Jearkjirm, 1996; Chan and Kumaraswamy, 1997; Frimpong, Oluwole and Crawford, 2003; Moura *et al.*, 2007; Fugar and Baah, 2010), Quality management (Pheng and Teo, 2004 ;Kanji and Wong, 1998; Love, Mandal and Li, 1999;), Supply chain management (Dainty, Millett and Briscoe (2001) Claims management (Semple, Hartman and Jergeas, 1994), Health and safety management (Smallwood, 2000).

3.3.2 Resources

There are two basic resources used in the construction industry: financial resources and human resources. According to Warszawski (1996), a firm's strength in the market is determined by its financial strength. He noted further that financial resources ensure that the company is able to get into risky situations that have prospect for high return. Indicators of financial strength include profitability, turnover and debt status. The human resource is an inevitable resource. It is the most strategically important resource of the firm because it possesses a unique quality of being able to integrate, coordinate, judge and imagine by its self (Drucker, 1994).

3.3.3 Reputation

Reputation and public image is used interchangeably in literature. Reputation is an estimation or valuation of a firm by its stakeholders which is expressed by the reactions of customers, investors, employees, and the general public (Fombrun, 1996; Gray and Ballmer, 1998). A firm's reputation stems from the satisfaction customers derive from consuming a particular good or engaging a service (Simon, 1985). Reputational success has been found to contribute significantly to firms' success because a good reputation logically leads to positive financial and social performance which ultimately enables the firm to achieve competitiveness (Lu, 2006).

3.3.4 Relationships

Several participants are involved in the construction process. Love, Skitmore and Earl (1998b) described construction participants as individuals or organizations who are actively involved in the project and contribute to the success of a project. Winch (2002) also classified project participants into internal stakeholders (employees, clients, contractors, sub-contractors, material

suppliers) and external stakeholders (local residents, landowners and public actors like the local and national government). Relationships established and maintained with external constituents (client, government, strategic partners etc) are in-valuable to firms' competitiveness especially when they reflect the knowledge sharing and learning ability of the firm (Lu, 2006).

3.3.5 Bidding Techniques

Bidding is an established mechanism by which construction firms signify interest in a construction project. Bidding requires a construction firm to make strategic decisions in terms of selection of contracts to bid for and the bid level necessary to secure the contract (Drew, Skitmore and Hing, 2001). The literature is replete with evidences showing a strong relationship between bidding decision and competitiveness (Odusote and Fellows, 1992; Sohail, Miles and Cotton, 1999; Drew *et al.*, 2001; Numba and Dinghem, 2005,; Flanagan, Lu, Shen and Jewell, 2007).

Given the vital place of resources in determining firms' competitiveness, the researcher adopts the RBV approach to competitiveness. A conceptual framework for this research is given in Figure 3.1

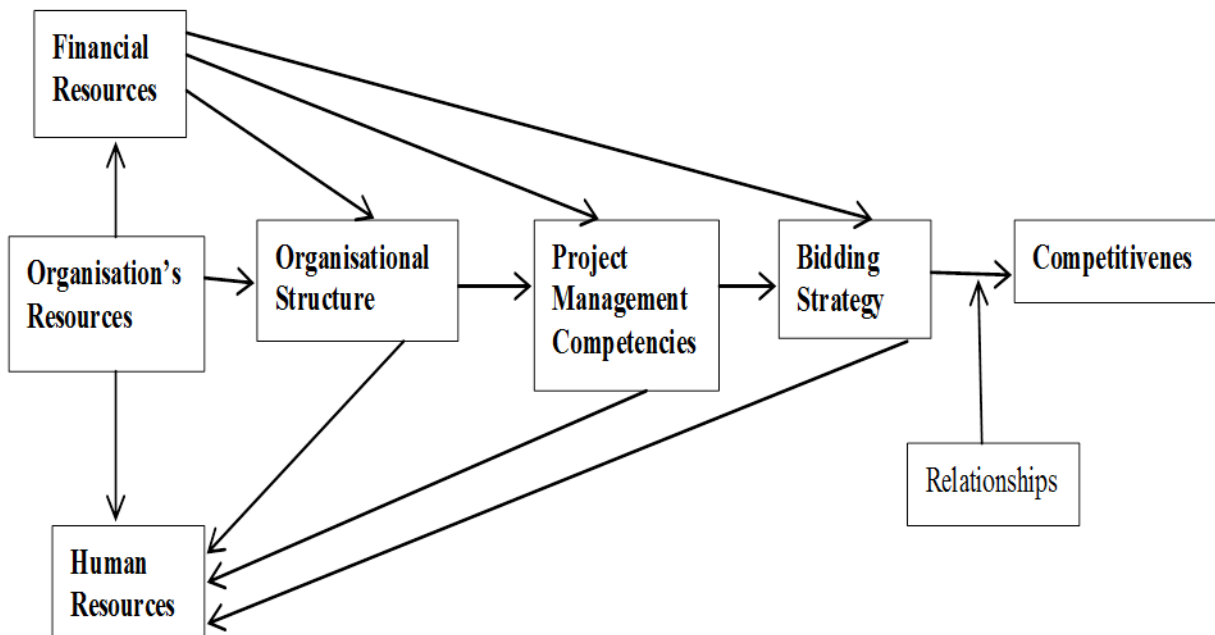


Fig 3.1 Conceptual Framework

Fig. 3.1 indicates that the inter relationship between firms' specific resources like project management competencies as in the case of construction firms, financial and human resources, organisational structure, relationships with stakeholders and the bidding technique adopted by a firm. All the resources identified in the framework are perceived to be significant for competitiveness and the availability of these resources are believed would greatly enhance the competitiveness of indigenous construction firms in Nigeria.

An organization's resource is made up of financial resources and human resources. Financial resources are key resources for construction firms because most of the resources and competencies identified in the conceptual framework as determinants of competitiveness can be

acquired with financial resources. The human resource is also another vital resource for firms particularly for labour intensive firms like construction firms. Human resources facilitate the translation of organisational goals into reality.

Organisation's resource determines a firm's organisational structure. This may be because an organization's structure can be described in terms of the size of financial measures like profit, return on investments and turnover. A firm can also be described in terms of the size (number) of human resource. Moreover, the financial capability of a firm determines the number and quality of human resource that a firm can employ.

A firm's organizational structure determines its project management competencies because type of organizational structure and pattern of communication can motivate employees towards achieving organizational goals through the use of project management competencies. There is also a relationship between organization's resources and project management competencies. Firm's financial resources determine the competence of its human resource in terms of the number of competent workforce that can be employed or the number of workers that can be trained to become competent.

A firm's project management competencies also determine its bidding strategy. Except for idle curiosity, a firm is only likely to bid for a project for which it has the required competencies. Moreover, a firm's success in bidding can also be determined by the available financial resources to cover for bidding expenses and available financial resources to employ experienced bidding professionals.

All these variables are internal factors (firm specific resources and competencies) that are perceived to have an impact on the competitiveness of the firm. Furthermore, a firm's relationship with clients or other stakeholders in a contract can greatly enhance the firm's chances of winning a job. There is a constant interaction between construction firms and stakeholders as a result of demand and supply of construction services. Hence, a healthy relationship between construction firms and stakeholders would likely influence competitiveness of construction firms positively. This could be irrespective of the firm's resources, structure, project management competencies or bidding strategy.

3.4 Summary

This chapter provided the conceptual frame work upon which this research is based. It presented the resource-based view on competitiveness as the conceptual framework adopted by this research. The concepts of firms' resources and capabilities have also been explained. Moreover, the resources of a typical construction firm which are classified into project management competencies, organizations' resources, organizational structure, relationships and bidding strategy were presented. Finally a diagrammatic representation of the conceptual frame work of the study was provided.

CHAPTER FOUR

RESEARCH METHOD

4.1 Overview

This chapter describes the research design that was employed for this research. The chapter is structured into the following sub – headings: research design, study population and sampling frame, sample size, questionnaire development, operationalization of the research variables, reliability of the research instrument, the survey process, method of data analysis and a summary of the chapter.

4.2 Research Design

Research design is the plan or approach a researcher adopts in solving research problems (Agbo and Ugwu, 2011). It involves the method of data collection and analyses, the research instrument to be used and the sampling technique to be employed (Olatunji, Adeeko and Kasali, 2008). There are two major approaches to solving research questions: the quantitative and the qualitative approach. However, this research employed a quantitative approach in solving the research problems. The quantitative approach was selected because it produces empirical results which provide strong evidences that enables a researcher to answer the ‘what question’ (Yin, 2003).

Moreover, quantitative research enables the researcher to determine the variables that are significant and the extent of significance in a scientific way (Walker, 1997). A cross-sectional survey research design was employed in this study. A cross-sectional survey research design is

one in which the research variables are observed without any attempt to control or manipulate them and the survey is carried out at one point in time (Ojo, 2003).

4.3 Study Population

The study focused on indigenous construction firms in Lagos and Abuja, Nigeria. As earlier stated, an indigenous construction firm is one established under the Enterprise Promotion Decree of 1972 and has no other home base but Nigeria. Their entire capital and any other proprietary interest in the enterprise are owned and controlled by Nigerian citizens or associations and most or all of its technical and managerial undertakings are manned by Nigerians (Olateju, 1991).

Construction firms operating in Nigeria are registered with several bodies. These bodies include: the Corporate Affairs Commission (CAC), the Nigerian Institute of Building (NIOB) and the Federation of Construction Industry (FOCI). However, indigenous construction firms registered with the NIOB constituted the population of the study because firms registered with the NIOB can be classified as Chartered construction firms and they have more potentials for competing with their foreign counterparts than other categories of indigenous construction firms. Indigenous construction firms on the NIOB list are also registered with CORBON (Council of Registered Builders of Nigeria), an organization that is recognized by law to regulate good building production practice in Nigeria (Federal Republic of Nigeria, 2006).

4.4 Sampling Frame

The research sample was drawn from indigenous construction firms that are registered with the NIOB. The sample frame for this study consisted of 92 indigenous construction firms based in Lagos and 25 in Abuja. Thus a total of 117 indigenous construction firms made up the sampling frame for this study.

4.5 Determining the Sample Size

In order to determine a suitable sample size for the study the formula below adapted from Czaja and Blair (1996) was employed assuming an infinite population:

$$SS = \frac{Z^2 * P * (1-P)}{C^2}$$

Where SS = sample size

Z = Z value (e.g. 1.96 for 95% confidence level)

P = Percentage of respondents picking a choice, expressed as a decimal (0.50 assumed)

C = Confidence interval ($\pm 10\%$ = 0.1 assumed)

$$SS = \frac{1.96^2 * 0.5 * (1-0.5)}{0.1^2} = 96 \text{ Indigenous construction firms}$$

Correction for Finite Population:

$$SS_{\text{new}} = \frac{SS}{1 + (SS-1)/POP}$$

Where POP = population in this case 92 indigenous construction firms in Lagos state

SS = sample size (96) assuming an infinite population

$$\text{Therefore new sample size} = \frac{96}{1 + (96-1)/92} = \frac{96}{1 + 95/92} = \frac{96}{2.032}$$

= 47.24 = 47 construction firms

Thus a total of 47 indigenous construction firms made up the sample size for indigenous construction firms that were studied in Lagos. All the twenty-five (25) indigenous construction firms in Abuja were studied because they are less than thirty (30) and it has been noted that samples having less than 30 are classified as small samples and all members of such population should be studied (Munn and Drever, 1990; Sutrisna, 2004).

Therefore, the total sample size for the study was seventy-two (72) indigenous construction firms (addition of forty-seven indigenous construction firms in Lagos and twenty-five indigenous construction firms in Abuja).

4.6 Sampling Technique

As earlier noted, study samples of less than 30 are classified as small samples and all members of such population are studied. Hence, all the twenty-five (25) indigenous construction firms in Abuja were studied. However, 47 indigenous construction firms were randomly selected from a population of 92 indigenous construction firms based in Lagos.

4.7 Questionnaire Development and Operationalisation of the Research Constructs

A questionnaire was designed to elicit information from respondents. Data gathered from the questionnaire was used to answer the research questions. The questionnaire was divided into three (3) sections. Section A requested general information about the organization. Section B sought answers to the strategy adopted by the organization for achieving competitive advantage while Section C required the opinions of respondents on the parameters that determine competitiveness. Refer to (*Appendix A*) for a copy of the questionnaire used for this research.

4.7.1 Operational Definition of Research Constructs

Operationalisation in the context of research is the reduction of research items so that they can become measurable and tangible (Babie, 1975; Sekaran, 2003). This research makes use of multiple-items to operationalise its concept because multiple items indicate different aspects of the abstract concept and are more likely to capture a wider angle of the concept (Bryman and Cramer, 2001). The constructs of the study are: strategies for gaining competitive advantage and parameters for competitiveness (*Table 4.1*).

4.7.1.1 Strategies for Gaining Competitive Advantage

The three generic strategies for achieving competitive advantage are cost leadership, differentiation and focus (Porter, 1980; 1985). However, a hybrid strategy for achieving competitive advantage was adopted for indigenous construction firms in Nigeria. The hybrid strategy was adapted from (Kale and Arditi, 2002). This hybrid strategy was adopted in this research because its items of measurement are more related to the construction context. The hybrid strategy is made up of the following items: (i) competing on the basis of cost (ii) competing on the basis of quality (iii) competing on the basis of time and (iv) competing on the basis of scope of operation.

Competing on the Basis of Cost

This item described the firm's choice of competition on the basis of cost by asking respondents to indicate on a five point likert scale ranging from 1- extremely unimportant to 5- extremely important the degree of importance attached to: (1) reducing cost in construction operations

(2) reducing cost in administrative activities and (3) Improving the cost-efficiency of the contracting services offered.

Competing on the Basis of Quality

This item was measured by asking respondents to indicate on a five point likert scale ranging from 1- extremely unimportant to 5- extremely important the extent of importance attached to:

(1) achieving high quality in the constructed facility (2) achieving high quality beyond the requirements in the specifications (3) improving the quality of the contracting services offered and (4) being highly responsive to clients' requests.

Competing on the Basis of Time

Here respondents were asked to indicate on a five point likert scale ranging from 1- extremely unimportant to 5- extremely important the level of importance attached to: (1) achieving on-schedule performance in construction operations (2) accommodating clients' acceleration requests and (3) attempting to deliver constructed facilities ahead of schedule.

Competing on the Basis of Scope of Operation

This item was measured by asking respondents to indicate on a five point likert scale ranging from 1- extremely unimportant to 5- extremely important the degree of importance attached to:

(1) Serving a specific geographical location (2) Operating in a specific construction market
(3) Offering a limited range of project delivery systems and (4) Serving a specific group of clients.

4.7.1.2 Parameters for Competitiveness

Several parameters have been identified in the literature that determines firms' competitiveness. These parameters have been grouped into clusters and are also referred to as the attributes of competitiveness (Lu, 2006). They include: project management, organization's resources, organizational structure, relationships and bidding technique (Holt *et al.*, 1994; Hatush and Skitmore, 1997; Shen *et al.*, 2003; Lu, 2006)

Project Management

This item measured eight parameters that were identified in literature as determining firms' competitiveness. The parameters include: cost management, time management, quality management, Health and Safety management, dispute (claims) resolving competencies and logistics and supply chain management. Respondents were asked to indicate on a five point likert scale ranging from 1- extremely unnecessary to 5- extremely necessary the extent to which these parameters were necessary in determining the competitiveness of their firms.

Organization's Resources

Two parameters were measured under this item. They are: financial resources and human resources. Respondents were asked to indicate on a five point likert scale ranging from 1- extremely unnecessary to 5- extremely necessary the extent to which these parameters were necessary in determining the competitiveness of their firms.

Organizational Structure

This item was measured by four parameters. These parameters are internal operations, suitability of organizational structure, internal communication and public image. Respondents were asked to indicate on a five point likert scale ranging from 1- extremely unnecessary to 5- extremely necessary the extent to which these parameters were necessary in determining the competitiveness of their firms.

Relationships

Four parameters were used to measure this item including relationship with government departments, relationship with client, relationship with subcontractor and suppliers, relationship with the public. Respondents were asked to indicate on a five point likert scale ranging from 1- extremely unnecessary to 5- extremely necessary the extent to which these parameters were necessary in determining the competitiveness of their firms.

Bidding Technique

This item was measured by two parameters namely bidding strategy and bidding resources. Respondents were asked to indicate on a five point likert scale ranging from 1- extremely unnecessary to 5- extremely necessary the extent to which these parameters were necessary in determining the competitiveness of their firms.

Table 4.1 Operationalization of Research Constructs

Construct	Scale	Measurement item	Source
Strategies for competitiveness (4 items)	Ordinal	C1- competing on the basis of cost C2- competing on the basis of quality C3- competing on the basis of time C4-competing on the basis of scope of operation	Kale and Arditi (2002)
Project Management competencies (6 items)	Ordinal	PM1- Cost management PM2-Time management PM2- Quality management PM3-Contract management PM4-Health and safety management PM5- Dispute (Claims) resolution skills PM6- Logistics and supply chain management	Lu (2006)
Resources (2 items)	Ordinal	R1 – Financial resources R2- Human resources	Lu (2006)
Organizational structure (4 items)	Ordinal	OS1- Internal operations OS2-Suitability of organizational structure OS3- Internal communication OS4-Public image	Lu (2006)
Relationship (4 items)	Ordinal	R1- Relationship with government departments R2-Relationship with client R3-Relationship with subcontractor and suppliers R4-Relationship with the public	Lu (2006)
Bidding Technique (2 items)	Ordinal	BT1- Bidding strategy BT2-Bidding resources	Lu (2006)

4.8 Reliability of the Research Instrument

Reliability is the extent to which a research instrument like a questionnaire measures research features consistently under the same set of conditions (Nunally, 1978; Pilot and Hunger, 1985).

The consistency of the questionnaire was assessed by Cronbach's alpha method which measures the internal consistency of a research instrument by determining the average correlation of items in a survey instrument. Cronbach's alpha coefficient ranges from 0 to 1 with alpha coefficients > 0.70 representing a satisfactory reliability (Nunally, 1978). However, Cronbach's alpha would generate lower coefficient if there is no correlation between test items or if test items are few (Cortina, 1993). The reliability of the survey items of this research is given in Table 4.2

Table 4.2 Reliability of survey items

Research Construct	Cronbach's Alpha	No. of items
Strategies for gaining competitive advantage	0.717	14
Project management competencies	0.878	21
Organization's resources	0.847	16
Organizational structure	0.864	10
Relationships	0.499	4
Bidding techniques	0.855	7

From Table 4.2, the constructs measuring strategies for competitive advantage, project management competencies, resources, organizational structure and bidding techniques have Cronbach's alpha of 0.717, 0.878, 0.847, 0.864, 0.855 respectively and all the aforementioned constructs were > 0.70 indicating a high degree of internal consistency. However, the construct measuring relationships has a Cronbach's alpha of 0.499. This may be due to the small number of items measuring the construct. As noted earlier Cronbach's alpha would generate lower coefficient if there is no correlation between test items or if test items are few. Four items were found adequate for operationalising the construct 'relationship'. They include: relationship with government departments, relationship with client, relationship with subcontractors and

relationship with the public. This construct was also operationalized in line with Lu (2006). Therefore, the likely reason for the low Cronbach's alpha coefficient for the construct of relationship is the small number of items making up the construct. Refer to appendix B for details of Cronbach's alpha reliability test.

4.9 The Survey Process

The survey was carried out between January and March 2014. The sample of indigenous construction firms used for this research was drawn from the list of construction firms registered with the Nigerian Institute of Building (NIOB).

A telephone call was made to contact persons in all the firms studied to elicit information about the contact details of the personnel who is in the best position to provide answers to the items in the questionnaire. Thereafter, 52 of the questionnaires were mailed electronically on request while the remaining 20 were delivered by hand.

4.10 Method of Data Analysis

The research made use of nominal and ordinal data. Therefore, a variety of statistical procedures were used to analyze the data. Two statistical procedures were used in analyzing the data: descriptive statistics and inferential statistics. The descriptive statistics used for analyzing the data include bar charts, tables and ranking analysis while the inferential statistics used include correlation.

4.10.1 Ranking Analysis

In order to identify the significant parameters that determine competitiveness of indigenous construction firms ranking analysis was used with the aid of the software package SPSS 16.0. A five point likert scale where 1 represented extremely unnecessary, 2 represented negligible, 3 represented not sure, 4 represented necessary and 5 represented extremely necessary was used to elicit information from respondents on parameters that determine competitiveness.

The total score, mean and standard deviation for each item in section C of the questionnaire were generated by entering the results into the SPSS. Thereafter, the mean values were used to rank the competitiveness parameters. In a situation where two items had the same mean then the item with the smaller standard deviation was ranked higher. Since '4' represents 'important'/'significant' in the likert scale, a mean value of 4.00 was used as the benchmark for identifying the significant parameters that determine competitiveness (Lu, 2006) of indigenous construction firms in Nigeria. Refer to *appendix D* for descriptive statistics. Moreover, ranking analysis was used to identify the most significant strategy adopted by indigenous construction firms in gaining competitive advantage. This was also achieved with the use of the software package SPSS 16.0. The mean and standard deviation for each item in section B of the questionnaire was generated by entering the results into the SPSS. Thereafter, the mean values were used to rank the strategies. Since '4' represents 'important'/'significance' in the likert scale, a mean value of 4.00 was used as the benchmark (Lu, 2006) for identifying significant strategies for gaining competitive advantage (*Appendix C*).

4.10.2 Weighted Summation

Weighted summation is a statistical method that is used for evaluating multi-criteria or multi-attribute concepts (Lu, 2006). As established in literature, competitiveness is a multi-attribute concept as such a suitable method of analyzing competitiveness is by the use of multi-criteria evaluation methods like the weighted summation. Other multi-attribute evaluation methods include multiple criteria goal programming (MCGP), Analytical Hierarchy Process (AHP) and Fuzzy set theories. However, the weighted summation has some advantages over the other multi-criteria methods identified above. First, it works well with discrete and continuous data and it does not produce complex algorithms when employed.

Moreover, ‘weighted summation’ is used for deriving the competitiveness of nations as presented in the World Competitiveness Yearbook (WCY) and the Global Competitiveness Report (GCR). Hence, weighted summation was used to develop competitiveness indices for indigenous construction firms in Nigeria.

The weighted summation formular was adopted from Lu (2006). It is as follows:

$$\text{Relative weight of } P_i = \frac{TV_i}{\sum TV} \dots\dots\dots\text{equation}$$

Where P_i is parameter 1

TV_i is the total value of Parameter 1 given by respondents

$\sum TV$ is the sum of total values given by respondents of parameters that fall in the same group as P_i .

Appendix E gives detailed information on the calculations of weightings for the competitiveness parameters developed in this study.

4.10.3 Correlation

Correlation is a measure of linear relationship between two variables. There are basically two kinds of correlation: Pearson's Product Moment Correlation for numeric data and Spearman's Rank Correlation for ordinal data. A correlation coefficient has a value ranging from +1 to -1. Values closer to 1 indicate a strong linear relationship between the variables correlated while values closer to 0 indicate little or no linear relationship. Correlation coefficient between 0 and 0.30 is regarded as weak, correlation coefficient between 0.31 and 0.60 is considered moderate while correlation coefficient greater than 0.61 is considered strong. A positive value indicates a direct relationship between variables while a negative value indicates an inverse relationship between variables (Gerber and Finn, 2005).

4.11 Means of Achieving Research Objectives

Table 4.3 indicates the means by which the research objectives were achieved. Objective one was achieved by identifying competitiveness parameters from literature. Objective two was achieved by the weighted summation formula; objective three was achieved by means of ranking analysis while objective four was achieved by means of ranking analysis and correlation analysis.

Table 4.3 Means of Achieving Research Objectives

	Objective	Means
i.	One	Identification
ii.	Two	Weighted summation
iii.	Three	Ranking analysis
iv.	Four	Ranking analysis and Correlation Analysis

4.12 Summary

The research design and research methods employed in this research were described. Specifically, the quantitative research design with the questionnaire instrument was adopted for this study. The reliability of the survey instrument was averagely satisfactory. Moreover, descriptive statistics (pie, tables and ranking analysis) and correlation analyses were used for this research. The choice of the weighted summation as a suitable method of analyzing competitiveness was justified by presenting the merits of the weighted summation over other multi-attribute evaluation methods.

CHAPTER FIVE

DATA ANALYSIS AND DISCUSSION OF RESULTS

5.1 Overview

This chapter presents the results of data analyzed. Data presented include response rate, respondents' profile, characteristics of the firms surveyed, significant competitiveness parameters for indigenous construction firms, strategies employed by indigenous construction firms for gaining competitive advantage and correlations between the study variables. The chapter also presents the weightings of the significant competitiveness parameters developed in this study. A methodology for practically employing the competitiveness indices as a benchmark in indigenous construction firms is also described. Finally, the Chapter discusses the results of the analyzed data.

5.2 Response Rate

Seventy two copies of the questionnaire were distributed out of which 53 were properly filled and returned. This gives a response rate of approximately 73.61%. The relatively high response rate obtained in this study could be due to the frequent calls made and e-mails sent to the respondents. Some of the studies carried out previously on contractors' competitiveness provided relatively low response rate. For instance Tan *et al.* (2007) and Lu (2006) had response rates of 23.96% and 30.67% respectively. However, other studies for example, Chan (2006) and Shrair (2011) reported relatively high response rates of 90.91% and 73.33% respectively.

5.3 Firms' Characteristics

This section presents the characteristics of the indigenous construction firms investigated. Firms' characteristics investigated in this research include firms' size, number of jobs bidded for, number of jobs secured and turn - over of firm.

5.3.1 Firms' Size

Out of the 53 indigenous construction firms surveyed in this research, 64.2% had less than 50 people in their work force, 20.8% had between 51-100 people in their work force, 7.5% had between 101-150 people in their work force, 3.8% of the indigenous construction firms surveyed had between 151-200 and another 3.8% had more than 200 people in their work force (*Table 5.1*). This indicates that majority of the indigenous construction firms surveyed have a workforce less than 50. This may be due to the fact that most of the indigenous construction firms surveyed might not be able to sustain a work force that is greater than 50

Table 5.1 Number of Workforce

Number of Workforce	Frequency	Percent
Less than 50	34	64.20
51-100	11	20.80
101-150	4	7.50
151-200	2	3.80
Above 200	2	3.80
Total	53	100.00

5.3.2 Jobs Bidded For

Of all the indigenous construction firms surveyed, 79.2% indicated that the average number of jobs bidded for in a year is more than 3. While the remaining 20.8% indicated that the average number of jobs they bid for yearly is 3 (*Figure 5.2*). This shows that a greater percentage of the indigenous construction firms surveyed seek for many project opportunities as possible.

Table 5.2 Number of Jobs Bidded For

Number of jobs bidded for	Frequency	Percent
3	11	20.80
Above 3	42	79.20
Total	53	100.00

5.3.3 Jobs Secured

Out of the 53 indigenous construction firms surveyed, 6 indicated that they secured only one job yearly, 20 indicated that the average number of jobs secured yearly was two, 15 indigenous construction firms indicated three jobs yearly while twelve firms indicated that they secure more than 3 jobs yearly (*Table 5.3*). This shows that the average number of jobs secured yearly by indigenous construction firms surveyed is 2. Since most of the indigenous construction firms surveyed secure an average of two jobs yearly, they are unable to generate enough resources to sustain a work force of more than 50 persons (*Section 5.3.1*).

Table 5.3 Average Number of Jobs Secured Yearly

Number of jobs secured	Frequency	Percent
1	6	11.30
2	20	37.70
3	15	28.30
Above 3	12	22.60

Total	53	100.00
-------	----	--------

5.3.4 Turnover in =N= Billion

Twenty six indigenous construction firms had a turnover of less than 0.20 billion Naira. Eleven indigenous construction firms had turnover of between 0.21 and 0.50 Billion Naira. Eight indigenous construction firms had turnover of between 0.51 and 0.70 Naira. Five indigenous construction firms had turnover of between 0.71-1 Billion Naira and only three indigenous construction firms had turnover that was greater than 1 Billion Naira (See *Table 5.4*).

Table 5.4 Turnover in Billions

Number of jobs secured	Frequency	Percent
< 0.20 billion Naira	26	49.10
0.21-0.50 billion Naira	11	20.80
0.51-0.70 billion Naira	8	15.10
0.71-1 billion Naira	5	9.40
> 1 billion Naira	3	5.70
Total	53	100.00

5.4 Relationship between Firms' Turnover and Firms' Workforce

Pearson's Correlation analysis was used to determine the relationship between firms' turnover and firms' workforce. Table 5.5 reveals Pearson correlation coefficient as 0.876. This indicates a very strong and positive relationship between firms' turnover and firms' workforce. Moreover, the correlation is significant as $p = 0.000 < 0.05$. This implies that the bigger an indigenous construction firm, in terms of turnover the greater the number of its workforce. As already noted in sections 5.3.1 and 5.3.4 indigenous construction firms in Nigeria comprise mainly of firms with workforce less than 50 and turnover less than 0.20 Billion Naira. It is likely that indigenous construction firms do not have the financial capability to maintain workforce greater than 50 as a result of their relatively low turnover. The strong, positive and significant correlation between

firms' turnover and firms' workforce explains why majority of the indigenous construction firms surveyed have a workforce of less than 50 persons.

Table 5.5 Correlation between Firms' Turnover and Firms' Workforce

		Number of Workforce	Turnover in Billions
Number of Workforce	Pearson Correlation	1	.876**
	Sig. (2-tailed)		.000
	N	53	53
Turnover in Billions	Pearson Correlation	.876**	1
	Sig. (2-tailed)	.000	
	N	53	53

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

5.5 Significant Parameters for Competitiveness of Indigenous Construction Firms

Table 5.6 indicates the competitiveness parameters for indigenous construction firms in Nigeria. The five most significant competitiveness parameters are: effectiveness of cost controlling methods, effectiveness of site management, method of procurement, effectiveness of time controlling methods and relationship with client.

Table 5.6 Parameters that determine competitiveness of indigenous construction firms in Nigeria.

Parameter	Sum	Mean	Standard deviation	Rank
Effectiveness of cost controlling methods	245	4.62	0.686	1
Effective site management	243	4.58	0.908	2
Method of procurement	234	4.42	0.602	3
Effectiveness of time controlling methods	234	4.42	0.770	4
Relationship with client	233	4.40	0.743	5
Client satisfaction with quality	232	4.38	1.004	6
Number of qualified professionals	230	4.34	0.618	7
Availability of quality management system	229	4.32	0.915	8
Availability and effectiveness of price information system	228	4.30	0.822	9
Effectiveness of executing system	228	4.30	0.845	10
Communications between managerial and general staff	227	4.28	0.568	11
Effectiveness of decision-making system	225	4.25	0.875	12
Availability and effectiveness of safety management	225	4.25	0.939	13
Existence and effectiveness of bidding strategy	224	4.23	0.640	14
Relationship with subcontractors/ suppliers	224	4.23	0.724	15
Communications between functional departments	224	4.23	0.824	16
Availability of health and safety protection resources	223	4.21	0.689	17
Personnel's job satisfaction	223	4.21	0.793	18
Effectiveness of procurement method	223	4.21	0.863	19
Company owner's personality and capability	222	4.19	0.962	20
Experiences for bidding projects	219	4.13	0.833	21
Labour productivity and effectiveness of motivation	218	4.11	0.751	22
Availability of resources for bidding	217	4.10	0.913	23
Availability of professionals for bidding	217	4.10	0.966	24
Communications between different subsidiaries and projects	217	4.09	0.628	25
Assets status	216	4.08	0.917	26
Clarity of divisions of functional departments	215	4.06	0.818	27
Personnel management system	215	4.06	0.864	28
Effectiveness of accident settlement process	215	4.06	0.908	29
Existence of contract administration system	215	4.06	1.099	30
Clarity of responsibilities of functional departments	214	4.04	0.831	31
Feedback mechanism in executing system	214	4.04	0.854	32
Adequacy of personnel structures	214	4.04	0.876	33
Good communication with bankers	214	4.04	0.898	34
Corporation identification and staff image	214	4.04	0.919	35

Table 5.6 Parameters that determine competitiveness of indigenous construction firms in Nigeria (cont'd).

Parameter	Sum	Mean	Standard deviation	Rank
Labour management system	214	4.04	0.940	36
Ability to gain finance from different channels	214	4.04	1.091	37
Profit status (Bii.ii)	213	4.02	0.772	38
Educational levels of personnel	213	4.02	0.843	39
Cost reduction rate over the past three years	212	4.00	1.038	40
Existence of regular training facilities	211	3.98	0.951	41
Availability of contract managerial resources	210	3.96	0.759	42
Existence of human resources development strategy	210	3.96	0.940	43
Level of knowledge about financial policy	206	3.89	0.891	44
Existence of personnel recruitment plan	206	3.89	0.954	45
Number of safety accidents over the past three years	201	3.79	1.261	46
Contract claim and dispute settlement	200	3.77	1.086	47
Availability of resources for dispute resolution	200	3.77	1.235	48
Previous records about construction delays	199	3.75	1.159	49
Dispute resolution skills	198	3.74	1.041	50
Debt status	198	3.74	1.163	51
Success rate of prequalification over the past three years	197	3.72	1.166	52
Sum of contracts over the past three years	196	3.70	1.119	53
Claims by clients over the past three years	196	3.70	1.119	54
Relationship with the public	195	3.68	1.088	55
Success rate of bidding over the past three years	192	3.62	1.228	56
Relationship with government departments	189	3.57	1.201	57
Number of quality awards over the past three years	189	3.57	1.323	58

5.6 Competitiveness Indices for Indigenous Construction Firms in Nigeria

The aim of this research is to develop indices which would be used as a benchmark for evaluating the competitiveness of indigenous construction firms. To achieve this, the relative weights of the significant competitiveness parameters were determined by means of the 'weighted summation' formula.

As indicated earlier, several parameters determine the competitiveness of indigenous construction firms and all parameters influence competitiveness to a certain degree. Therefore, there was a need to determine the relative weight of each parameter with regard to competitiveness. The relative weights were only applied to significant competitiveness parameters.

The first task was to re - arrange the significant competitiveness parameters so that parameters with the same attribute can be grouped together. Table 5.5 presents a list of significant competitiveness parameters according to original group.

Table 5.7 Classification of Significant Competitiveness Parameters

Group	Parameter
Project management competencies	<u>Site management</u>
	Effective site management (Ai.i)
	<u>Cost management</u>
	Effectiveness of cost controlling methods (Aii.i)
	Cost reduction rate over the past three years (Aii.ii)
	<u>Quality management</u>
	Availability of quality management system (Aiii.i)
	Clients 'satisfaction with quality (Aiii.iii)
	<u>Time management</u>
	Effectiveness of time controlling methods Aiv.i
	<u>Contract management</u>
	Existence of contract administration system (Av.i)
	<u>Health and safety management</u>
	Availability and effectiveness of safety management system (Avi.i)
	Effectiveness of accident settlement process (Avi.ii)
	Availability of health and safety protection resources (Avi.iv)
	<u>Logistics and supply chain management</u>
Availability and effectiveness of price information system (Aviii.i)	
Effectiveness of procurement system (Aviii.ii)	
Method of procurement (Aviii.iii)	

Table 5.7 Classification of Significant Competitiveness Parameters (cont'd)

Group	Parameter
Resources	<u>Financial ability</u>
	Good communication with bankers (Bi.i)
	Ability to gain finance from different channels (Bi.iii)
	<u>Financial status</u>
	Assets status (Bii.i)
	Profit status (Bii.iii)
	<u>Capacity of human resources</u>
	Adequacy of personnel structure (Biii.i)
	Number of qualified professionals (Biii.ii)
	Educational levels of personnel (Biii.iii)
	<u>Use of human resources</u>
	Personnel management system (Biv.i)
	Personnel's job satisfaction (Biv.ii)
	Labour productivity and effectiveness of motivation (Biv.iii)
Labour management system (Biv.iv)	
Organizational structure	<u>Internal operations</u>
	Effectiveness of decision making system (Ci.i)
	Effectiveness of executing system (Ci.ii)
	Feedback mechanism in executing system (Ci.iii)
	<u>Suitability of organizational structure</u>
	Clarity of divisions of functional departments (Cii.i)
	Clarity of responsibilities of functional departments (Cii.ii)
	<u>Internal communication</u>
	Communications between functional departments (Ciii.i)
	Communications between managerial and general staff (Ciii.ii)
	Communications between different subsidiaries and projects(Ciii.iii)

Table 5.7 Classification of Significant Competitiveness Parameters (cont'd)

Group	Parameter
	<u>Public image</u>
	Company owner's personality and capability (Civ.i)
	Corporation identification and staff image (Civ.ii)
Relationships	Relationship with client (D.ii)
	Relationship with subcontractors/suppliers (D.iii)
Bidding Techniques	<u>Bidding strategy</u>
	Existence and effectiveness of bidding strategy (Ei.i)
	Bidding resources
	Experiences for bidding projects (Eii.i)
	Availability of professionals for bidding (Eii.ii)
	Availability of resources for bidding (Eii.iii)

Relative weights of only the forty significant competitiveness parameters are given in Table 5.8.

Note that the weights are not in order of significance. Refer to *appendix E* for calculation.

Table 5.8 Relative Weights of Significant Competitiveness Parameters

Parameter	TV	SUM TV	RELATIVE WEIGHT
Effectiveness of site management	243	243	1
Effectiveness of cost controlling method	245	457	0.536
Cost reduction rate over the past three years	212	457	0.464
Availability of quality management system	229	461	0.497
Clients' satisfaction with quality	232	461	0.503
Effectiveness of time controlling methods	234	234	1
Existence of contract administration system	215	215	1
Effectiveness of accident settlement process	215	663	0.324
Availability of health and safety protection resources	223	663	0.336
Availability and effectiveness of safety management system	225	663	0.339

Table 5.8 Relative Weights of Significant Competitiveness Parameters (Cont'd)

Parameter	TV	SUM TV	RELATIVE WEIGHT
Method of procurement	223	685	0.326
Effectiveness of procurement system	223	685	0.326
Good communication with bankers	214	428	0.5
Ability to gain finance from different channels	214	428	0.5
Assets status	216	429	0.504
Profit status	213	429	0.4977
Adequacy of personnel structure	214	657	0.326
Number of qualified professionals	230	657	0.350
Educational levels of personnel	213	657	0.324
Personnel management system	215	870	0.247
Personnel's job satisfaction	223	870	0.256
Labour productivity and effectiveness of motivation	218	870	0.251
Labour management system	214	870	0.246
Effectiveness of executing system	228	667	0.342
Effectiveness of decision making system	225	667	0.337
Feedback mechanism in executing system	214	667	0.321
Clarity of divisions of functional departments	215	429	0.501
Clarity of responsibilities of functional departments	214	429	0.499
Communications between functional departments	224	668	0.335
Communications between managerial and general staff	227	668	0.340
Communications between different subsidiaries and projects	217	668	0.325
Company owner's personality and capability	222	436	0.509
Corporation's identification and staff image	214	436	0.491
Relationship with client	232	456	0.509
Relationship with subcontractors/suppliers	224	456	0.491
Existence and effectiveness of bidding strategy	224	224	1
Experiences for bidding projects	219	653	0.335
Availability of resources for bidding	213	653	0.326
Availability of professionals for bidding	217	653	0.332

5.7 Practical Applications of the Competitiveness Indices

The significant competitiveness parameters and the relative weights developed in this study represent the competitiveness indices for indigenous construction firms in Nigeria. Although practical application of the competitiveness indices in indigenous construction firms is not within the scope of this research, a systematic way of using the developed indices is explained as follows:

The performance of the significant competitiveness parameters in indigenous construction firms is evaluated. Performance evaluation of competitiveness parameters can be achieved by measuring the performance of each competitiveness parameter against the developed benchmark. The performance scores derived from the evaluation should be normalized or standardized. Normalization of performance scores is necessary because the competitiveness parameters consist of hard and soft data which are scaled differently. For example, Bii.iii (profit status) in Table 5.6 is probably scaled by an amount of currency, while Aii.i (effectiveness of cost controlling methods) in table 5.6 might be rated with a scale between very effective to very ineffective. Both parameters should be transformed into comparable units by means of normalization or standardization in order to provide a fair performance assessment for both parameters.

The results obtained can then be compared with the benchmark developed in this study so as to determine whether the competitiveness of the firm is below, above, or at the same level as the developed competitiveness benchmark.

5.8 Strategies for Gaining Competitive Advantage

Section B of the questionnaire (*Appendix A*) sought answers to the strategy adopted by indigenous construction firms in gaining competitive advantage. This construct consisted of four items namely: competing on the basis of cost, competing on the basis of quality, competing on the basis of time and competing on the basis of the scope of operation.

From Table 5.9, the three most significant strategies adopted by indigenous construction firms in Nigeria for gaining competitive advantage are: achieving high quality in constructed facilities, being highly responsive to clients' request and achieving on-schedule performance in operations.

Table 5.9 Ranking of Strategies for Gaining Competitive Advantage

Strategy	Mean	Standard deviation	Rank
Achieving high quality in constructed facilities	4.75	0.55	1
Being highly responsive to clients requests	4.57	0.57	2
Achieving on-schedule performance in operations	4.43	0.57	3
Improving the quality of contracting services offered	4.38	0.71	4
Improving the efficiency of the contracting activities	4.34	0.83	5
Accommodating the client's acceleration request	4.15	0.84	6
Reducing costs in construction operations	4.13	0.9	7
Reducing costs in administrative activities	3.94	0.95	8
Achieving high quality beyond the requirements in the specifications	3.87	1.11	9
Attempting to deliver constructed facilities ahead of schedule	3.68	1.21	10
Operating in specific construction market segments	3.38	0.97	11
Serving a specific geographic construction market	3.21	1.06	12
Serving a specific group of clients	3.19	1.16	13
Offering a limited range of project delivery systems	3.06	1.13	14

5.9 Relationship between Firms' Turnover and Firms' Strategies

Table 5.10 shows Spearman's Rank Correlation between firms' turn over and firms' strategies. There is a moderate, positive and significant correlation between firms' turnover and achieving high quality in constructed facilities. In order words the bigger the indigenous construction firm the greater the penchant to achieve high quality in constructed facility. There is also a moderate, positive and significant relationship between firms' turnover and achieving on-schedule performance in operations. This indicates that the bigger the indigenous construction firm the greater the desire to achieve on-schedule performance. Moreover, table 5.10 shows a significant positive but moderate correlation between firms' turnover and improving the quality of construction services offered. This implies that the bigger the indigenous construction firm the more the quality of construction services offered. Furthermore, the table indicates a moderate, significant and positive relationship between firms' turnover and improving the cost efficiency of contracting activities.

Table 5.10 Spearman's Rank Correlation between Firms' Turn Over and Firms' Strategies

Strategy	Spearman's Rank Coefficient	Remark	Significance	Remark
Achieving high quality in constructed facilities	0.331*	Moderate +	0.015	SS
Being highly responsive to clients requests	0.211	Weak +	0.129	NS
Achieving on-schedule performance in operations	0.517**	Moderate +	0.000	SS
Improving the quality of construction services offered	0.422**	Moderate +	0.002	SS
Improving the cost efficiency of contracting activities	0.475**	Moderate +	0.000	SS
Accommodating the clients acceleration request	0.187	Very Weak +	0.179	NS
Reducing cost in construction operation	0.087	Very Weak +	0.537	NS

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

*correlation is significant at the 0.05 level (2-tailed)

NS- not significant

SS-statistically significant

5.10 Determining Significant Relationships between Strategies Adopted by Indigenous Construction Firms for Gaining Competitive Advantage

Spearman's Rank correlations indicate relationships between the strategies adopted by indigenous construction firms in gaining competitive advantage (*Refer to appendix F for detailed correlation results*).

Table 5.11 reveal that correlation coefficient for correlation between achieving high quality in constructed facilities and achieving on-schedule performance is 0.300. This indicates a positive but weak relationship. However, the correlation is significant as $p = 0.029 < 0.05$. This means that the more firms strive to achieve high quality in constructed facilities the more they also strive to achieve on-schedule performance.

Table 5.11 Correlation between Strategies Adopted by Indigenous Construction Firms for Gaining Competitive Advantage

	Hquality	HResClients	On schedule	QConSer	CEcONSER	CacceleReq	Cinconcatvt
Hquality	1	0.061 0.662	0.300* 0.029	0.233 0.093	0.368** 0.007	-0.076 0.589	0.334* 0.015
HResClients	0.061 0.662	1	0.071 0.615	0.248 0.073	0.181 0.195	0.093 0.509	0.17 0.225
On schedule	0.300* 0.029	0.071 0.615	1	0.066 0.637	0.390** 0.004	0.402** 0.003	-0.019 0.89
QConSer	0.233 0.093	0.248 0.073	0.066 0.637	1	0.450** 0.001	0.156 0.265	0.016 0.908
CEcONSER	0.368** 0.007	0.181 0.195	0.390** 0.004	0.450** 0.001	1	0.262 0.058	-0.033 0.815
CacceleReq	-0.076 0.589	0.093 0.509	0.402** 0.003	0.156 0.265	0.262 0.058	1	0.066 0.636
Cinconcatvt	0.334* 0.015	0.17 0.225	-0.019 0.89	0.016 0.908	-0.033 0.815	0.066 0.636	1

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

Correlation is significant at the 0.05 level (2-tailed)

Key -

Hquality -Achieving high quality in construction facilities

HResClients - Being highly responsive to clients request

On Schedule-Achieving on-schedule performance in operations

QConSer-Improving the quality of construction services offered

CEcONSER - Improving the cost efficiency of the contracting activities

Cinconcopp- Reducing cost in construction operation

CaccelerReq Accommodating the clients acceleration requests

From table 5.11 the correlation coefficient for relationship between achieving high quality in constructed facilities and improving the cost efficiency of contracting activities is 0.368. This shows a positive and moderate relationship. Moreover, the correlation is significant as $p = 0.007 < 0.05$. This implies that the more firms strive to achieve high quality in constructed facilities the more they also strive to improve cost efficiency in contracting services.

Correlation coefficient for correlation between achieving high quality in constructed facilities and reducing cost in construction operation is 0.334. This indicates a moderate and positive correlation. Furthermore, the relationship is significant as $p = 0.015 < 0.05$. This means that the more firms strive to achieve quality in constructed facilities the more they strive to reduce cost in construction operations.

There is a significant, positive and moderate correlation between achieving on-schedule performance and improving cost efficiency of contracting services. This is indicated by the correlation coefficient 0.390 and p value $0.004 < 0.05$ in table 5.10. This implies that the more firms strive to achieve on-schedule performance the more they strive to improve cost efficiency of contracting services.

Correlation coefficient for correlation between on-schedule performance and accommodating clients' acceleration requests is 0.402 (table 5.11). This shows a positive and moderate correlation. P value for the correlation is $0.003 < 0.05$ (table 5.11) which indicates a significant relationship. This shows that the more a firm strives to achieve on-schedule performance the more it accommodates clients' acceleration requests.

From table 5.11 the correlation between improving the quality of construction services offered and improving the cost efficiency of contracting services is significant, moderate and positive. This is indicated by the correlation coefficient 0.450 and p value $0.001 < 0.05$ in table 5.11 .This implies that the more firms strive to improve the quality of construction services offered the more they improve the cost efficiency of contracting services.

5.11 Discussion of Major Findings

5.11.1 Significant Competitiveness Parameters

A total of 40 parameters were identified as significant in determining the competitiveness of indigenous construction firms as shown in (Table 5.6). The most significant parameter that determines the competitiveness of indigenous construction firms in Nigeria is effectiveness of cost controlling methods (Table 5.6). Cost control involves the creation of cost plan for a project so as to ensure completion of the work within agreed cost limits while maintaining good quality of the constructed facility (Al-Jibouri, 2003). Drew and Skitmore (1990) revealed that a good strategy for securing jobs in the construction industry is for construction firms to present low bids compared to their competitors. However, for a construction firm to present a low bid and still make profit it has to employ effective cost control methods. No wonder, effectiveness of

cost controlling methods has been ranked as the most significant determinant of competitiveness in the Nigerian construction industry. Effectiveness of cost control methods (cost management) was ranked the fourth significant determinant of competitiveness of construction firms in China (Lu, 2006).

Effectiveness of site management was ranked as the second important determinant of competitiveness of indigenous construction firms in Nigeria (*Table 5.6*). Given the low profit margin of most construction projects (Aniekwu and Audu, 2010) it is not surprising that indigenous construction firms have ranked effectiveness of site management as the second important determinant of competitiveness in Nigeria. This may be because effective site management determines how much profit can be made or lost from a construction project depending on the efficient use of materials, labour and other resources (Jimoh, 2012).

The third significant determinant of the competitiveness of indigenous construction firms in Nigeria is the method of procurement (*Table 5.6*). Procurement method in the context of the construction industry is the technique that a client uses to acquire project resources for the purpose of realizing a constructed facility. The literature provides several procurement methods in use in the construction industry and each method of procurement has its merits and demerits. Although this thesis did not investigate the procurement method adopted by clients in the Nigerian construction industry, indigenous construction firms believe that competitiveness depend on the procurement method adopted by clients in the construction industry. For instance, if negotiated and selective tendering methods are prevalent procurement methods used by clients in the Nigerian construction industry, then new competent construction firms would have little or no opportunity to show case their skills. Hence, their competitiveness is negatively affected.

Indigenous construction firms ranked method of procurement as the third significant determinant of the competitiveness.

Effectiveness of time controlling methods was ranked the fourth significant determinant of competitiveness of indigenous construction firms in Nigeria (*Table 5.6*). A construction firm should possess a track record of timely completion of projects if it must become competitive because no client wants to be stuck with a construction firm that is unable to meet deadlines. Abbas (2006) revealed that ineffective time control can be very costly to both the client and the contractor because it leads to extra expenses, disputes and litigations. Hence, indigenous construction firms in Nigeria rank effectiveness of time controlling methods as the fourth determinant of competitiveness in the Nigerian construction market.

Relationship with clients has been ranked the fifth significant determinant of competitiveness by indigenous construction firms in Nigeria (*Table 5.6*). Clients here refer to private clients.

Indigenous construction firms believe that old and prospective clients play a significant role in determining the success of their contract bids because clients are able to award further contracts to a preferred construction firm or refer such a firm to other clients. As a result, indigenous construction firms have ranked relationship with client as the fifth significant determinant of competitiveness.

It is worth noting that relationship with government departments was ranked 57 out of 58 determinant of the competitiveness of indigenous construction firms in Nigeria. This is alarming, but not surprising. The level of patronage enjoyed by indigenous construction firms in Nigeria is low compared to foreign construction firms as revealed in Table 1.1. No wonder, relationship with government departments have been ranked as the 57th determinant of competitiveness of indigenous construction firms in Nigeria. However relationship with government departments

was ranked the third determinant of the competitiveness of indigenous construction firms in China. This may be due to several reasons: First, the Chinese government plays a strong supervisory role to its entire economy including construction and has provided favorable business conditions for its construction firms (Lu, 2006). Moreover, the Chinese government has a keen interest in the construction industry and describes the industry as the ‘pillar industry’ because the government has noted the consistent contribution of the construction industry to the rapid and healthy development of its economy (Lu, 2006).

5.11.2 Significant Strategies for Gaining Competitive Advantage

The most significant strategy adopted by indigenous construction firms for gaining competitive advantage is achieving high quality in constructed facilities (*Table 5.9*). This finding is consistent with that of Kale and Arditi (2002) who assessed how construction firms in the US position themselves in order to gain competitive advantage. Kale and Arditi (2002) revealed that most of the construction firms in the US place strong emphasis on the quality of the facilities they construct as a means of gaining competitive advantage over rivals. Quality in constructed facilities is one of the factors that determine clients’ satisfaction (Karna, 2004). Furthermore, only clients who are fully satisfied with the quality of constructed facility would be willing to do repetitive work with the same contractor or would be willing to refer other clients to such a contractor (Egemen and Mohammed, 2005). By achieving high quality in constructed facilities, indigenous construction firms are able to secure repetitive works thereby gaining competitive advantage and enjoying an increase in market share. This explains why indigenous construction firms have ranked achieving high quality in constructed facility as the most significant strategy for gaining competitive advantage in the Nigerian construction market.

The second important strategy adopted by indigenous construction firm in gaining competitive advantage is being highly responsive to clients' requests (*Table 5.9*). Indigenous construction firms understand that clients play a vital role in their survival in the construction market. Hence, indigenous construction firms are quick to provide their clients with what they need in terms of design and material variation or acceleration requests. Gomolski (2001) in his study of businesses in the real time found out that responsiveness to clients is a source of competitive advantage for many businesses. Moreover, David (2005) noted that a key to winning and keeping target customers is to understand their needs better than rivals do.

Achieving on - schedule performance in operations was found to be the third important strategy for gaining competitive advantage (*Table 5.9*). This may be due to the fact that every client has a time frame within which he desires that his project be completed. A client whose purpose of construction is commercial has projected that after a particular period his facility (investment) would begin to yield some returns. Moreover, the client who embarks on construction for other reasons aside commercial purposes also has a time at which he intends to put the facility to use. Anything short of this time expectation is usually not acceptable by the client. In situations where construction time extends beyond the agreed time extra expenses are incurred. Construction firms are aware of this as such they strive to deliver projects on-schedule. Maloney (2002) noted that on-schedule performance is a factor that promotes client satisfaction and ultimately brings competitive advantage.

Improving the quality of contracting services offered was ranked the fourth significant strategy for gaining competitive advantage by indigenous construction firms (*Table 5.9*). Ling and Chong (2005) found that the quality of contracting services is antecedent to client satisfaction. Moreover

(Al-Shorafa, 2008) noted that client satisfaction gives the contractor an opportunity to remain a potential partner of the client in the future thereby securing jobs for the contractor.

It is worth noting that all the variables measured under focus strategy were ranked relatively low by indigenous construction firms in Nigeria. This may be because the most important priority for indigenous construction firms is survival amidst stiff competition and low profit margin. Hence, indigenous construction firms strive to secure jobs irrespective of client type or geographical location. This agrees with the findings of Kale and Arditi (2002) that construction firms which are not restricted to a particular client type and geographical location experience more growth in contract awards than those that operate within a specific geographical location or patronize a particular client type.

5.11.3 Correlation between Firms' Turnover and Firms' Strategies

Quality is relatively expensive. All categories of quality: quality in constructed facilities and quality in construction service offered have some inherent costs. Inherent costs of quality include cost of preventing defects and cost of rework. Bigger firms in terms of turnover have the ability to accommodate the inherent costs of quality more than the relatively smaller firms. Hence, the correlation between firms' turnover and achieving high quality in constructed facilities; firms' turnover and improving quality in construction services offered.

Achieving on-schedule performance is also relatively expensive. On-schedule performance can be achieved by excellent management of the construction process which includes – efficient planning of work, procurement of specified materials and good stock control. To attain excellent management of the construction process, there is also the need to hire qualified and experienced workforce to manage the construction process. Excellent management of the construction

process is expensive. In other words excellent management of the construction process would require financial resources to attain. Firms with higher turnover are more likely to have the financial capability to ensure excellent management of the construction process which facilitates the delivery of construction work on time. This explains the significant positive relationship between firms' turnover and achieving on-schedule performance.

As noted earlier, quality and on-time performance are relatively expensive. Therefore, firms with higher turnover deliberately look for ways of reducing or eliminating unnecessary cost so as to use the cost savings to offset the cost of quality. Consequently, firms with higher turnover are more cost efficiency in contracting activities than firms with relatively lower turnover. Hence, the positive relationship between firms' turnover and improving cost efficiency in contracting activities.

5.11.4 Correlation between Firms' Strategies

The prevalent tradeoffs in quality, time and cost performance has necessitated the development of new and innovative contracting methods some of which emphasize the need to maximize quality while attempting to achieve on-schedule performance (Afshar et al., 2007; Narayanam and Suribabu, 2014). Consequently, firms that strive to achieve high quality in constructed facilities also strive to achieve on-schedule performance as indicated in the positive correlation between achieving high quality in constructed facilities and achieving on-schedule performance.

As earlier noted, quality irrespective of the type is relatively expensive. As such, firms look for ways of eliminating or reducing cost in construction activities. Firms that strive to achieve high quality in constructed facilities also strive to reduce cost in construction activities. Hence the positive relationship between achieving high quality in constructed facility and reducing cost in

construction activities. Firms also attempt to improve cost efficiency in construction services so that cost savings can be used to offset cost of quality. In order words firms that strive to achieve high quality in constructed facilities also strive to improve cost efficiency in contracting activities. This explains the correlation between achieving high quality in constructed facility and improving cost of efficiency in construction service.

Achieving on-schedule performance through the use of efficient work plan, good stock control, specified materials and good supervision is relatively expensive. Hence firms seek ways of reducing cost in construction process. In order words, firms strive to improve cost efficiency in order to achieve on-schedule performance. This is indicated by the correlation between achieving on-schedule performance and improving the cost efficiency in construction service.

5.12 Summary

This Chapter presented the results of the data analyzed for this research. The survey was conducted on a randomly selected sample of indigenous construction firms registered with the Nigerian Institute of Building (NIOB). Fifty three copies of the questionnaire were returned from a total of 72 copies that were distributed representing an overall response rate of 73.61%. The characteristics of the firms surveyed were also presented. This Chapter also reported the significant parameters that determine the competitiveness of indigenous construction firms in Nigeria. Competitiveness indices for indigenous construction firms were developed by means of the weighted summation. A systematic way of applying the indices developed in this study was given. Moreover, significant correlations between firms' turn over and firms strategies were presented.

The key findings from the study are as follows:

Most of the indigenous construction firms surveyed have a workforce of less than 50

Majority of the firms surveyed bid for more than three jobs in a year.

Greater percentage of the firms surveyed secured an average of two jobs yearly.

The average turnover of most indigenous construction firms surveyed is less than 200 Million Naira.

The five most significant competitiveness parameters for indigenous construction firms surveyed are effectiveness of cost controlling methods, effectiveness of site management, method of procurement, effectiveness of time controlling methods and relationship with client.

The three most significant strategies adopted by indigenous construction firms in gaining competitive advantage are achieving high quality in constructed facilities, being highly responsive to clients' request and achieving on-schedule performance in operations.

There is a statistically significant correlation between firms' turn over and firms' strategies.

There is a statistically significant relationship between the strategies adopted by indigenous construction firms in gaining competitive advantage.

CHAPTER SIX

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

6.1 Overview

This Chapter presents a summary of the research findings, conclusions, contributions of the research to indigenous construction firms, academics, other construction industries and to the existing body of knowledge on competitiveness. Moreover, recommendations to the construction industry and suggestions for further studies are presented.

6.2 Summary of Research Findings

This research developed indices which would be used as a benchmark in determining the competitiveness of indigenous construction firms in Nigeria. Strategies by which indigenous construction firms can gain competitive advantage were also identified in this research. The major findings are summarized below:

6.2.1 Competitiveness Parameters

Competitiveness of a firm is simply the ability of a firm to bid, win and successfully execute a project. Significant competitiveness parameters identified by this research include: effectiveness of cost controlling methods (cost management), effectiveness of site management, method of procurement, effectiveness of time controlling methods and relationship with client.

6.2.2 Strategies for Gaining Competitive Advantage

As earlier noted indigenous construction firms operate in a harsh and turbulent business environment characterized by stiff competition, relatively low entry barrier and profit margin. In order to survive and control a good share of the construction market, indigenous construction firms must adopt strategies that would enable them gain competitive advantage i.e. to have an edge over competitors. This research has identified strategies that indigenous construction firms in Nigeria can adopt in order to gain competitive advantage. Significant strategies for gaining competitive advantage as found by this study include: achieving high quality in constructed facility, being highly responsive to clients' requests and achieving on-schedule performance in construction operations.

6.3 Conclusion of the Research

Three out of the five most significant competitiveness parameters namely: effectiveness of cost controlling methods, effectiveness of site management and effectiveness of time controlling methods belong to the project management competencies group of competitiveness parameters. This suggests that project management competencies are the major determinants of competitiveness for indigenous construction firms in Nigeria.

Client bias, as a result of the procurement method adopted also affects the competitiveness of indigenous construction firms. A client may be favourably disposed to a particular construction firm not only because the firm satisfies established prequalification requirements but because of some subjective reasons such as family ties, societal ties, political affiliations, etc.

Good client relationship is also important for competitiveness of indigenous construction firms, because construction clients are powerful stakeholders of the construction process who are able to award new contracts to a preferred construction firm and refer such firms to other clients.

Client focused strategies rather than cost and scope strategies are more effective in gaining competitive advantage since the three most significant strategies for gaining competitive advantage as identified in this study namely: achieving high quality in constructed facilities, being highly responsive to clients' requests and achieving on-schedule performance on operations are all client focused strategies.

Statistically significant correlations exist between firms' turnover and firms' strategies

Statistically significant relationships exist between the strategies adopted by indigenous construction firms for gaining competitive advantage.

6.4 Contributions of the Research

The competitiveness indices developed in this study would be used as a benchmark for determining the competitiveness of indigenous construction firms in Nigeria. The indices developed in this study can be used by:

6.4.1 Indigenous Construction Firms

The strategies for gaining competitive advantage identified in this research can be adopted by indigenous construction firms for survival and sustainability. A major contribution of this research is the development of competitiveness indices for significant competitiveness parameters in indigenous construction firms. The indices were developed by means of the weighted summation formular. Indigenous construction firms can use the indices to determine

their level of competitiveness per time and also to spot areas of deficiencies or strengths in their organization that could hamper or positively influence the competitiveness of their firms.

6.4.2 Researchers

Academics can use the competitiveness indices developed in this study as a benchmark for evaluating the performance of competitiveness parameters in indigenous construction firms.

6.4.3 Other Construction Industries

The findings from this research emanate from the Nigerian construction industry. The competitiveness parameters and strategies for gaining competitive advantage were identified by indigenous construction firms operating in Nigeria. Similar studies aimed at developing competitiveness indices and identifying strategies for gaining competitive advantage can be carried out in other countries and comparisons made with the results.

6.4.4 Existing Knowledge on Competitiveness

Building on the existing knowledge on competitiveness, this research has provided greater insight into the competitiveness of indigenous construction firms within the Nigerian construction context. Moreover, empirical evidence has been provided of suitable strategies that can be adopted by indigenous construction firms in Nigeria in order to gain competitive advantage. Furthermore, the competitiveness indices developed in this research can form part of the existing global reports on competitiveness especially since the World Economic Forum introduced competitiveness of regions (African competitiveness report) and industries (Travel and tourism competitiveness report).

6.5 Recommendations

The following recommendations are made from the findings of this study:

- i. Since most of the indigenous construction firms surveyed have a workforce of less than 50 persons and turnover of less than 0.20 billion Naira, indigenous construction firms should explore the idea of forming alliances through mergers, partnering or other forms of collaborative relationships in order to enjoy economies of scale.
- ii. Indigenous construction firms should give priority to the development of Project Management Competencies (PMCs) such as cost management, site management and time management competencies by allocating sufficient resources aimed at improving PMCs through training and other staff development programmes.
- iii. The Nigerian Government should assist in developing PMCs for indigenous construction firms through consistent patronage.
- iv. The Council of Registered Builders of Nigeria (CORBON) should be empowered to license and regulate the operation of construction firms in order to ensure good building production practices.
- v. A substantial part of the resources of indigenous construction firms should be set aside for the development of client-focused strategies like achieving high quality in constructed facilities and achieving on-schedule performance on operations, so that indigenous construction firms can gain competitive advantage.
- vi. Indigenous construction firms should improve on client relations in terms of the quality of services rendered to clients and responsiveness to clients' requests.
- vii. Indigenous construction firms should embark on brand development exercises that showcase firms' project management competencies and excellent customer service.

6.6 Areas of Further Studies

Two areas are recommended for further studies:

There is a need for further studies that will determine the level of performance of these competitiveness parameters in indigenous construction firms using the competitiveness indices developed in this study as a bench mark.

This study employed the weighted summation in developing competitiveness indices for indigenous construction firms. There is a need to carry out further studies on developing competitiveness indices with the use of other multi-criteria methods of evaluation like multiple criteria goal programming (MCGP), Analytical Hierarchy Process (AHP) and Fuzzy set theories. Comparative analysis of competitiveness indices developed with weighted summation and other multi-criteria evaluation methods can also be carried out.

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APPENDIX A QUESTIONNAIRE SURVEY

To whom it may concern:

Dear Sir/Ma

Assessing the Competitiveness of Indigenous Construction Firms in Nigeria

You are invited to participate in this **PhD** research which is aimed at determining the strategies adopted by indigenous construction firms for achieving competitiveness and also proposing a framework for improving same.

Competitiveness in this context refers to the ability of a construction firm to bid successfully for construction projects and provide services with superior quality, lower costs and with shorter time so that they can attain superior performance.

The questionnaire is divided into three (3) sections. **Section A** requests general information about you and your organization. **Section B** seeks answers to the strategy adopted by your organization for achieving competitiveness while **Section C** requires your opinion on the parameters that determine competitiveness.

While appreciating you for the sacrifice of your time, please note that the information provided by this questionnaire would be used for the purpose of research only.

Thank you for your kind consideration.

Patience F. Tunji –Olayeni (MNIQS)
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SECTION A: GENERAL INFORMATION

1. Name of firm (optional)

2. Designation of respondent Quantity Surveyor Architect Builder
 Engineer Others please specify.....

3. Total number of workforce in head office and on site Below 50 51-100
 101-150 151-200 Above 200

4. Total number of jobs bidded for last year None One Two
 Three Above three

5. Total number of jobs secured last year None One Two
 Three Above three

6. Turnover (*last year*) in Billions of Naira Below 0.20 Billion 0.21-0.50 Billion
 0.51-0.70 Billion 0.71- 1 Billion Above 1 Billion

SECTION B: STRATEGIES FOR COMPETITIVENESS

Please indicate the extent to which the following strategies are considered important in your organization. EUI- extremely unimportant, UI –unimportant, US-unsure, I-important, EI – Extremely important.

		EUI 1	UI 2	US 3	I 4	EI 5
A	Competing on the basis of cost					
i	Reducing costs in construction operations					
ii	Reducing costs in administrative activities					
iii	Improving the cost efficiency of the contracting activities					
B	Competing on the basis of quality					
i	Achieving high quality in the constructed facility					
ii	Achieving high quality beyond the requirements in the specifications					
iii	Improving the quality of contracting services offered					
iv	Being highly responsive to clients' requests					

C	Competing on the basis of time	EUI 1	UI 2	US 3	I 4	EI 5
i	Achieving on-schedule performance in construction operations					
ii	Accommodating the clients acceleration requests					
iii	Attempting to deliver constructed facilities ahead of schedule					
D	Scope of operation					
i	Serving a specific geographic construction market					
ii	Operating in specific construction market segments					
iii	Offering a limited range of project delivery systems					
iv	Serving a specific group of clients					

SECTION C: PARAMETERS THAT DETERMINE COMPETITIVENESS OF INDIGENOUS CONSTRUCTION FIRMS

Please indicate the level of necessity of the following parameters as determinants of competitiveness for indigenous construction firms. EN – extremely necessary, N – necessary, NS- not sure, NG – Negligible, UN-unnecessary

		UN 1	NG 2	NS 3	N 4	EN 5
A	PROJECT MANAGEMENT					
I	Site management					
i.i	Effective site management					
ii	Cost management					
ii.i	Effectiveness of cost controlling methods					
ii.ii	Cost reduction rate over the past three years					
iii	Quality management					
iii.i	Availability of quality management system					
iii.ii	Number of quality awards over the past three years					
iii.iii	Client satisfaction with quality					
iv	Time management					
iv.i	Effectiveness of time controlling methods					
iv.ii	Previous records about construction delays					
iv.iii	Claims by clients over the past three years					
v	Contract management					
v.i	Existence of contract administration system					
v.ii	Availability of contract managerial resources					
v.iii	Contract claim and dispute settlement					
vi	Health and safety management					
vi.i	Availability and effectiveness of safety management					
vi.ii	Effectiveness of accident settlement process					
vi.iii	Number of safety accidents over past three years					
vi.iv	Availability of health and safety protection resources					
vii	Dispute resolving skills					
vii.i	Availability of resources for dispute resolution					
vii.ii	Dispute resolution skills					
viii	Logistic and supply chain management					
viii.i	Availability and effectiveness of price information system					
viii.ii	Effectiveness of procurement system					
viii.iii	Methods of procurement					

		UN 1	NG 2	NS 3	N 4	EN 5
B	ORGANIZATION'S RESOURCES					
I	Financial ability					
i.i	Good communications with bankers					
i.ii	Level of knowledge about financial policy					
i.iii	Ability to gain finance from different channels					
ii	Financial status					
ii.i	Assets status					
ii.ii	Profit status					
ii.iii	Debt status					
iii	Current capacity of human resources					
iii.i	Adequacy of personnel structure					
iii.ii	Number of qualified professionals					
iii.iii	Educational levels of personnel					
Iv	Use of human resources					
iv.i	Personnel management system					
iv.ii	Personnel's job satisfaction					
iv.iii	Labour productivity and effectiveness of motivation					
iv.iv	Labour management system					
V	Development of human resources					
v.i	Existence of human resources development strategy					
v.ii	Existence of personnel recruitment plan					
v.iii	Existence of regular training facilities					
C	ORGANIZATIONAL STRUCTURE					
I	Internal operations					
i.i	Effectiveness of decision-making system					
i.ii	Effectiveness of executing system					
i.iii	Feedback mechanism in executing system					
ii	Suitability of organizational structure					
ii.i	Clarity of divisions of functional departments					
ii.ii	Clarity of responsibilities of functional departments					
iii	Internal communication					
iii.i	Communications between functional departments					
iii.ii	Communications between managerial and general staff					
iii.iii	Communications between different subsidiaries and projects					
Iv	Public image					
iv.i	Company owner's personality and capability					
iv.ii	Corporation identification and staff image					
D	RELATIONSHIPS					
I	Relationship with government departments					
Ii	Relationship with client					
Iii	Relationship with subcontractors/suppliers					
Iv	Relationship with the public					
E	BIDDING TECHNIQUES					
I	Bidding strategy					
i.i	Existence and effectiveness of bidding strategy					
i.ii	Success rate of prequalification over the past three years					
i.iii	Success rate of bidding over the past three years					
Iv	Sum of contracts over the past three years					
ii	Bidding resources					
ii.i	Experiences for bidding projects					

ii.ii	Availability of professionals in bidding					
ii.iii	Availability of resources for bidding					

APPENDIX B RELIABILITY OF THE SURVEY ITEMS

1.1 STRATEGIES FOR GAINING COMPETITIVE ADVANTAGE

Table 1 Case Processing Summary

		N	%
Cases	Valid	53	100.0
	Excluded ^a	0	.0
	Total	53	100.0

a. Listwise deletion based on all variables in the procedure.

Table 2 Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.717	.701	14

1.2 PROJECT MANAGEMENT

Table 3 Case Processing Summary

		N	%
Cases	Valid	53	100.0
	Excluded ^a	0	.0
	Total	53	100.0

a. Listwise deletion based on all variables in the procedure.

Table 4 Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.878	.888	21

1.3 ORGANIZATION'S RESOURCES

Table 5 Case Processing Summary

		N	%
Cases	Valid	53	100.0
	Excluded ^a	0	.0
	Total	53	100.0

a. Listwise deletion based on all variables in the procedure.

Table 6 Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.847	.853	16

1.4 ORGANIZATIONAL STRUCTURE

Table 7 Case Processing Summary

		N	%
Cases	Valid	53	100.0
	Excluded ^a	0	.0
	Total	53	100.0

a. Listwise deletion based on all variables in the procedure.

Table 8 Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.861	.864	10

1.5 RELATIONSHIPS

Table 9 Case Processing Summary

		N	%
Cases	Valid	53	100.0
	Excluded ^a	0	.0
	Total	53	100.0

a. Listwise deletion based on all variables in the procedure.

Table 10 Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.499	.571	4

1.6 BIDDING TECHNIQUES

Table 11 Case Processing Summary

		N	%
Cases	Valid	52	98.1
	Excluded ^a	1	1.9
	Total	53	100.0

a. Listwise deletion based on all variables in the procedure.

Table 12 Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.855	.853	7

**APPENDIX C DESCRIPTIVE STATISTICS: STRATEGIES FOR GAINING
COMPETITIVE ADVANTAGE**

Table 1 Descriptive Statistics

	N	Mean	Std. Deviation
Acheiving high quality in constructed facility	53	4.75	.551
Being highly responsive to clients' requests	53	4.57	.572
Acheiving on-schedule performance	53	4.43	.572
Improving high quality of contracting services offered	53	4.38	.713
Improving the cost efficiency of the contracting activities	53	4.34	.831
Accomodating the clients' acceleration requests	53	4.15	.841
Reducing costs in construction operations	53	4.13	.900
Reducing costs in administartive activities	53	3.94	.949
Acheiving high quality beyond the requirements in the specifications	53	3.87	1.110
Attempting to deliver constructed facilities ahead of schedule	53	3.68	1.205
Operating in specific construction market segments	53	3.38	.965
Serving specific geographic construction market	53	3.21	1.063
Serving a specific group of clients	53	3.19	1.161
Offering a limited range of project delivery systems	53	3.06	1.134

Table 1 **Descriptive Statistics**

	N	Mean	Std. Deviation
Acheiving high quality in constructed facility	53	4.75	.551
Being highly responsive to clients' requests	53	4.57	.572
Acheiving on-schedule performance	53	4.43	.572
Improving high quality of contracting services offered	53	4.38	.713
Improving the cost efficiency of the contracting activities	53	4.34	.831
Accomodating the clients' acceleration requests	53	4.15	.841
Reducing costs in construction operations	53	4.13	.900
Reducing costs in administartive activities	53	3.94	.949
Acheiving high quality beyond the requirements in the specifications	53	3.87	1.110
Attempting to deliver constructed facilities ahead of schedule	53	3.68	1.205
Operating in specific construction market segments	53	3.38	.965
Serving specific geographic construction market	53	3.21	1.063
Serving a specific group of clients	53	3.19	1.161
Offering a limited range of project delivery systems	53	3.06	1.134
Valid N (listwise)	53		

**APPENDIX D DESCRIPTIVE STATISTICS: COMPETITIVENESS
PARAMETERS**

Table 1 Descriptive Statistics

	N	Sum	Mean	Std. Deviation
Effectiveness of cost controlling methods	53	245	4.62	.686
Effective site management	53	243	4.58	.908
Effectiveness of procurement system	53	234	4.42	.602
Effectiveness of time controlling methods	53	234	4.42	.770
Relationship with client	53	233	4.40	.743
Client satisfaction with quality	53	232	4.38	1.004
Number of qualified professionals	53	230	4.34	.618
Availability of quality management system	53	229	4.32	.915
Availability and effectiveness of price information system	53	228	4.30	.845
Effectiveness of executing system	53	228	4.30	.822
Communications between managerial and general staff	53	227	4.28	.568
Effectiveness of decision-making system	53	225	4.25	.875
Availability and effectiveness of safety management	53	225	4.25	.939
Existence and effectiveness of bidding strategy	53	224	4.23	.824
Relationship with subcontractors/suppliers	53	224	4.23	.640
Communications between functional departments	53	224	4.23	.724

Availability of health and safety protection resources	53	223	4.21	.793
Personnel's job satisfaction	53	223	4.21	.689
Method of procurement	53	223	4.21	.863
Company owner's personality and capability	53	222	4.19	.962
Experiences for bidding projects	53	219	4.13	.833
Labour productivity and effectiveness of motivation	53	218	4.11	.751
Availability of resources for bidding	52	213	4.10	.913
Availability of professionals in bidding	53	217	4.09	.966
Communications between different subsidiaries and projects	53	217	4.09	.628
Assets status	53	216	4.08	.917
Clarity of divisions of functional departments	53	215	4.06	.864
Personnel management system	53	215	4.06	.818
Effectiveness of accident settlement process	53	215	4.06	1.099
Existence of contract administration system	53	215	4.06	.908
Clarity of responsibilities of functional departments	53	214	4.04	.854
Feedback mechanism in executing sytem	53	214	4.04	.898
Adequacy of personnel structures	53	214	4.04	.876
Good communication with bankers	53	214	4.04	.919

Corporation identification and staff image	53	214	4.04	1.091
Labour management system	53	214	4.04	.831
Ability to gain finance from different channels	53	214	4.04	.940
Profit status	53	213	4.02	.843
Educational levels of personnel	53	213	4.02	.772
Cost reduction rate over the past three years	53	212	4.00	1.038
Existence of regular training facilities	53	211	3.98	.951
Availability of contract managerial resources	53	210	3.96	.759
Existence of human resources development strategy	53	210	3.96	.940
Level of knowledge about financial policy	53	206	3.89	.954
Existence of personnel recruitment plan	53	206	3.89	.891
Number of safety accidents over the past three years	53	201	3.79	1.261
Contract claim and dispute settlement	53	200	3.77	1.086
Availability of resources for dispute resolution	53	200	3.77	1.235
Previous records about construction delays	53	199	3.75	1.159
Dispute resolution skills	53	198	3.74	1.041
Debt status	53	198	3.74	1.163
Success rate of prequalification over the past three years	53	197	3.72	1.166

Sum of contracts over the past three years	53	196	3.70	1.119
Claims by clients over the past three years	53	196	3.70	.932
Relationship with the public	53	195	3.68	1.088
Success rate of bidding over the past three years	53	192	3.62	1.228
Relationship with government departments	53	189	3.57	1.201
Number of quality awards over the past three years	53	189	3.57	1.323
Valid N (listwise)	52			

APPENDIX E CALCULATING THE RELATIVE WEIGHTS BY MEANS OF WEIGHTED SUMMATION

Employing the weighted summation formular adopted by Lu (2006),

$$\text{Relative weight of } P_i = \frac{TV_i}{\sum TV}$$

Where P_i is parameter I

TV_i is the total value of P_i given by respondents; $\sum TV$ is the sum of total values given by respondents of parameters that fall in the same group as P_i .

Refer to table 5.6 for competitiveness parameter and TV(Total value)

Effectiveness of cost controlling methods (Aii.i)

$$P_{Aii.i} = TV_{Aii.i} / \sum TV$$

Where $TV_{Aii.i} = 245$

$$\begin{aligned} \sum TV &= TV_{Aii.i} + TV_{Aii.ii} \\ &= 245 + 212 = 457 \end{aligned}$$

$$P_{Aii.i} = 245/457 = \mathbf{0.536}$$

Effectiveness of site management (Ai.i)

$$P_{Ai.ii} = TV_{Ai.i} / \sum TV$$

Where $TV_{Ai.i} = 243$

$$\sum TV = TV_{Ai.i} = 243$$

$$P_{Ai.i} = 243/243 = \mathbf{1}$$

Effectiveness of time controlling methods (Aiv.i)

$$P_{Aiv.i} = TV_{Aiv.i} / \sum TV$$

Where $TV_{Aiv.i} = 234$

$$\sum TV = TV_{Aiv.i} = 234$$

$$P_{Aiv.i} = 234/234 = \mathbf{1}$$

Relationship with client (D.ii)

$$P_{D.ii} = TV_{D.ii} / \sum TV$$

Where $TV_{D.ii} = 233$

$$\begin{aligned} \sum TV &= TV_{D.ii} + TV_{D.ii} \\ &= 233 + 224 = 457 \end{aligned}$$

$$P_{D.ii} = 233/457 = \mathbf{0.510}$$

Client satisfaction with quality (Aiii.iii)

$$P_{Aiii.iii} = TV_{Aiii.iii} / \sum TV$$

Where $TV_{Aiii.iii} = 232$

$$\begin{aligned} \sum TV &= TV_{Aiii.iii} + TV_{Aiii.iii} \\ &= 232 + 229 = 461 \end{aligned}$$

$$P_{Aiii.iii} = 232/229 = \mathbf{0.503}$$

Number of qualified professionals (Biii.ii)

$$P_{Biii.ii} = TV_{Biii.ii} / \sum TV$$

Where $TV_{Biii.ii} = 230$

$$\begin{aligned} \sum TV &= TV_{Biii.i} + TV_{Biii.ii} + TV_{Biii.iii} \\ &= 214 + 230 + 213 = 657 \end{aligned}$$

$$P_{Biii.ii} = 230/657 = \mathbf{0.350}$$

Availability of quality management system (Aiii.i)

$$P_{Aiii.i} = TV_{Aiii.i} / \sum TV$$

Where $TV_{Aiii.i} = 229$

$$\begin{aligned} \sum TV &= TV_{Aiii.i} + TV_{Aiii.iii} \\ &= 229 + 232 = 461 \end{aligned}$$

$$P_{Aiii.i} = 229/461 = \mathbf{0.497}$$

Availability and effectiveness of price information system (Aviii.i)

$$P_{Aviii.i} = TV_{Aviii.i} / \sum TV$$

Where $TV_{Aviii.i} = 228$

$$\begin{aligned} \sum TV &= TV_{Aviii.i} + TV_{Aviii.ii} + TV_{Aviii.iii} \\ &= 228 + 223 + 234 = 685 \end{aligned}$$

$$P_{Aviii.i} = 228/685 = \mathbf{0.333}$$

Effectiveness of executing system (Ci.ii)

$$P_{Ci.ii} = TV_{Ci.ii} / \sum TV$$

Where $TV_{Ci.ii} = 228$

$$\begin{aligned} \sum TV &= TV_{Ci.i} + TV_{Ci.ii} \\ &= 225 + 228 = 453 \end{aligned}$$

$$P_{Aiii.i} = 228/453 = \mathbf{0.503}$$

Method of procurement (Aviii.ii)

$$P_{Aviii.ii} = TV_{Aviii.ii} / \sum TV$$

Where $TV_{Aviii.ii} = 234$

$$\begin{aligned} \sum TV &= TV_{Aviii.i} + TV_{Aviii.ii} + TV_{Aviii.iii} \\ &= 228 + 234 + 223 = 685 \end{aligned}$$

$$P_{Aviii.ii} = 234/685 = \mathbf{0.342}$$

Communications between managerial and general staff (Ciii.ii)

$$P_{Ciii.ii} = TV_{Ciii.ii} / \sum TV$$

Where $TV_{Ciii.ii} = 227$

$$\begin{aligned} \sum TV &= TV_{Ciii.i} + TV_{Ciii.ii} + TV_{Ciii.iii} \\ &= 224 + 227 + 217 = 668 \end{aligned}$$

$$P_{Ciii.ii} = 227/668 = \mathbf{0.340}$$

Effectiveness of decision making system (Ci.i)

$$P_{Ci.i} = TV_{Ci.i} / \sum TV$$

$$\text{Where } TV_{Ci.i} = 214$$

$$\begin{aligned} \sum TV &= TV_{Ci.i} + TV_{Ci.ii} + TV_{Ci.iii} \\ &= 225 + 228 + 214 = 667 \end{aligned}$$

$$P_{Ci.i} = 214/667 = \mathbf{0.337}$$

Availability and effectiveness of safety management system (Avi.i)

$$P_{Avi.i} = TV_{Avi.i} / \sum TV$$

$$\text{Where } TV_{Avi.i} = 225$$

$$\begin{aligned} \sum TV &= TV_{Avi.i} + TV_{Avi.ii} + TV_{Avi.iv} \\ &= 225 + 215 + 223 = 663 \end{aligned}$$

$$P_{Avi.i} = 225/663 = \mathbf{0.339}$$

Existence and effectiveness of bidding strategy (Ei.i)

$$P_{Ei.i} = TV_{Ei.i} / \sum TV$$

$$\text{Where } TV_{Ei.i} = 224$$

$$\sum TV = TV_{Ei.i} = 224$$

$$P_{Ei.i} = 224/224 = \mathbf{1}$$

Relationship with subcontractors/suppliers (D.iii)

$$P_{D.iii} = TV_{D.iii} / \sum TV$$

Where $TV_{D.iii} = 225$

$$\begin{aligned} \sum TV &= TV_{D.ii} + TV_{D.iii} \\ &= 233 + 224 = 457 \end{aligned}$$

$$P_{D.iii} = 224/457 = \mathbf{0.491}$$

Communications between functional departments (Ciii.i)

$$P_{Ciii.i} = TV_{Ciii.i} / \sum TV$$

Where $TV_{Ciii.i} = 224$

$$\begin{aligned} \sum TV &= TV_{Ciii.i} + TV_{Ciii.ii} + TV_{Ciii.iii} \\ &= 224 + 227 + 217 = 668 \end{aligned}$$

$$P_{Ciii.i} = 224/663 = \mathbf{0.335}$$

Availability of health and safety protection resource (Avi.iv)

$$P_{Avi.iv} = TV_{Avi.iv} / \sum TV$$

Where $TV_{Avi.iv} = 223$

$$\begin{aligned} \sum TV &= TV_{Avi.i} + TV_{Avi.ii} + TV_{Avi.iv} \\ &= 225 + 215 + 223 = 663 \end{aligned}$$

$$P_{Avi.iv} = 223/663 = \mathbf{0.336}$$

Personnel's job satisfaction (Biv.ii)

$$P_{Biv.ii} = TV_{Biv.ii} / \sum TV$$

$$\text{Where } TV_{Biv.ii} = 223$$

$$\begin{aligned} \sum TV &= TV_{Biv.i} + TV_{Biv.ii} + TV_{Biv.iii} + TV_{Biv.iv} \\ &= 215 + 223 + 218 + 214 = 870 \end{aligned}$$

$$P_{Biv.ii} = 223/870 = \mathbf{0.256}$$

Effectiveness of procurement system (Aviii.iii)

$$P_{Aviii.iii} = TV_{Aviii.iii} / \sum TV$$

$$\text{Where } TV_{Aviii.iii} = 223$$

$$\begin{aligned} \sum TV &= TV_{Aviii.i} + TV_{Aviii.ii} + TV_{Aviii.iii} \\ &= 228 + 234 + 223 = 685 \end{aligned}$$

$$P_{Aviii.iii} = 223/685 = \mathbf{0.326}$$

Company owner's personality and capability (Civ.i)

$$P_{Civ.i} = TV_{Civ.i} / \sum TV$$

$$\text{Where } TV_{Civ.i} = 222$$

$$\begin{aligned} \sum TV &= TV_{Civ.i} + TV_{Civ.ii} \\ &= 222 + 214 = 436 \end{aligned}$$

$$P_{Civ.ii} = 222/436 = \mathbf{0.491}$$

Experiences for bidding projects (Eii.i)

$$P_{Eii.i} = TV_{Eii.i} / \sum TV$$

Where $TV_{Eii.i} = 219$

$$\begin{aligned} \sum TV &= TV_{Eii.i} + TV_{Eii.ii} + TV_{Eii.iii} \\ &= 219 + 217 + 217 = 653 \end{aligned}$$

$$P_{Eii.i} = 219/653 = \mathbf{0.335}$$

Labour productivity and effectiveness of motivation (Biv.iii)

$$P_{Biv.iii} = TV_{Biv.iii} / \sum TV$$

Where $TV_{Biv.iii} = 218$

$$\begin{aligned} \sum TV &= TV_{Biv.i} + TV_{Biv.ii} + TV_{Biv.iii} + TV_{Biv.iv} \\ &= 215 + 223 + 218 + 214 = 870 \end{aligned}$$

$$P_{Biv.iii} = 218/870 = \mathbf{0.251}$$

Availability of resource for bidding (Eii.iii)

$$P_{Eii.iii} = TV_{Eii.iii} / \sum TV$$

Where $TV_{Eii.iii} = 217$

$$\begin{aligned} \sum TV &= TV_{Eii.i} + TV_{Eii.ii} + TV_{Eii.iii} \\ &= 219 + 217 + 217 = 653 \end{aligned}$$

$$P_{Eii.iii} = 217/653 = \mathbf{0.326}$$

Availability of professionals for bidding (Eii.ii)

$$P_{Eii.ii} = TV_{Eii.ii} / \sum TV$$

$$\text{Where } TV_{Eii.ii} = 217$$

$$\begin{aligned} \sum TV &= TV_{Eii.i} + TV_{Eii.ii} + TV_{Eii.iii} \\ &= 219 + 217 + 217 = 653 \end{aligned}$$

$$P_{Eii.ii} = 217/653 = \mathbf{0.326}$$

Communications between different subsidiaries and projects (Ciii.iii)

$$P_{Ciii.iii} = TV_{Ciii.iii} / \sum TV$$

$$\text{Where } TV_{Ciii.iii} = 217$$

$$\begin{aligned} \sum TV &= TV_{Ciii.i} + TV_{Ciii.ii} + TV_{Ciii.iii} \\ &= 224 + 227 + 217 = 668 \end{aligned}$$

$$P_{Ciii.iii} = 217/668 = \mathbf{0.325}$$

Assets status (Bii.i)

$$P_{Bii.i} = TV_{Bii.i} / \sum TV$$

$$\text{Where } TV_{Bii.i} = 216$$

$$\begin{aligned} \sum TV &= TV_{Bii.i} + TV_{Bii.ii} \\ &= 216 + 213 = 429 \end{aligned}$$

$$P_{Bii.i} = 216/429 = \mathbf{0.503}$$

Clarity of divisions of functional departments (Cii.i)

$$P_{Cii.i} = TV_{Cii.i} / \sum TV$$

$$\text{Where } TV_{Cii.i} = 215$$

$$\begin{aligned} \sum TV &= TV_{Cii.i} + TV_{Cii.ii} \\ &= 215 + 224 = 439 \end{aligned}$$

$$P_{Cii.i} = 215/439 = \mathbf{0.501}$$

Personnel management system (Biv.i)

$$P_{Biv.i} = TV_{Biv.i} / \sum TV$$

$$\text{Where } TV_{Biv.i} = 215$$

$$\begin{aligned} \sum TV &= TV_{Biv.i} + TV_{Biv.ii} + TV_{Biv.iii} + TV_{Biv.iv} \\ &= 215 + 223 + 218 + 214 = 870 \end{aligned}$$

$$P_{Biv.i} = 215/870 = \mathbf{0.247}$$

Effectiveness of accident settlement process (Avi.ii)

$$P_{Avi.ii} = TV_{Avi.ii} / \sum TV$$

$$\text{Where } TV_{Avi.ii} = 215$$

$$\begin{aligned} \sum TV &= TV_{Avi.i} + TV_{Avi.ii} + TV_{Avi.iv} \\ &= 225 + 215 + 223 = 663 \end{aligned}$$

$$P_{Avi.ii} = 215/663 = \mathbf{0.324}$$

Existence of contract administration system (Av.i)

$$P_{Av.i} = TV_{Av.i} / \sum TV$$

Where $TV_{Av.i} = 215$

$$\sum TV = TV_{Av.i} = 215$$

$$P_{Av.i} = 215/215 = \mathbf{1}$$

Clarity of responsibilities of functional departments (Cii.ii)

$$P_{Cii.ii} = TV_{Cii.ii} / \sum TV$$

Where $TV_{Cii.ii} = 214$

$$\begin{aligned} \sum TV &= TV_{Cii.i} + TV_{Cii.ii} \\ &= 215 + 214 = 429 \end{aligned}$$

$$P_{Cii.i} = 214/429 = \mathbf{0.499}$$

Feedback mechanism in executing system (Ci.iii)

$$P_{Ci.iii} = TV_{Ci.iii} / \sum TV$$

Where $TV_{Ci.iii} = 214$

$$\begin{aligned} \sum TV &= TV_{Ci.i} + TV_{Ci.ii} + TV_{Ci.iii} \\ &= 225 + 228 + 214 = 667 \end{aligned}$$

$$P_{Ci.iii} = 214/667 = \mathbf{0.321}$$

Adequacy of personnel structure (Biii.i)

$$P_{Biii.i} = TV_{Biii.i} / \sum TV$$

$$\text{Where } TV_{Biii.i} = 214$$

$$\begin{aligned} \sum TV &= TV_{Biii.i} + TV_{Biii.ii} + TV_{Biii.iii} \\ &= 214 + 230 + 213 = 657 \end{aligned}$$

$$P_{Biii.i} = 214/657 = \mathbf{0.326}$$

Good communication with bankers (Bi.i)

$$P_{Bi.i} = TV_{Bi.i} / \sum TV$$

$$\text{Where } TV_{Bi.i} = 214$$

$$\begin{aligned} \sum TV &= TV_{Bi.i} + TV_{Bi.iii} \\ &= 214 + 214 = 428 \end{aligned}$$

$$P_{Bi.i} = 214/428 = \mathbf{0.500}$$

Corporation identification and staff image (Civ.ii)

$$P_{Civ.ii} = TV_{Civ.ii} / \sum TV$$

$$\text{Where } TV_{Civ.ii} = 214$$

$$\begin{aligned} \sum TV &= TV_{Civ.i} + TV_{Civ.ii} \\ &= 214 + 222 = 436 \end{aligned}$$

$$P_{Civ.ii} = 214/436 = \mathbf{0.491}$$

Labour management system (Biv.iv)

$$P_{\text{Biv.iv}} = \text{TV}_{\text{Biv.iv}} / \sum \text{TV}$$

Where $\text{TV}_{\text{Biv.iv}} = 214$

$$\begin{aligned} \sum \text{TV} &= \text{TV}_{\text{Biv.i}} + \text{TV}_{\text{Biv.ii}} + \text{TV}_{\text{Biv.iii}} + \text{TV}_{\text{Biv.iv}} \\ &= 215 + 223 + 218 + 214 = 870 \end{aligned}$$

$$P_{\text{Biv.iv}} = 214/870 = \mathbf{0.246}$$

Ability to gain finance from different channels (Bi.iii)

$$P_{\text{Bi.iii}} = \text{TV}_{\text{Bi.iii}} / \sum \text{TV}$$

Where $\text{TV}_{\text{Bi.iii}} = 214$

$$\begin{aligned} \sum \text{TV} &= \text{TV}_{\text{Bi.i}} + \text{TV}_{\text{Bi.iii}} \\ &= 214 + 214 = 428 \end{aligned}$$

$$P_{\text{Bi.iii}} = 214/428 = \mathbf{0.500}$$

Profit Status (Bii.ii)

$$P_{\text{Bii.ii}} = \text{TV}_{\text{Bii.ii}} / \sum \text{TV}$$

Where $\text{TV}_{\text{Bii.ii}} = 213$

$$\begin{aligned} \sum \text{TV} &= \text{TV}_{\text{Bii.i}} + \text{TV}_{\text{Bii.ii}} \\ &= 216 + 213 = 429 \end{aligned}$$

$$P_{\text{Bii.ii}} = 213/429 = \mathbf{0.497}$$

Educational levels of personnel (Biii.iii)

$$P_{Biii.iii} = TV_{Biii.iii} / \sum TV$$

Where $TV_{Biii.iii} = 213$

$$\begin{aligned} \sum TV &= TV_{Biii.i} + TV_{Biii.ii} + TV_{Biii.iii} \\ &= 214 + 230 + 213 = 657 \end{aligned}$$

$$P_{Biii.iii} = 213/657 = \mathbf{0.324}$$

Cost reduction rate over the past three years (Aii.ii)

$$P_{Aii.ii} = TV_{Aii.ii} / \sum TV$$

Where $TV_{Aii.ii} = 212$

$$\begin{aligned} \sum TV &= TV_{Aii.i} + TV_{Aii.ii} \\ &= 245 + 212 = 457 \end{aligned}$$

$$P_{Aii.ii} = 212/457 = \mathbf{0.464}$$

APPENDIX F: CORRELATION RESULTS

Correlations

			wkforce	Turnover	Hquality	HResClients	On schedule	QConSer	CEcONSER	CaccelerReq	Cin concop.
Spearman's rho	wk force	CC	1	.801**	0.185	0.248	.391**	0.268	.299*	0.123	0.075
		S.(2-t)	.	0	0.185	0.074	0.004	0.052	0.03	0.379	0.593
		N	53	53	53	53	53	53	53	53	53
	Turnover	Correlation Coefficient	.801**	1	.331*	0.211	.517**	.422**	.475**	0.187	0.087
		S.(2-t)	0	.	0.015	0.129	0	0.002	0	0.179	0.537
		N	53	53	53	53	53	53	53	53	53
	Hquality	Correlation Coefficient	0.185	.331*	1	0.061	.300*	0.233	.368**	-0.076	.334*
		S.(2-t)	0.185	0.015	.	0.662	0.029	0.093	0.007	0.589	0.015
		N	53	53	53	53	53	53	53	53	53
	HResClients	Correlation Coefficient	0.248	0.211	0.061	1	0.071	0.248	0.181	0.093	0.17
		S.(2-t)	0.074	0.129	0.662	.	0.615	0.073	0.195	0.509	0.225
		N	53	53	53	53	53	53	53	53	53
On schedule	Correlation Coefficient	.391**	.517**	.300*	0.071	1	0.066	.390**	.402**	-0.019	
	S.(2-t)	0.004	0	0.029	0.615	.	0.637	0.004	0.003	0.89	
	N	53	53	53	53	53	53	53	53	53	
QConSer	Correlation Coefficient	0.268	.422**	0.233	0.248	0.066	1	.450**	0.156	0.016	
	S.(2-t)	0.052	0.002	0.093	0.073	0.637	.	0.001	0.265	0.908	
	N	53	53	53	53	53	53	53	53	53	
CEcONSER	Correlation Coefficient	.299*	.475**	.368**	0.181	.390**	.450**	1	0.262	-0.033	
	S.(2-t)	0.03	0	0.007	0.195	0.004	0.001	.	0.058	0.815	
	N	53	53	53	53	53	53	53	53	53	
CaccelerReq	Correlation Coefficient	0.123	0.187	-0.076	0.093	.402**	0.156	0.262	1	0.066	
	S.(2-t)	0.379	0.179	0.589	0.509	0.003	0.265	0.058	.	0.636	
	N	53	53	53	53	53	53	53	53	53	
Cin concopp	Correlation Coefficient	0.075	0.087	.334*	0.17	-0.019	0.016	-0.033	0.066	1	
	S.(2-t)	0.593	0.537	0.015	0.225	0.89	0.908	0.815	0.636	.	
	N	53	53	53	53	53	53	53	53	53	

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

* . Correlation is significant at the 0.05 level (2-tailed).

Key -

wkforce- work force

Hquality -Acheiving high quality in construction facilities

HResClients - Being highly responsive to clients requets

On Schedule-Achieving on-schedule performance in operations

QConSer-Improving the quality of construction services offered

CEcONSER - Improving the cost efficinecy of the contracting activities

Cinconcopp

- Reducing cost in contruction operation

CaccelerReq

- Accomodating the clients acceleration requets