UNIVERSITY OF EDUCATION, WINNEBA

EFFECTS OF ORGANISATIONAL CULTURE AND STRATEGY ON

CONSTRUCTION PROJECT PERFORMANCE IN GHANA

FRANK ACKON

2022

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CONSTRUCTION PROJECT PERFORMANCE IN GHANA

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A Thesis in the Department of Construction Technology and Wood Science

Education, Faculty of Technical Education, Submitted to the School of

Graduate Studies, in partial fulfillment

of the requirements for the award of the degree of

Doctor of Philosophy (Construction Management)

in the University of Education, Winneba

**JULY, 2022**

DECLARATION

STUDENT'S DECLARATION

I, Frank Ackon, declare that this thesis, with the exception of quotations and references contained in published works which have all been identified and duly acknowledged, is entirely my own original work, and it has not been submitted, either in part or whole, for another degree in this University or elsewhere.

SIGNATURE …………………………………………

Date …………………………………………………...

SUPERVISORS' DECLARATION

We hereby declare that the preparation and presentation of this work were supervised in accordance with the guidelines for supervision of thesis as laid down by University of Education, Winneba.
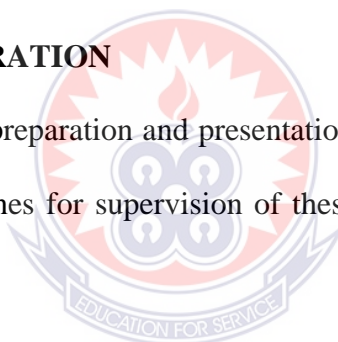
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Date …………………………………………………

DEDICATION

This thesis is dedicated to my wife, Rita Ackon and my three children – Gloria, Enyimpa

and Aseda for their support, sacrifices and encouragement.
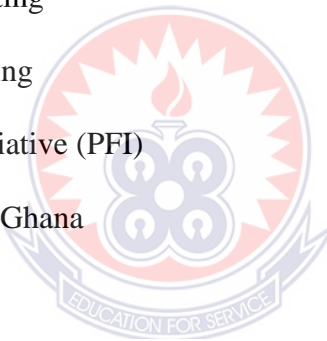
ACKNOWLEDGEMENTS

I am grateful to my supervisors, Prof. John Victor Mensah and Dr. Nongiba Kheni for their excellent guidance, encouragement and patience that have led to the successful completion of this research. Sincere thanks are also extended to Prof. Humphry Danso and Prof. Enerst Kofi Davis for their encouragement and advice in undertaking this research. I would like to thank University of Cape Coast for financially supporting this research. I also acknowledge all Association of Building and Civil Engineering Contractors of Ghana (ABCECG) members who participated in the study; especially, the national Chairman and his Vice as well as the regional executives for their great assistance. Further, I acknowledge Mrs. Anthonette Akufo, the Administrator of ABCECG Secretariate -Accra for her wonderful support.

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LIST OF ABBREVIATIONS/ACRONYMS

ABCECG   Association of Building and Civil Engineering Contractors of Ghana

AC   Adhocracy Culture

ANOVA   Analysis of Variance

BIM   Building Information Modeling

BSI   British Standards Institute

CC   Clan Culture

CFA   Confirmatory Factor Analysis

EFQM   European Foundation for Quality Management

CHRM   Competency in Human Resource Management

CMS   Construction Management Strategy

EVM   Earned Value Management

GCI   Ghanaian Construction Industry

GDP   Gross Domestic Product

GIA   Ghana Institution of Architects

GIS   Ghana Institution of Surveyors

GhIE   Ghana Institution of Engineers

GSS   Ghana Statistical Service

HC   Hierarchy Culture

ICT   Information Communication Technology

IET-GH   Institution of Engineering and Technology, Ghana

KMO   Kaiser-Meyer-Olkin

KPI   Key Performance Indicators

LoB   Level of Barriers

LoI   Level of Implementation

MC   Market Culture

MCS   Monitoring and Control Strategy

MRH   Ministry of Road and Highways

OC   Organisational Culture

OCAI   Organisational Culture Assessment Instrument

PCA   Principal Component Analysis

PERT   Program Evaluation and Review Technique

PP   Project Performance

PS   Planning Strategy

RBV   Resource-Based View

SD   Standard Deviation

SEM   Structural Equation Modelling

SMS   Stakeholder Management Strategy

SPSS   Statistical Package for Social Science

TQM   Total Quality Management

TS   Technology Strategy

VIF   Variance Inflation Factors
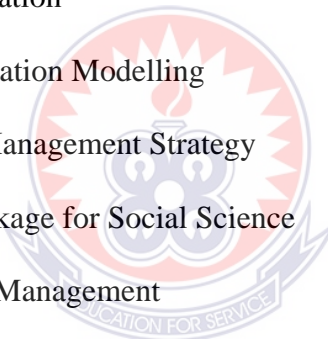
ABSTRACT

Globally, the construction industry is faced with poor project performance attributable to inappropriate corporate culture and poor implementation of construction management strategies (CMSs). Thus, organisational culture-strategy-performance trilogy has become essential for both academics and practitioners. A better understanding of how organisational culture and strategy influence project performance is foundational to developing interventions for improving construction project delivery. This study examines how organisational culture (OC) and strategy influence construction project performance, and investigates the mediating role of strategy in organisational culture and project performance relationship. This was achieved by undertaking a descriptive cross-sectional survey approach to obtain 375 usable quantitative data from site managers of large and medium-scale construction firms in Ghana. The data was analysed using both descriptive and inferential statistics such as mean and standard deviation, PCA, CFA, correlation and regression analysis. The results of this study revealed that the surveyed construction firms implement construction management strategies (CMSs) to a moderate extent. The results also showed that the dominant organisational culture type of the surveyed firms is adhocracy culture. CMSs had significant effects on overall project performance; market culture had the highest influence on CMS implementation; market and hierarchy culture types had significant effects on overall project performance; whilst clan and adhocracy culture types had insignificant effects on overall project performance. CMS partially mediates the relationship between OC and overall project performance. In conclusion, organisational culture types (market and hierarchy) and management strategies (effective planning, monitoring and control, stakeholder involvement, and use of technology and digital tools) positively and significantly affect construction project performance in Ghana.

CHAPTER ONE

INTRODUCTION

This chapter presents the background to the study. The problem statement is explained, and the general and specific objectives of the research prompted by the statement of the problem are well defined. In addition, the significance and scope of the study are set out. The chapter also gives a brief overview of the structure of the thesis.

1.1 Background to the Study

Globally, the construction industry is recognised as the engine of infrastructure development and among the pillars of the economy. Worldwide, construction industry output was estimated at $10 trillion or 13% of global GDP in 2020; and this figure is expected to increase to $14 trillion in 2025; it also employs an estimated 7 - 10% of the total world's workforce (Mckinsey, 2020).

Despite the achievement of the construction industry, the performance of the sector has been reported with many critical short falls; including: rework, cost and time overrun, low productivity, unsafe working practices, and client dissatisfaction (Nguyen & Watanabe, 2017; Rivera et al., 2017; Bentil et al., 2017). This is partly attributable to poor construction project management and weak internal characteristics of some construction firms (Peteraf & Barney, 2003; Ofori, 2013; Rivera et al., 2017). For instance, Ofori (2013) revealed that inadequate top management support, inadequate communication, coordination, and commitment, inadequate competent personnel, bureaucracy in public institutions, and inadequate consultation with stakeholders are the five critical factors militating against project success in Ghana.

Industrial organisational theory contends that the internal characteristics of an organisation make up critical sources for success (Barney, 1991). Thus, increasing attention has been paid to identifying what characteristics are vital to construction project success and how they exert their influence on project outcomes. Effective and efficient strategies coupled with strong organisational factors such as organisational culture and structure have been identified as key elements in construction project success (Willar, 2012; Ramanayaka, 2013; Ofori-Kuragu et al., 2016; Nguyen & Watanabe, 2017).

Project strategy focuses on the tactics of doing tasks and completing deliverables to complete the project on time and within budget, and to specification, increase productivity, and to have the project stakeholders' satisfaction and competitive advantage (Poli & Shenhar, 2003; Janicijevic, 2012). This includes the major intended and emergent initiatives taken by senior management in utilising organisational resources and capabilities to enhance performance, while mitigating the pressures of the external environment (Waweru & Onwenga, 2015).

According to Ramanayaka (2013), there are two main levels of strategies associated with construction industry: project level strategy and corporate level strategy. Ramanayaka (2013) argues that project level strategy is more appropriate to the construction industry than corporate level strategy. Similarly, the applicability of project level strategy is emphasised by past scholars (Abeysekera, 2007; Wong & Ng, 2010; Waweru & Onwenga, 2015). Ramanayaka (2013) further argues that project level strategy could be tested at the activity level thus revealing success/failure than corporate level strategy, and hence more easily and effectively adjusted or replaced. Nonetheless, studies show that most firms have adopted some form of project level strategy to improve quality and other indicators of performance; however, management initiatives do not always produce the intended results (Asif et al., 2009; Idoro, 2012). Many management scholars

suggest that the differences between the results come from the fact that the implementation of these strategies may occur differently in countries, due to different national cultures and especially cultures of organisations and users involved in particular situations (Vlachos & Siachou, 2016; Roslin et al., 2017).

Organisational culture has been highlighted as one of the contextual variables that may explain the success rate of management strategies, and also considered to be catalyst to performance (Cameron & Quinn, 2011; Cheung, Wong & Lam, 2012; Gambi et al., 2015). Organisational culture significantly influences both strategy formulation, as well as strategy implementation process. In strategy formulation phase, culture significantly influences the selection of strategy, while in the phase of its implementation culture may be both a stimulating factor, as well as an insurmountable barrier (Janicijevic, 2012). Thus, the cultural factors, which are integrated into organisational management and policies play a major role in determining how effectively companies implement their management principles and achieve the desired benefits.

In order to support the necessary management strategies and project performance, an appropriate organisational culture is a prerequisite. This relationship is "mutually reinforcing" and this means that if the organisational culture is good, the management strategies will be applied appropriately, with the resulting output (performance) also being good (Willar, 2012; Janicijevic, 2012; Zaidi et al., 2018). Past studies however disclose that certain types of culture could contribute to performance than others due to external environment and strategic orientation of the organisation (Cameron & Quinn, 2011; Coffey & Willar, 2010).

In the construction industry, contractors occupy a pivotal role among all the stakeholders in the industry. They are the public face of the industry and their performance on quality, cost, time, customer satisfaction, safety and environmental sustainability have

a huge impact on the industry. In order to develop a sustainable, safe and efficient construction industry, large and medium-scale contracting organisations are being enthusiastic to improve their management practices. Also, growing competition, and different customers and stakeholders' requirements, fulfilment of legal obligations, a means of compliance to social obligations, and the urge for a community responsible image also vitalizes their performance (Bhutto, 2004; Ofori-Kuragu et al., 2016).

1.2 Statement of the Problem

Achieving superior project success is a major concern of all project stakeholders of construction organisations. Literature suggests that regardless of the particular economic, socio-cultural, and political environments in which construction projects are executed, project failures and corresponding company failures in the construction industry are widespread all over the world of which Ghana is no exception (Ramanayaka, 2013; Ofori-Kuragu et al., 2016; Rivera et al., 2017; Bentil et al., 2017).

Past studies suggest that most construction clients and other stakeholders are highly dissatisfied with construction contractors' performance in Ghana due to large cost and time overruns, excessive project variations, poor health and safety practices, and negative impacts of construction site activities on the environment (Ayarkwa et al., 2014; Bentil et al., 2017; Osei-Asibey et al., 2021). For instance, Bentil et al. (2017) established that, public building construction projects in Ghana had an alarming average cost and time overruns of 75% and 146% respectively with a maximum limit of cost and time overruns of 376% and 400% respectively, whereas, private building construction projects in Ghana, had an average cost and time overruns of 34% and 77% respectively, with maximum limits of cost and time overruns of 98% and 300% respectively. Also, there is a lack of commitment towards the health and safety of Ghanaian construction workers who work in

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a generally unsafe environment (Osei-Asibey et al., 2021). Consequently, Ghanaian contractors generally have poor reputation and difficulty in attracting investors (Ghana Stock Exchange, 2021). There are currently no listed construction companies in the Ghana stock exchange and Ghana Club 100 list of prestigious companies which demonstrate excellence in performance (GIPC, 2020). Besides, many large-scale contracts are executed by foreign owned contractors or contractors with foreign backing (Ofori-Kuragu et al., 2016). As a result of the performance short-comings, the Ghana government and other stakeholders have expressed the need for a performance measurement tool and critical success factors to serve as barometers for contractors and as a means of ensuring that construction projects are awarded only to competent contractors (Wayem & Addo, 2015; Ofori-Kuragu et al., 2016).

Literature suggests that application of appropriate construction management strategy such as effective planning, monitoring and control, stakeholder involvement and use of technology and digital tools is paramount if Ghanaian contractors want to achieve project success (Ofori, 2013; Fummey, 2016; Ofori-Kuragu et al., 2016; Kissi et al., 2019). These strategies have been recognised in past studies to influence construction project success and other performance characteristics of construction project in other countries (Ramanayaka, 2013; Mckinsey, 2017; Naeem et al., 2018; Adebayo et al., 2018; Mandala, 2018). However, there is paucity of similar study in Ghana to examine whether adoption of these project strategies do in fact lead to better project performance and project success of construction companies. Also, in the global context, the combined effects of these set of strategies (planning, monitoring and control, stakeholder involvement and technology) on project performance had not been previously determined.

A set of project level strategy such as the aforementioned must be implemented within a specific organisational setting. One characteristic of an organisation that is likely to affect the success of any management approach and performance outcome is its organisational culture (Cameron & Quinn, 2011; Gambi et al., 2015; Mwaura, 2017). Nevertheless, while there is an overwhelming support that organisational culture supports management practices/techniques, there remains two competing views on the role of culture in management practices/techniques. The unitarist view suggests that management practice/technique is associated with a single 'homogeneous' culture (Panuwatwanich & Nguyen, 2017), while the pluralist view supports the idea that management practice/technique is supported by heterogeneity of cultural dimensions (Prajogo & McDermott, 2005, 2011; Zu et al., 2010; Gambi et al., 2015). The empirically suspects or inconclusive character of research findings in this area suggests the need to investigate further the nature of the relationship between organisational culture and management practices by focusing on construction management strategy.

Furthermore, past studies suggest that organisational culture is a strong catalyst to firm performance and a key ingredient that differentiates successful firms from the others, and creates a competitive advantage (Cameron & Quinn, 2011). However, mix results have been found by some researchers about the association of organisational culture types and overall project performance (Thomas et al., 2002; Coffey & Willar, 2010; Yazici, 2011). For instance, in the construction industry, Thomas et al. (2002) found that clan cultures produced above average performance, hierarchy and adhocracy cultures produced average project performance, whereas market cultures were found to produce below average project performance. Conversely, Coffey and Willar (2010) found a positive relationship between each of three traits of organisational culture ('Consistency (Hierarchy)', 'Adaptability (Adhocracy)' and 'Mission (Market)') with overall project performance.

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However, there was no correlation between 'Involvement (clan)' and overall project performance. Subsequently, Nguyen and Watanabe (2017) maintain that the nature of the relationship between corporate culture and performance at the project level clearly remain unanswered in the context of the construction industry and deserve further investigation

Literature further suggests that the strength of organisational culture and its alignment to strategy are important in explaining the performance of a firm (Stock et al., 2007; Gambi et al., 2015). Researchers have examined the separate effects of organisational culture and management strategy on performance of construction firm; however, the previous studies in the construction industry summarily neglected the role of mediating factors in understanding the relationship between organisational culture and project performance (Thomas et al., 2002; Ankrah, 2007; Coffey & Willar, 2010; Panuwatwanich & Nguyen, 2017). Understanding mediating factors become important as management scholars argue that there is inconsistent support for the proposition that corporate culture is a direct predictor of performance (Yazici, 2011; Gambi et al., 2015).

It is important to understand whether organisational culture has a direct or an indirect relationship with project performance and this has implications for the development of the mediating construct. If organisational culture is mediated by management strategy, then it would be important for management to strengthen the development of the management strategy to achieve higher project performance.

Additionally, extant literature shows that there is scarcity of integrative model that links organisational culture, management strategy and project performance measures in one reliable framework in construction context. These knowledge gaps need to be bridged in order to increase understanding of the effects of organisational culture and management strategy on project performance in construction context. This is considered important due

to the role of the construction sector in the economic development of a nation and its linkages with other sectors of the economy (Mckinsey, 2020).

1.3 Purpose of the Study

The purpose of this study is to examine the effects of organisational culture and strategy on construction project performance in Ghana.

1.4 Specific Objectives of the Study

This study specifically sought to;

i. determine the level of implementation of CMSs in project delivery,

ii. examine the effects of strategy on construction project performance,

iii. examine the effects of OC on construction project performance,

iv. examine the influence of OC profiles on strategy implementation,

v. determine the mediating role of strategy in OC and project performance relationship, and

vi. develop OC - Based framework for building the capacity of construction firms to improve their project performance.

1.5 Research Questions

i. What are the levels of implementation of CMSs in project delivery?

ii. How does CMSs affect construction projects performance?

iii. How does OC affect construction projects performance?

iv. How do the OC profiles of Ghanaian construction companies influence CMS implementation?

v. How does CMS affect OC and project performance relationship?

vi. How can Ghanaian construction project performance be improved?

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1.6 Hypotheses

The following hypotheses were tested:

H1:   CMS has significant effects on construction project performance.

H2:   Organisational culture has significant effects on project performance.

H3:   CMS mediates the relationship between OC and project performance.

H4a: CMS implementation is supported by 'heterogeneity' of cultural profiles.

H4b: CMS implementation is supported by a single 'homogeneous' culture.

1.7 Significance of the Study

The findings of this study would be useful for both policy makers and the general public. For instance, the proposed framework will enable policy makers such as the Ministry of Road and Highways (MRH), the Ministry of Works and Housing (MWH), the Ministry of Special Development Initiatives (MSDI), Metropolitan, Municipal and District Assemblies responsible for the policies that have effect on construction industry in Ghana to assess the capacity and performance of construction contractors. It will also assist clients and consultants to predict project performance of construction companies. It will also assist contractors to harness good organisational culture that can drive the implementation of project level strategy effectively. This would help to improve their delivery capability of construction projects, and thereby contribute to giving them a greater competitive advantage in the local, national and global markets.

This study will also assist foreign based construction companies in Ghana with different organisational cultures to understand the operating environment and undertake effective management practices that could help them achieve project success. This study contributes to current discourse on strategic management practices in the global construction environment. For academics, this research seeks to provide a deeper

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understanding of the existing body of knowledge with respect to the link between organisational culture, construction management strategy and project performance; this could serve as a reference material for construction management researchers.

1.8 Scope of the Study

Contextually, this study is informed by resource-based view theory, theory of construction project management, stakeholder theory, and Competing Value Framework theory. This study is also delimited to contractors' project or operational level strategy at the post-contract stage. The pace of project progress including the design phase before the contractor procures the contract is not considered under the scope of this study.

Geographically, the data collection was drawn from all the ten administrative regions of Association of Building and Civil Engineering Companies of Ghana (ABCECG). Large-scale (D1K1) and medium-scale (D2K2) companies were involved in the study. Thus, the outcomes contextually reflect the scenarios prevalent in large and medium-scale construction companies in Ghana. However, global construction industry experience was referred to in the literature review in order to provide an in-depth understanding of the research topic.

1.9 Organisation of the Study

The study is organised into seven chapters. Chapter one covers the background to the study, statement of the problem, objectives of the study, research hypotheses, significance of the study, the scope of the research, and organisation of the study.

Chapter two reviews relevant literature regarding the Ghanaian construction industry, theories underpinning the study, construction management strategies, organisational culture including the Competing Values Framework theory, as well as

construction project performance. Following that, empirical studies about the ways in which organisational culture and construction management strategy implementation can influence project performance are reviewed in order to advance hypotheses about the four key types of organisational culture, construction management strategy and their relationship with project performance. This is followed by the conceptual framework of the study.

The third chapter focuses on the methodology used for the study. Specifically, it captures the philosophical paradigms and the design which underpins the research, the study population, sampling, data collection instruments and procedures, data processing and analysis as well as the ethical considerations adopted for the study.

Chapter four presents the results and discussions of construction management strategies implementation and its effectiveness within the surveyed firms. Results of the demographic characteristics of the respondents are first presented and discussed to put the study into context. This is followed by site managers' responses on project performance. The level of implementation of the management strategies identified is also presented. The chapter also presents the results and discussions of the associations between construction management strategy implementation and overall project performance. This chapter addresses the first and second objectives of this study.

The fifth chapter presents the results and discussions of the current cultural profiles of the surveyed firms, the effects of organisational culture types on construction management strategy implementation, and the effects of organisational culture types on performance of construction projects. The mediating role of management strategy in cultural context of construction project is also examined. This chapter addresses the third, fourth and fifth research objectives.

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Chapter six tests the robustness, and usefulness of the key outputs of this study, external validation was carried out using both survey questionnaire and semi-structured interview. The chapter also presents the results obtained from the validation of the key research outputs of this study. The feedback received as well as the ultimate research findings are presented in the form of a finalised framework. This chapter addresses the sixth objective of this study.

Chapter seven summarises the key findings, conclusions and recommendations of the study. The first section presents the summary, while the second section covers the conclusions. The third section presents the recommendations based on the main findings, followed by the contributions to existing knowledge, and direction for further research.

CHAPTER TWO

LITERATURE REVIEW

This chapter consists of extensive review of relevant literature pertaining to socio-cultural life of Ghanaians, the Ghanaian economy, construction industry in Ghana, the theories underpinning the study, conceptual issues, and related empirical studies. The chapter ends with a conceptual framework which serves as an embodied visualized blueprint of the study.

2.1 Socio- Cultural Life of Ghanaians

Ghana's culture and traditions are diverse and fascinating. According to Gracia (2017), the people of Ghana are warm and friendly; they are polite, open and trustworthy even with strangers. Gracia, further revealed that Ghanaian society is generally hierarchical. Seniors and older persons are treated with greater respect in Ghanaian culture. Furthermore, any loss of honour affects the entire family, making the culture a collective one. Ghanaians have a strong and healthy relationship. People maintain decorum in order to avoid causing humiliation to others. Ghanaian culture is made up of various ethnic groups, each of which has its own culture. Ghanaians place a strong focus on communal values such as respect for the elderly, traditional leaders, decency, and correct social behavior. Individual behaviour is considered as having an impact on a family, social group, or community as a whole; as a result, everyone is expected to be respectful, dignified, and observant in public places and in all aspects of life (Gracia, 2017).

The country also has a strong sense of national identity and unity that supersedes other affiliations such as ethnicity and tribe, arising out of an educational system in which people from diverse backgrounds tend to mix. Along with being serious about their own customs and traditions, Ghanaians are fast learners who easily understand and adopt other

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cultures and practices. This makes Ghana a comfortable society for everyone to live in and an easy African country for outsiders to visit.

2.1.1 Ghanaian Working Culture

Ghanaian business environment culture could be considered hierarchy and clan (Gracia, 2017). Older people are regarded as being wise and failing to address seniors properly is considered an offence in Ghanaian business circles. Senior business people tend to be in charge of making decisions in their company's best interests. In Ghana, as in other hierarchical societies, managers may take a paternalistic attitude toward their employees, demonstrating a concern for them beyond the workplace and professional issues. This can include involvement in their family, housing, health, and other practical life matters; also, harmony and interpersonal relationships are valued in the Ghanaian work place (Gracia, 2017).

2.1.2 The Economy of Ghana

Ghanaian economy has seen remarkable improvement over the past four years (2016-2019). The growth rate of the economy showed a better performance with an increase of the annual gross domestic product (GDP) from year to year. The inflation rate in Ghana is however, relatively high (11.4%) compared to many developing countries like Mauritius, Cameron, Namibia, Ivory Coast, Senegal, South Africa, Tanzania, Benin, Egypt, Tunisia, and Malawi with inflation index between (1.5-8.0) (Ghana Statistical Service, 2020). Also, the government of Ghana has increased the pump prices of fuel by 20% which in no small way has increased inflation rate in the country. The currency exchange rate of the Ghanaian Cedi to United State dollar is (8.00 GHC; June, 2022).

The interest rate in Ghana varies from (27% - 32%), which is high compared to some developing countries which makes borrowing for construction projects very difficult. Also, high exchange and inflation rate lead to escalation of construction material prices and increased labour cost. It is therefore clear that the construction industry which invests mostly in long term investment is faced with a lot of financial challenges.

2.1.3 The Ghanaian Construction Industry

In Ghana, just like many other developing countries the construction industry plays a vital role in socio-economic development goals, providing shelter, infrastructure and employment and above all contributing significantly to the GDP of the country. According to the Ghana Statistical Service (GSS), a government body tasked with compiling economic data and indicators, construction was the largest sub-sector in 2015, with a growth of 30.6 percent and a 14.8 share of the national GDP (GSS, 2015; 2020). Table 2.1 shows that the construction industry contributed an average of 13.8% GDP to the national economy.

In a developing country like Ghana where unemployment is high, the construction industry is an important source of jobs for the unemployed and/or unskilled (Darko & Lowe, 2016). The Ghana Statistical Service (2015) noted that the construction industry employs over 600,000 workers, amounting to about 7% of the working population in Ghana. This number may actually be higher in reality because the number of informal workers is not recorded. The construction sector in Ghana is expected to create between 700,000 and 1million jobs in the next 10 years (Owusu-Boateng, 2021). This is indicative that construction industry in Ghana plays a very vital role in the gross development of the nation. Previous studies indicate that the Ghanaian construction industry is male dominated (Ayarkwa et al., 2012; Atuahene, 2016). Martin and Barnard (2013) explain

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that organisational structures make it difficult for women to successfully integrate into male dominated sectors like construction.

Table 2.1: The Annual Gross Domestic Product from 2014-2019

Year	GDP National Average	GDP (Contribution of Construction Sector)
2014	2.9	12.7
2015	2.2	14.8
2016	3.4	13.7
2017	8.1	13.7
2018	6.3	14.2
2019	6.5	13.6

Source: Ghana Statistical Service (2018, 2020)

2.1.4 Regulators of Ghanaian Construction Industry

Ministry of Road and Highways (MRH), and the Ministry Water Resources Works and Housing (MWRWH) are responsible for the policies that have an effect on the construction industry in Ghana (Ofori-Kuragu, 2014). Both Ministries are responsible for the registration and classification of contractors – road contractors by the former and building and civil engineering contractors by the latter respectively. They do this in collaboration with the Registrar General's Department under Act 179 (1963) of the companies' registration code. However, neither ministry has a monitoring or regulatory function with respect to contractor's performance.

2.1.5 Classification of Ghanaian Contractors

Construction activities are done in all sectors of the government as well as the private sector; Government is the largest client of Ghanaian construction industry (GCI). There are two main forms of classifications of GCI used by researchers in Ghana as shown in Tables 2.2 and 2.3 respectively.

i.   Classification based on financial classes (Ofori-Kuragu, 2014; Offei et al., 2016).

ii.   Classification based on size of employees (Atuahene, 2016).

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2.1.5.1 Ministry of Water Resources, Works and Housing (MWRWH)

All water systems, buildings and other civil engineering works are regulated by the MWRWH. All building and civil engineering contractors with specialisation as indicated earlier and want to undertake government funded or government supervised projects register with the MWRWH. Ghanaian construction firms are categorised into four financial classes by the Ministry of Water Resources, Works and Housing according to annual turnover, equipment holding, and personnel. Both building and civil contractors are respectively classified under categories D1, D2, D3, D4 and K1, K2, K3, K4 by the Ministry of Water Resources, Works and Housing (MWRW&H) in collaboration with the Registrar General's Department (Amoah et al., 2011; Offei et al., 2016). Thus, the D1K1 class of contractors are regarded as large-scale firms, whereas D2K2 contractors are medium-scale and D3K3 and D4K4 are small-scale firms (Amoah et al., 2011; Ofori-Kuragu, 2014; Offei et al., 2016). By this classification, firms in each category could tender for building contracts within a certain financial threshold (Ofori-Kuragu, 2014; Offei et al., 2016). The large-scale firms are registered as financial class 1, capable of undertaking projects of any value, class 2 (medium-scale firms) are capable of undertaking projects up to US$500,000, while the small-scale firms (financial class 3) are also capable of undertaking projects up to US$200,000; the class 4 category undertakes projects up to US$75,000 as shown in Table 2.2.

According to Amoah et al. (2011), inclusion of a contractor's name in the Ministry's classification register is not compulsory, but then it is only those who are duly registered who can tender for government contracts. In the context of this research, large-scale and medium-scale contractors in the GCI are defined as firms within D1K1 and D2K2 categories.

Table 2.2: Classification of Ghanaian Contractors Based on Financial Class

Financial Class	Contractor Designation	Financial Limit of Projects
1	D1 K1	No limit
2	D2 K2	US$ 500,000
3	D3 K3	US$200,000
4	D4 K4	US$ 75,000

Sources: Amoah et al. (2011); Ofori-Kuragu (2014).

Table 2.3: Classification of GCI Based on Size of Employees

N	Company Size	Size of Employees
1	Small	Less than 50
2	Medium	50 to 150
3	Large	Above 150

Source: Atuahene (2016)

The large and medium Ghanaian construction firms form about 10% of the total number of construction firms registered with the Ministry of Water Resources, Works and Housing and the remaining 90% are the small firms (Amoah et al., 2011). The large-scale and medium-scale contractors play a substantial role in the sector and are perhaps, the most visible stakeholders in the built environment.

According to Oxford Business Group (2022), the government of Ghana has initiated plans to create Construction Industry Development Authority (CIDA). This Authority would act as an overarching regulator and supporter of the Ghanaian construction industry. The CIDA would ensure better compliance to building regulations and standards. The Authority is also expected to advise the Government on the construction sector, as well as register contractors, consultants and other enterprises involved in the sector, such as materials providers. Additionally, the CIDA would be tougher on delayed payments to contractors and ensure that debtors pay interest on the payments that take longer than the stipulated time.

A major feature of the Ghanaian construction environment is the separation between design and construction with professionals tending to operate independently with allegiance to their respective professional bodies such as Ghana Institution of Architects (GIA), Ghana Institution of Engineers (GhIE), Institution of Engineering and Technology, Ghana (IET-GH), Ghana Institute of Construction (GIOC) and Ghana Institution of Surveyors (GIS). As a result, the adversarial relationship which traditionally characterises construction industry is also very prominent in the Ghanaian industry (Ahadzie, 2007).

According to Kheni (2008), international donor organisations like the Department for International Development (DFID), International Development Agency (IDA), International Monetary Fund (IMF), Danish Development Agency (DANIDA), and World Bank finance the development of civil infrastructure in the majority of African nations. Through their participation in the procurement process, these funding organisations have helped to raise standards in the civil and road sectors of the construction industry in Ghana.

2.1.6 Challenges facing Ghanaian Contractors

The biggest challenge facing Ghanaian local contractors is their limited capacity (financial, logistical and technical expertise), which excludes them from winning major public infrastructure projects. Another critical challenge confronting the industry relate to delays and excessive bureaucratic conditions by government in paying for services. According to Ofori-Kuragu (2014), most Ghanaian contractors are mainly reliant on government sources for projects. Most public projects are facilitated by government departments and agencies. Awarding departments and agencies may have to endorse completed projects before payments are sanctioned by the Ministry of Finance before Bank of Ghana effects payment. Other issues relate to weak oversight by government agencies in monitoring and evaluation, political interference, bribery and corruption, equipment

challenges, lack of skilled craftsmen, poor management practices, and low levels of technology (Imbeah, 2012; Sutton & Kpentey, 2012; Ofori-Kuragu, 2014; Wayem & Addo, 2015).

Although, there is a large pool of qualified and unemployed construction graduates in the labour market, World Bank estimated a shortage of 60,000 skilled artisans and tradesmen in Ghana (Oxford Business Group, 2020). Oxford Business Group further reports that most construction and real estate companies operating in Ghana say that local hires are able to learn skills quickly even without formal training, but need close supervision.

To encourage companies to hire more local staff, the government has invoked a policy that hiring a large number of local staff helps a construction company receive a strategic development certification, which allows the company to apply for exemptions like duty-free imports of materials. According to Oxford Business Group (2020), to meet the need of skilled labour in the Ghanaian construction industry, the government is working to expand qualified labour in the country. Under the newly established Youth Inclusive Entrepreneurial Development Initiative for Employment, a program run in partnership with the MasterCard Foundation, is hoping to train over 23,000 Ghanaians for jobs in construction and related industries over the next five years.

Another concern within the construction industry in Ghana is the low workloads of Ghanaian contractors. The number of contractors relative to the size of the economy means that too many contractors are chasing few jobs. Contractor turnovers are thus small and profit margins low. This has a wide range of effects on other areas such as contractors' ability to invest in relevant technology (Ofori-Kuragu, 2014).

2.2 Organisational Structure

Organisational structure (OS) is the arrangement of workflow, line of communication, and delegation of authority or relationships within an organisation (Oyewobi et al., 2013). Literature suggests that OS is important to organisation but not without its inherent effect on organisation's business and operational activities. Zheng et al. (2010) and Mansoor et al. (2012), contend that ideal organisational structure is a recipe for organisational effectiveness and superior performance.

According to Shirazi et al. (1995) in the construction industry, the organisational patterns have to take account of the need for subcontractors or specialist contractors working together, and the organisational structure of a project can shape the nature of these intrafirm relations and the way people involved in construction projects are organised. Brandts and Cooper (2015) classified organisational structures into centralised and decentralised structures. According to Montana and Charnov (1993) the issues of centralisation and decentralisation involve the principle of delegation of authority. When a limited amount of authority is delegated in an organisation, it is usually characterised as centralised. When a significant amount of authority is delegated to lower levels in the organisation, the business is characterised as decentralised.

Montana and Charnov (1993) argue that in a highly centralised organisation, employees at lower levels have a limited range of decision-making authority. However, the scope of authority to make decisions in decentralised organisations, is very broad for lower-level. Each form has its advantages and disadvantages and is affected by a number of factors, such as size of organisation and the amount of geographic dispersion. For example, the size and complexity of the firm can affect the delegation of authority. If an organisation is very large and diversified, the limitations of expertise will generally lead to decentralisation of authority to the heads of these different businesses (Montana &

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Charnov, 1993). Geographic dispersion also favours decentralisation of authority. On the other hand, some organisations have excellent and speedy communications systems that tend to favour the centralisation of authority. In situations in which adequate personnel are unavailable, the organisation tends to centralised authority (Montana & Charnov, 1993).

Centralised structure facilitates closer control of operations, uniformity of policies, practices, and procedures, and better use of centralised specialised experts (Montana & Charnov, 1993). On the other hand, decentralised structure has been found to encourage communication and increases employee satisfaction and motivation (Montana & Charnov, 1993; Zhen et al., 2010); because in less centralised environments, free flow of lateral and vertical communication is encouraged, experts on the subject have greater say in decision-making than the designated authority, promotes higher levels of creativity, and responsiveness to market conditions is also enhanced (Zhen et al., 2010).

2.3 Procurement Methods in Construction Industry

Procurement methods in construction industry refers to the type of contract systems used for the execution of projects. There are several categories of procurement methods in the construction industry of which the selection is based on the client's requirement at the planning stage of the project. These include: time, budget, expected quality, specific project constraints, risk, asset ownership, and financing.

2.3.1 Types of Procurement Methods

Literature suggests there are commonly, five procurement systems being used in the construction industry. These are: Traditional Methods, Design and Build, Management Contracting, Joint Venture/Partnering, and Private Financing Initiative (PFI) as shown in Table 2.4.

Table 2.4: Procurement Methods

Sl.No	Procurement methods	Functions of Construction				
		Design	Build	Management	Finance	Operation
1	Traditional Method	Consultant	Contractor	Consultant	Client	Client
2	Design & Build Method	Contractor	Contractor	Consultant	Client	Client
3	Management Contracting	Consultant	Specialized Contractors	Contractor	Client	Client
4	Joint venture/Partnering	All the functions shall be shared with parties in mutually understanding environment				
5	Private Financing Initiative	All the functions shall be carried out by contractor and ownership of project shall be transferred to client				

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2.3.1.1 Traditional Method of Procurement System

In the traditional method of procurement system, the responsibility of a contractor is limited only to build. All design works and management of contract are carried out by consultant or engineer. Finance and operation on project are controlled by the client. This method of procurement is recommended for complex and comparatively huge project.

2.3.1.2 Design and Build

In design and build, the entire responsibility of the project is covered by the contractor. Consultant's scope is only limited to management of the contract. Client is responsible for finance of the project. The design-build contract can follow either the single-stage tender or the two-stage tender. In a single-stage tender, the contractor submits the tender with a fixed lump sum cost. In a two-stage tender, the contractor first presents programs, preliminaries, project team, overheads, and profits. Afterwards, the contractor is appointed to work for the client on a consultancy basis. The contractor then negotiates for a fixed price for the costs of project works.

2.3.1.3 Management Contracting

This method of procurement system is completely different from traditional method and design & builds method. In addition to client, consultant and contractor, specialised contractors become participants. Contractor acts as a manager for the project; whereas specialised contractors undertake real build aspect on their specialised field. Finance of the project is carried out by client. This method is chosen if there are possibilities to identify projects in packages. The payment terms are usually a fixed fee in the form of a percentage.

2.3.1.4 Joint Venture/Partnering

Literature suggests that many of the problems that exist in construction are attributed to barriers found between parties of contract. In order to overcome these barriers, different parties establish a work environment based on mutual objectives, teamwork, trust and sharing risks and rewards. The success of this setup solely depends on memorandum of understanding. However, identifying responsibilities of each party is a bit difficult in joint venture procurement system.

2.3.1.5 Private Financing Initiative (PFI)

In this procurement method, the contractor with funding capabilities and expertise in design, construction, and management is appointed to design, build and operate a project. The contractor funds the project and operate the project for some time after successful completion for a period. After this time elapses, the development is reverted to the client. This is very helpful for client who does not have a sound financial background. This method is generally used by government of developing countries.

2.3.2 Procurement System in Ghana

According to Adamu, Sadik and Osei-Tutu (2017), the traditional procurement system inherited from the British system is still the most popular form of procurement route for many projects in Ghana, mainly due to the predominance of the public sector and the demand for openness and public accountability. The clients' familiarity with the system is another factor that contributes to its popularity.

In Ghana, the government procures for construction works through the Ministries, the Assemblies, Departments, Institutions, and other agencies (Gyadu-Asiedu, 2009). The government as a client is represented by the Ministry of Road and Transport (for road works) and the MWRW&H in giving out contracts (Gyadu-Asiedu, 2009). This is done in accordance with the rules and regulations of the national procurement law as stipulated in the Public Procurement Act (2016) (Act 914). The main procurement arrangement is the traditional competitive bidding where the client makes sure the needed funds are available; whiles upon professional advice and designs (usually Architects, Quantity Surveyors, Project Managers and other consultants), a suitable contractor is appointed to execute and complete a given project (Offei et al., 2016; Adamu, Sadik & Osei-Tutu, 2017). The consultants make sure that the objectives of the project are met with the client and contractors fulfilling their respective parts of the contract.

Competitive tendering, together with the practice of awarding contracts based on the tender cost, results in a fierce competition among the large number of construction businesses in the country. Consequently, this may result in underpricing by many construction firms in a bid to win contracts and subsequently not being able to perform to the expected quality upon award of the contract (Sadik & Osei-Tutu, 2017). This research is based on traditional method of procurement system as it is the commonly procurement system in Ghana.

2.4 Theories of the Study

Yin (2003) and Kuziemsky (2016) opine that theoretical review remains one of the most important strategies for completing research. Neumann (2014) contends that theoretical review provides the general knowledge and explanation of the logical consistencies and complexities in the entire research process, from the stage of topic selection, focus objectives/questions, study design, data collection through to informing how data is analysed and interpreted. Kumar (2011) posits that theoretical review provides a set of parameters for reviewing the literature concerning the main themes pertinent to a particular research field, thereby giving a focus to the review. This study is theoretically underpinned by resource-based view theory, theory of construction management (theory of planning, theory of execution, and theory of control), stakeholder theory, and Competing Value Framework theory.

2.4.1 Resource-Based View Theory

The resource-based view theory (RBV) is a managerial framework used to determine the strategic resources a firm may use to achieve sustainable competitive advantage. The resource-based view theory is based on the principle that a firm's competitive advantage is derived from its internal resources rather than its external environment. That is rather than simply evaluating environmental opportunities and threats when doing business; a firm's competitive advantage is based on its unique resources and capabilities (Barney, 1995). The resource-based view of the firm predicts that certain types of resources owned and controlled by firms have the potential and promise to generate competitive advantage and eventually superior firm performance (Barney, 1991).

The resource-based view theory magnifies the importance of internal resources within the firm and the use of these resources in formulating strategy to achieve sustainable advantage within the firms' competitive markets (Schroeder et al., 2002). The resources a

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firm possesses include total assets expressed in monetary terms, experience of key human resources and the overall personnel adequacy, management skills, organisational processes, firms' attributes, information and knowledge it controls (Barney, 1991).

In the context of the construction industry, the resource-based view is used to identify and explore man-power expertise and strategic planning systems that can help construction firms manage present construction projects and grab future business opportunities therefore increasing the firm's portfolio (Waweru & Omwenga, 2015). Capabilities, resources and knowledge acquired over time create options for future business exploration and gives a firm leverage over its competitors (Kogut & Kulatilaka, 2001). Within the context of the construction industry these may include, organisational culture, operating structure, construction processes, plant and machinery, planning and scheduling templates, cost and financing models, professional consultants and knowledge of workers as well as certified organisational processes and best practices (Waweru & Omwenga, 2015). This theory is relevant for this study because it explains the role played by internal resources controlled by an organisation in the level of performance recorded. Table 2.5 shows resource portfolio for construction company adopted from Waweru and Omwenga (2015).

Table 2.5: Resource Portfolio for a Construction Company

Resources		Description
Tangible Assets	Physical Assets	Raised financial capital Cash on hand Financial investments Building and Land
Intangible Assets	Intellectual Property assets	Held-in-secret technology State of art equipment Construction Process or best practices Trademarks Designs Copyrights
	Organisational assets	Contracts Operating structure Culture HRM Policies
	Reputational assets	Company reputation Customer service reputation Product / service reputation
	Capabilities of human capital	Manager expertise Employee know-how External relationship

Source**:** Waweru and Omwenga (2015)

2.4.2 Criticisms of Resource-Based View Theory

Despite the benefits that resource-based view provides to practitioners and scholars alike, one of the main criticisms of resource-based view theory is the generalisability of the definition of the term resource (Truijens, 2003; Newbert, 2007; Green et al., 2008). According to Green et al. (2008) it is not always clear how terms such as skill, competence, capability, and resource differ from one another.

2.4.3 Project Management

The British Standard for project management (BS6079, 1996) defined project management as, "the planning, monitoring and control of all aspects of a project, as well as the motivation of all people involved in it to achieve the project objectives on time and

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to the specified cost, quality and performance." APM (2015) also defines project management as the planning, organisation, monitoring and control of all aspects of a project and the motivation of all involved to achieve the project objectives safely and within agreed time, cost and performance criteria. According to Mwangu and Iravo (2015), planning defines the strategies, tactics and methods for achieving project objectives, while monitoring and control provides the required checks and balances for ensuring that the plans and overall project objectives are achieved.

2.4.4 Theory of Construction Management

Contributors to this theory include Koskela and Howell (2002) and Association of Project Management (APM) (2015). According to Koskela and Howell (2002), theory of construction management is founded on three theories: planning, execution and controlling.
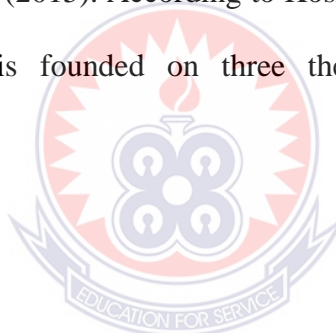
2.4.4.1 Theory of Planning

Theory of planning is interpreted in management as planning and organising. Thus, it is subdivided into: management-as-planning and management-as-organising (Koskela & Howell, 2002). In management-as-planning; management at the project/operations level consists of creation and implementation of plans. Management-as-planning, conceptualized that in planning a project, there is a managerial part and an effector part (Koskela & Howell, 2002); The primary function of the managerial part is planning, while the primary function of the effector part is to translate the resultant plan into action.

According to APM (2015), planning is the process of identifying the methods, resources and activities necessary to accomplish the projects objectives. It achieves this by drawing on the expertise, experience and knowledge of organisations and individuals

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(including lessons gained from past projects), as well as external parties if appropriate, in order to:

i. Understand the need or opportunity that the project will address and the benefits that it will deliver;

ii. Define what has to be accomplished and delivered, typically stated in terms of scope, time, budgets and quality;

iii. Develop a plan to deliver the project (APM, 2015).

On the other hand, management-as-organising requires the gathering of the necessary resources (inputs: manpower, materials, time and money) for carrying out the work outlined in the plan (Kraemer et al., 2014).

2.4.4.2 Theory of Execution

Theory of execution or implementation is viewed within the context of dispatching model and the language/action perspective (Koskela & Howell, 2002; Ibrahim, 2014). The dispatching model proposed that, from a managerial standpoint, execution is about dispatching tasks to work stations, and it is considered as the classical communication theory. However, for execution to be effective the classical communication theory must be complemented with the language/action perspective (Koskela & Howell, 2002); this emphasises two-way communication and commitment. Thus, the device used in communicating the tasks dispatched to work stations must be completely comprehensive to the operatives. Also, there should be feedback mechanisms in place to ensure that the operatives understand the instructions given to them. This will enable tasks to be executed according to the plan (Ibrahim, 2014).

2.4.4.3 Theory of Control

There are two models in control theory: the thermostat model and the scientific experimentation model (Koskela & Howell, 2002). The thermostat model assumed that in the production process, there is a process to control, a unit for performance measurement, a standard of performance, and a controlling unit. The scientific experimental model of controlling focuses on finding causes of deviations and acting on those causes, rather than only changing the performance level for achieving predetermined goals in the case of deviation.

The scientific experimentation model incorporates the aspect of learning to control (Koskela & Howell, 2002). Thus, project control involves monitoring or gauging performance, finding deviations and learning the causes of deviations, their effects and the best ways to mitigate them. According to Ibrahim (2014), the learning process is a tool that contractors can utilize to improve their project management skills. Monitoring and controlling the progress of a project is one of the most significant management functions of project management because it is a factor of project success. While monitoring activities could be done by the contractors' team alone, control activities require the involvement and approval of other project stakeholders, especially project consultants (Mwangu & Iravo, 2015).

2.4.4.4 Stakeholder Theory

Contributors to this theory include Donaldson and Preston (1995), Friedman and Miles (2002), and Phillips (2003). Stakeholder theory identifies the individuals that have a direct or indirect interest in an organisation (APM, 2015; Fummey, 2016). Stakeholders are the organisations or people who have interest or role in a project, or are impacted by it. Stakeholder management is the formal management of these interests, including the

management of the relationships and monitoring the delivery of commitments made to the stakeholders (APM, 2015). Stakeholders have a key role in defining the project's success criteria, and their involvement is critical. Managing stakeholders can make the difference between success and failure of a project, and as such should feature highly on the list of management priorities and be treated with appropriate gravity (APM, 2015; Fummey, 2016). Stakeholders must be identified, their level of interest and power to influence the project analysed, and plans devised for their management.

Stakeholder theory identifies five primary stakeholder groups for a company: three of them, financiers, customers, and communities (end users), define the company's performance expectations; the other two, suppliers, contractual professionals and employees, collaborate with the company to plan, design, implement and deliver the company's products and services to its customers (Waweru & Omwenga, 2015; Mandala, 2018). The purpose of the theory is to bring government, managers, sponsors, contractors and community to find out their strategic role and place in project success.

Within the confines of construction management, one of the most critical skills a construction manager must possess is the ability to manage and control the expectations of construction stakeholders while keeping everyone on board (Ramanayaka, 2013). Management scholars maintain that failure or inability to satisfy these expectations can result in project failure, particularly if the primary stakeholders and direct respondents are not adequately managed, as they can bring a project to a halt with greater political and financial influence (Bourne & Walker, 2005).

2.5 Project Strategy

According to O'Regan et al. (2008), strategy is an organisation's major approach to accomplishing overall organisational objectives and core strategic goals which leads to superior performance. Project strategy focuses on the tactics of doing tasks and completing activities in order to finish the project on time, within budget, with increased productivity and to specification, to have the project stakeholders' satisfaction and to achieve competitive advantage (Poli & Shenhar, 2003; Janicijevic, 2012).

2.5.1 Concept of Construction Management Strategy

Abeysekera (2007) sees construction management strategy as practices that construction managers could use to make construction more understandable, less complex, and imaginable. Similarly, Ramanayaka (2013) reinforces that construction management strategy is that which construction manager employs in decision making and problem solving within the complexities, uncertainties, uniqueness and dynamisms of any construction process. In this current study, the term "strategy" is defined in the context of construction project planning and implementation at the post contract stage adopting the definition given by Ramanayaka (2013).

2.5.2 Reasons for the Use of Strategy in Construction Projects

The reasons for the use of strategy in construction projects are that construction projects are characterised in common by their complexity, dynamism, uncertainty, and uniqueness (Ramanayaka, 2013). Kumar (2002) emphasizes that strategy application is the most promising way to handle dynamic situation within the context of construction project planning and implementation. Table 2.6 summarises the reasons for the use of strategy in construction projects adopted from Ramanayaka (2013).

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Table 2.6: Reasons for the Use of Strategy in Construction Projects

Characteristics	Meaning	Examples
Complexity	Difficult to grasp due to its complicated nature.	Complex design, technology used, procurement methods, tough clientele
Dynamism	Sudden changes in work processes	Client changing their desires from time-to -time, irregular weather changes
Uncertainty	Unpredicted or unexpected situations	Unforeseen ground conditions, uncertainties in resource supply
Uniqueness	Novelty for things in the project	Novelty in the use of construction methods, type of project, procurement or type of stakeholders

Source: Ramanayaka (2013)

2.5.3 Construction Management Strategy at Post Contract Stage

Construction management strategy at post contract stage includes: reviewing past construction projects, ensuring vision and mission are understood by the employees, effective planning, effective monitoring and control, stakeholders' involvement, and use of technology and digital tools (Lee et al., 2006; Idoro, 2012; Ramanayaka, 2013; Waweru & Omwenga, 2015; Fummey, 2016; Chinn. 2020; LetsBuild, 2020). From Table 2.7, the dimensions for the strategy are underpinned by both reflective practice and technical rationality (Ramanayaka, 2013).

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Table 2.7: CMSs Extracted from Literature

N	Construction Management Strategies	Authors
1	Review of past construction projects	Ramanayaka (2013)
2	Design review for constructability	Voght & Epstein (2019)
3	Collaborative project planning	Ramanayaka (2013)
4	Definition of the tasks of team members	Ofori (2013)
5	Clarity of project mission and goals to the team	Ofori (2013)
6	Use of alternative construction methodologies	Ramanayaka (2013)
7	Applying reasonable buffer (safety time)	Ramanayaka (2013)
8	Top management commitment and support	(Ahmed, 2016; Gunduz & Almuajebh, 2020)
9	Use of competent team	(Hickson & Ellis, 2014; Kuwaiti et al., 2018)
10	Regular update of programme of works	Chinn (2020)
11	Provision of quality assurance functions	(Kuwaiti et al., 2018; Pownya et al., 2022)
12	Conduct of training workshop and site meetings	(Ramanayaka, 2013; Adik, 2014; Chinn, 2020)
13	Enclose construction site from public	Osei-Asibey et al. (2021)
14	Display of Health and safety posters on site	Osei-Asibey et al. (2021)
15	Review of construction activities	Mwangu and Iravo (2015)
16	Prepare interim valuation and financial statement	Idoro (12012)
17	Involvement of stakeholders in decision making	Fummey (2016)
18	Clients' requirements as the basis for quality	Imbeah (2012)
19	Involvement of stakeholders in project M&E	Magassouba et al. (2019
20	Updates of project communicated to project team	Mckinsey (2017)
21	Warm working relationship with stakeholders	Magassouba et al. (2019)
22	Use of computer software for project planning	Kissi et al. (2019),
23	Use of 3D modelling software for visualisation	Ramanayaka (2013)
24	Use of computer aided software for data processing	(Adebayo et al., 2018; Chinn, 2020; Mckinsey, 2017;
25	Use of ICT/digital tools for communication	Kissi et al., 2019)
26	Implement environmental protection policy	Acheamfour, Kissi, Adjei-Kumi, & Adinyira, 2020)
27	Provide health and safety manual to workers	Osei-Asibey et al. (2021)
28	Practice reward and incentive system	Pownya et al. (2022)
29	Establish clear organisational structure and delegate authority	(Gunduz & Yahya, 2015; Pownya et al., 2022)
30	Ensure site workers wear protective clothing	Osei-Asibey et al. (2021)
31	Implement logistic and supply chain management	Kuwaiti et al. (2018)
32	Implement IT system for site security	(Fang et al., 2016; Pownya et al., 2022)

2.6 Concepts of Organisational Culture

This section looks at the theoretical concepts surrounding organisational culture. According to Cameron and Quinn (1999), organizational culture refers to shared assumptions, values, norms, interpretations and approaches that characterise organisations and their members. Hofstede (2001) defines organizational culture as the collective programming of the mind that distinguishes the members of one organization from another. Hill and Jones (2001, p.240) define organisational culture as "the specific set of

values and norms held by people and groups in an organisation that regulate how they interact with each other and with stakeholders outside the organisation.". Coffey (2005, p.94) define organizational culture as "the informal shared values, norms and beliefs that control how individuals and groups in organisations consistently perform tasks, solve problems, resolve conflicts and interact with each other and with others outside the organisation." Willar (2012) defines organisational culture as the shared values and underlying assumptions within the construction organisation, which allow the organisation to operate effectively.

Despite the fact that there are numerous definitions for organisational culture, there is consensus that it consists of shared values, norms and basic assumptions and that it is manifested in organisational practices. In this study, the term 'organisational culture' is defined as the shared values, norms and underlying assumptions within construction organisations, which support the organisations to operate effectively to achieve project goals.
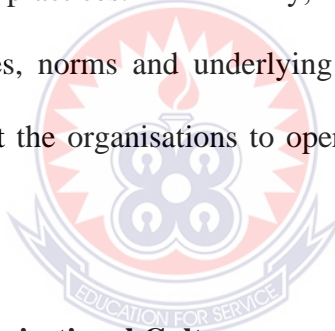
2.6.1 Determinants of Organisational Culture

Rameezdeen and Gunarathna (2003) and Fellows and Liu (2013) believe that the foundation of organisational culture emanates from national culture. Conversely, Abu-Jarad et al. (2010) opined that, the individual beliefs of the employees in an organisation define the organisational culture. Rameezdeen and Gunarathna (2003) assert that, organisational culture is synonymous to the real self of an individual, which underpins the reason why culture defers from one organisation to the other because every individual is unique. O'Donnell and Boyle (2008) recommend that the success story achieved by the organisation in solving its problems should be used to define the culture of the organisation. According to Campbell et al. (2002), the following factors contribute to the determination of culture in organisations:

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    i.   The philosophy of the organisational founder

    ii.   The business activities undertaken by the organisation

    iii.   The relationships established in the work environment

    iv.   The management and control systems used in the organisation.

    v.   The influence of national culture

    vi.   The organisational structure, and

    vii.   Technological advancement of the organisation

Schein (2004) avowed that, the founder's belief and a workable philosophy form the basis of culture. Abu-Jarad et al. (2010) posit that, the performance of an organisation can never be separated from its culture. Schein (2004) asserts that, the stability and effectiveness of an organisation is entirely linked to its culture. Alinaitwe et al. (2009) assert that, the measure of an organisational performance is dependent on the fulfilment of its beliefs and values.

Drawing from earlier researchers, the formation of culture in an organisation does not occur instantaneously but developed with time. Organisations are product of the society; thereby culture of the organisation is a prototype of the national culture of the organisational founders.

2.6.2 Importance of Culture to Organisation

Culture has penetrated through organisational studies. Cultural studies have gained root within the last three decades and continues to make strides in management studies. The remarkable idea about the concept of culture is its indelible contribution to the well-being of organisations. From a lay person's point of view, culture is said to give a group of people an identity which is not technically different from O'Donnell and Boyle's (2008) view with regard to the importance of culture to organisation. Oney-Yazici et al. (2007)

added that, culture is not only instrumental to the effectiveness of an organisation in the short-term but the long-term as well.

Abdul Nifa and Ahmed (2010) proposed that, even partnership between organisations yields good outcome provided the entities involve have similar organisational culture. Organisational culture has been proved to have a significant impact on performance (Cameron & Quinn, 2011). Organisational culture influences the way people think (decisions) and feel, their beliefs, shared values and acts; and manifests itself in individual decisions and the way they perform their work in the organisation (Dharmayanti, 2013). It is argued however, that organisational culture will remain linked to superior performance only if the culture is able to adapt to changes in environment.

2.6.3 Organisational Culture in the Construction Industry

The organisational culture assessment model of Cameron and Quinn (1999), derived from Quinn and Rohrbaugh's (1983) earlier Competing Values Framework (CVF) is reviewed. This model is chosen for use as the primary instrument for the collection and interpretation of data for analysing the effects of organisational culture and strategy on performance of construction project in Ghana in order to be compatible with the organisational culture studies in construction organisations conducted in many other countries. Also, the organisational culture assessment instrument (OCAI) was chosen because it has been tested and proved to be the most valid and reliable in measuring organisational culture (Willar, 2012; Harinarain et al., 2013; Mwaura, 2017). Additionally, the instrument had been validated in the Ghanaian context by Atuahene (2016).

2.6.4 The Competing Values Framework Theory

There are a number of well-established and well-recognised OC models which are used for identifying and measuring organisational culture. In this study, Competing Values Framework (CVF) theory developed by Cameron and Quinn (1999) was selected to assess the OC profiles. The CVF describes four types of organisations or corporate cultures which indicate how a company operates, how employees collaborate and what the corporate values are. The CVF is based on two major dimensions. The first dimension emphasises the organisational focus (internal versus external), whereas the second one distinguishes between stability and control and flexibility and discretion. An organisation can possess either a predominant internal or external focus, and may either be wishing to achieve flexibility and discretion, or stability and control. These two dimensions create four quadrants, each representing a major type of organisational culture.

The CVF helps to determine predominant type of culture by utilising the Organisational Culture Assessment Instrument (OCAI), which identifies characteristics relating to the six dimensions of the organisation's core dimensions that accumulatively represent culture (Willar, 2012). These dimensions are the basis on which OC is judged and estimated. The assessment of OC-profiles requires individuals to respond to six key dimensions of organisational culture (i.e., dominant characteristic, organisational leadership, management of employees, organisational glue, strategic emphases, criteria of success). Each key dimension has four alternatives that refer to the organisation characteristics or culture type as depicted in Figure 2.1.

CVF was chosen as the theoretical paradigm for analysis in this study, due to its suitability for identifying the profiles or types of organisational culture. Also, it is one of the dominant and arguably most widely used multidimensional model over the past 20

years, particularly among construction companies (Coffey, 2010; Willar, 2012; Harinarain et al., 2013; Atuahene, 2016; Alao & Aina, 2020).

Flexibility and Discretion

CLAN
- Internal Focused
- Flexibility oriented
- Collaborative
- Concern for people
- Human development
- Sensitivity to customers;
- Promotes teamwork
- Participation and consensus in decision making
- Friendly and supportive work environment

ADHOCRACY
- Externally positioning rather than seeking stability and control;
- Dynamic, creative and entrepreneurial place to work
- High degree of flexibility and individuality
- innovativeness, transformation and risk taking are key values;
- Concentrating to be pioneers

Internal Focus and Integration

External Focus and Differentiation

HIERARCHY
- Internal Focused;
- Seeks stability and control;
- Formalized and structured environment
- Formal rule, smooth- running organisation
- Effective monitoring and control.
- Efficient performance
- Secure employment
- Consistency, cooperation, conformity, predictability
- The leaders are good coordinators, organisers, and efficiency-minded

MARKET
- Concern for stability and control
- External partnership
- Focusing on getting the work done
- Competitive and Goal oriented organisation
- Focus on reputation and Success
- Profitability,
- Customer focus and market share are key drivers
- The leaders are 'hard drivers, producers and competitors'

Stability and Control

Figure 2.1: Competing Values Framework

Source: Adapted from Cameron and Quinn (2011)

2.7 Organisational Culture Types

The Competing Values Framework consists of four major culture types (clan, adhocracy, hierarchy, market) that are theorized to compose cultural profiles within various kinds of organisational contexts. According to Cameron and Quinn (1999), each

of the organisational culture types may contribute to organisational success depending on the needs of external environment and strategic orientation of the organisation.

2.7.1 Clan Culture

Clan culture is shaped between the dimensions of the organisational internal focus, and flexibility and discretion. This culture is also known as the "collaborative" culture because of it emphasises on reaching common agreement on important decisions. This type of culture has characteristics similar to extended family-type organisation (Cameron & Quinn, 2011), such as developing an environment that stresses human relationships; establishment of a very friendly workplace where the employees are committed to the company as well as the company to its employees. This culture is characterize by participative leadership; the leaders of the organisation are considered to be mentors, treat their employees as family members and clients as partners; they focus on the development of human potential, being sensitive to both internal and external customers' needs, promoting teamwork and empowerment, participation and consensus on how workers can improve their own work and the company's performance; rewards are based on organisational or group performance (not individual); and the organisational success is defined in terms of internal climate and concern for people (Rameezdeen & Gunarathna, 2003; Prajogo & McDermott, 2011; Cameron & Quinn, 2011; Mwaura, 2017).

2.7.2 Adhocracy Culture

Adhocracy culture is shaped between external focus and flexibility/discretion dimensions. According to Cameron and Quinn (2011), adhocracy culture is an organisation with qualities such as dynamic, entrepreneurial and creative workplace. This organisation fosters adaptability, flexibility and creativity in a constantly changing

environment. Entrepreneurial activity and acquisition of resources are prominent features in such organisations, which is also noted for its commitment to risk and innovation (Rameezdeen & Gunarathna, 2003; Cameron & Quinn, 2011). The leaders are risk-takers and innovators. Devotion to experimentation and invention is the glue that keeps the organisation together; having the most original and up-to-date products at all times are also seen as vital for the organisational success (Cameron & Quinn, 2011).

Adhocracy, unlike markets or hierarchies, do not have centralised power or authority relationships. Instead, power flows from individual to individual or from task team to task team, depending on what problem is being addressed at the time. This culture is associated with temporary institutions, which are created for the purpose of performing a specific task and disband once the task is completed (Cameron & Quinn, 2011).

2.7.3 Hierarchy Culture

Hierarchy culture also known as the bureaucratic culture, is located between internal focus and stability/control dimensions. Hierarchy culture is in direct contrast to Adhocracy culture where the people perform tasks based on formalized, structured and standardized rules and procedures under effective leaders/ coordinators. The organisational effectiveness is measured by stability, efficient performance, secure employment, predictability, and smooth operations (Cameron & Quinn, 2011). There is a very high level of labour division: therefore, specialisation is very high (Janicijevic, 2012).

Stability and control are achieved through measurement, documentation and information management. The internal system is well-regarded and maintained, and members are expected to follow the rules and procedures that control their actions in clearly defined positions. The leaders take satisfaction in being "excellent coordinators and organisers who are efficiency-minded" (Rameezdeen & Gunarathna, 2003; Cameron & Quinn, 1999, 2011).

2.7.4 Market Culture

This culture is also known as the competitive culture. Market culture is located between external focus and stability/control dimensions. Market culture organisation is results-oriented in which people are pushed to getting the job done in a hard-driven, demanding, and goal-oriented work environment. Such organisations employ planning and goal setting as the means of achieving results. The cultural values of such organisations are goal and task clarification, and decisiveness. The managers in this culture are demanding, hard-driving, and goal-oriented; their employees are given clear instructions and are financially rewarded for their efforts in increasing productivity (Rameezdeen & Gunarathna, 2003). The market culture places a premium on external interaction on relationship between suppliers, clients and regulators (Cameron & Quinn, 2011). Profitability, results-oriented, high reputation, market superiority, exceeding customer expectation, and secure customer bases are primary objectives of this organization (Yu & Wu, 2009; Cameron & Quinn, 2011; Harinarain et al., 2013).

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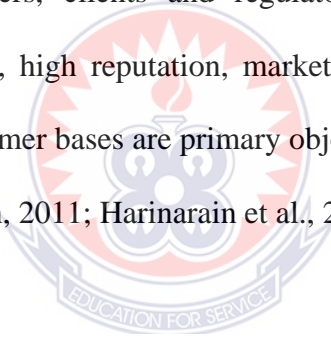
Table 2.8: Advantages and Disadvantages of Cultural Types

Culture Type	Advantages	Disadvantages	Source
Clan	Supportive Collaborative decision making Good internal communication and integration High levels of cooperative and effective group work	People may focus on relationships and neglect the work Disagreement may be avoided, there is surface harmony and covert conflict Lack of authority, potential for abuse	Jince (2015);
Adhocracy	Creative and Innovative. Respond to change Future oriented	Lack of formalized procedures Problem of clear communication Lack of planning and risk management	Jince (2015); Benstead (2019)
Market	Speedy work Unity of effort toward mutually valued goals. Maximum utilization of members' talents. Rapid learning, problem solving and adaptation to change Maximized profit	People become intolerant of personal needs, and they sacrifice family, social life and health for work The commitment to excellence at any cost leads to waste and unhealthy atmosphere	Jince (2015); Benstead (2019)
Hierarchy	Provides direction and certainty; Reduces conflict and confusion Eliminates issues of indecisiveness Leverages the knowledge, wisdom and talent of the leader It takes the pressure off the entry-level worker	Reduces internal innovation Creates a lot of bureaucracy that must be managed Creates a structure of unequal treatment Lacks collaboration	Flynn, Schroeder & Sakakibara (1994); Jince (2015) Panuwatwanich & Nguyen (2017)

2.8 Strong and Weak Organisational Cultures

Organisational culture can be either weak or strong. Martins and Martins (2003, p.380) highlight that "in a strong culture, the organisation's core values are held strongly and shared widely". This suggests that when organisational members accept the shared values, they become more committed to them. A strong organisational culture therefore refers to an organisation in which beliefs and values are shared relatively consistently throughout the organisation (Jince, 2015). Strong organisational cultures have a great influence on the behavior of organisational members (Martins & Martins, 2003). In other words, a strong culture is a powerful lever for guiding behavior. Strong cultures are associated with homogeneity of effort, clear focus, and higher performance in environments where unity and common vision exist within an organisation (Cameron & Quinn, 2011).

Brown (1998) believes that strong organisational culture can enable an organisation to achieve high performance based on the following reasons:

   i.   A strong organisational culture facilitates goal alignment.

   ii. A strong organisational culture leads to high levels of employee motivation.

   iii. A strong organisational culture is better able to learn from its past.

In relation to the above benefits of a strong organisational culture, Martins and Martins (2003, p. 380) states that "one specific result of a strong culture should be a lower employee turnover". This is due to the fact that when organisational members agree about what the organisation stands for, the end results are cohesiveness, loyalty and organisational commitment.

A weak culture, on the other hand, means the opposite of a strong culture, in other words, organisational members do not subscribe to the shared beliefs, values and norms (O'Reilly et al, 1991). Organisational members in a weak culture find it difficult to identify

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with the organisation's core values and goals (Jince, 2015). As a result, components or different departments within such an organisation uphold different beliefs that do not necessarily address the core goals of the organisation. Weak cultures have a negative impact on employees because they are directly linked to increased turnover (Harrison, 1993).

However, there are many different perspectives regarding the efficacy of a company's strength and congruence being dominated by a single cultural type. According to Choi et al. (2010), there is no single right type of culture that an organisation must have in order to be more effective or successful, since there are many sub-units within an organisation that have different cultures at different organisation levels. Coffey (2010), on the other hand, indicates that construction companies that have a dominating combination of organisational culture traits are stable in performance.

2.9 Organisational Culture Assessment Instrument

Organisational culture (OC) can be assessed in terms of the 'organisational culture dimensions' and the 'organisational culture-profile'. However, Cameron and Quinn (2011) suggest that the assessment of OC should be made in terms of 'OC-profile', or the cultural type of the organisation. The Organisational Culture Assessment Instrument (OCAI) model, provides a tool for an organisation to diagnose the current/existing and the preferred cultures of the organisation (OC-profiles), and also to facilitate required changes in organisational culture (Cameron & Quinn, 2011).

This instrument is constructed in the form of a questionnaire that requires individuals to rate a set of statements that relate to six cultural dimensions: dominant characteristics, organisational leadership, and management of employees, organisational glue, strategic emphasis, and criteria of success. The OCAI assists companies in

diagnosing an organisation's cultural type, cultural strength, and cultural congruence (Cameron & Quinn, 2011).

In construction research on organisational culture profiles, Thomas et al. (2002), Liu, Zhang and Leung (2006), Oney-Yazıc et al. (2007), Koh and Low (2008), Willar (2012), Harinarain et al. (2013), Atuahene (2016) and Panuwatwanich and Nguyen (2017) used the OCAI to identify the culture profiles of construction companies in each country of their research domain. They found that the tool is helpful in providing a comprehensive picture of a company's organisational culture and the values that characterize each culture, as well as providing a comparison standard for culture profile interpretation. This model has also been validated by Lamond (2003) as a representation of organisational culture. The six cultural dimensions of OCAI represent the culture climate in an organisation which forms a cumulative representation of an organisational culture (Cameron & Quinn, 2011; Rameezdeen & Gunarathna, 2003). The cultural dimensions with associated cultural types of the OCAI are presented in Table 2.9.
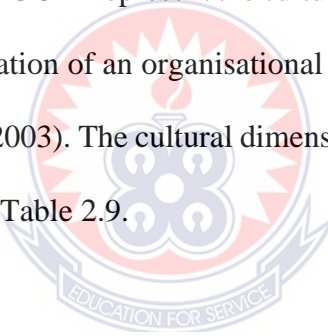
Table 2.9: OCAI Traits and Typologies

Cultural Dimensions	Culture Types			
	Clan Culture	**Adhocracy Culture**	**Market Culture**	**Hierarchy Culture**
Dominant Characteristics	It is a very personal place. It is like an extended family. People seem to share a lot of themselves.	It is a very dynamic and entrepreneurial place. People are willing to stick their necks out and take risks.	It is very results-oriented. concern with getting the job done. Competitive and achievement-oriented.	It is a very controlled and structured place. Formal procedures govern what people do
Organisational Leadership	The leader is generally considered to exemplify mentoring, facilitating, and nurturing.	The leader is generally considered to exemplify entrepreneurship, innovation and risk taking.	The leader is generally considered to exemplify a no-nonsense, aggressive, results-oriented focus.	The leader is generally considered to exemplify coordinating, organizing, or smooth-running efficiency.
Management of Employees	The management style is characterized by teamwork, consensus, and participation	The management style is characterized by individual risk taking, innovation, freedom, and uniqueness	The management style is characterized by hard-driving competitiveness, high demands, and achievement	The managementt style is characterized by security employment, conformity, predictability, and stability in relationships
Organisation Glue	The glue that holds the organisation together is loyalty and mutual trust. Commitment to this organisation runs high	The glue that holds the organisation together is commitment to innovation and development. There is an emphasis on being on the cutting edge.	The glue that holds the organisation together is the emphasis on competitive achievement and goal accomplishment	The glue that holds the organisation together is formal rules and policies. Maintaining a smooth-running organisation is important.

Strategic Emphases	It emphasizes human development. High trust, openness, and participation persist	It emphasizes acquiring new resources and creating new challenges. Trying new things and prospecting for opportunities are valued	It emphasizes competitive actions and achievement. Hitting stretch targets and winning in the marketplace are dominant	It emphasizes permanence and stability. Efficiency, control, and smooth operations are important.
Criteria of Success	Success is on the basis of the development of human resources, teamwork, employee commitment, and concern for people.	Success is on the basis of having the most unique or newest products. It is a product leader and innovator	Success is on the basis of winning in the marketplace and outpacing the competition. Competitive market leadership is key	Success is on the basis of efficiency. Dependable delivery, smooth scheduling, and low-cost production are critical.

Source: Cameron and Quinn (2011)

2.10 Culture-Based Strategic Management System

Culture-based strategic management system is interpreted as meaning a mixture of strong organisational culture and effective strategy implementation (Willar, 2012). In more concrete terms, this means ensuring that, with recognisable adaptable strong organisational culture profiles, a company's strategic management practices can be efficiently and effectively implemented to improve company's performance. With respect to this study, it is anticipated that with recognizable suitable OC profiles, contractor's management strategies can be effectively implemented leading to superior project performance.

2.11 Strategies for Culture Change

Cameron and Quinn (2011) suggest "culture change" is concerned with making real changes in the behavior of people throughout the organisation. According to Naoum (2011), a strong organisational culture plays an active role to lead construction employees to a higher level of motivation, where the stronger the culture the better the employees' performance in terms of efficiency and productivity. According to Cameron and Quinn (2011), there are six potential steps for organisational culture change. These steps are:

i.   Reach a consensus on the current culture in order to foster involvement and to minimize resistance to the culture change by those affected.

ii. Reach consensus on the desired future culture, to clarify for all concerned what the new cultural emphases will be.

iii. Determine what the changes will and will not mean, to identify what is to remain unaltered in the organisation in the midst of change.

iv. Identify illustrative stories.

v.   Develop a strategic action plan.

vi. Develop an implementation plan to generate specific action steps that can be initiated to create momentum toward culture change.

The strategy for culture change must be well planned, in order to minimize the chance of failure. According to Susanto (2008), one of the causes of organisational change failure is because of a lack of strong consensus with the organisational leaders as to what is to be changed and how. If members of organisations feel that the proposed changes will cause any pressure, then resistance can sometimes manifest in the form of sabotage, reduced productivity and reduced motivation (Low &Teo, 2004).

Yip and Poon (2009) emphasize that the culture in construction companies needs to be a sustainable one, and this can only be achieved by making changes over time in response to social demands for sustainability, and global tendencies in sustainable construction development. Therefore, any proposed steps for culture change need to be included in the culture-based framework design, to identify the organisational culture profiles currently in place that can lead management towards designing strategy for culture development and change, in order to reach a desired quality culture.

One of the objectives of this study is to develop a culture-based framework for overcoming the existing challenges, and support the strategic management practices and improve the performance of construction companies. This may require either strengthening of the existing OC-profiles or changing of existing organisational culture into more suitable OC-profiles that can mitigate the prevailing challenges; therefore, construction companies can improve the effectiveness of their strategic management practices, and their project performance (Mwaura, 2017). It is acknowledged that different organisations have diverse working environments, work attitudes and roles, leadership styles, and strategies base on the explanation on the four types of culture. Companies should, therefore, fully understand their organisational culture profiles and initiate changes, if necessary, to improve their companies' performance in order to be competitive.

According to Cameron and Quinn (2011) having a congruent culture can eliminate many complications and obstacles that might prevent an organisation from performing effectively. The existence of congruence implies all the six culture dimensions have a similar dominant culture type. However, there are many different perspectives regarding the efficacy of a company's strength and congruence being dominated by a single cultural type. Choi et al. (2010), hold the view that there is no single right type of culture that an organisation must have in order to be more effective or successful, since there are many

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sub-units within an organisation that have different cultures at different organisation levels. Coffey (2010) on the other hand indicates that construction companies that have a dominating combination of organisational culture traits are stable in performance.

2.12 The Unitarist and Pluralist Views

Studies indicate that there are two competing views on the relationship between organisational culture and management practices/technique. While the unitarist view suggests that quality management practices are associated with a single 'homogeneous' culture (Panuwatwanich & Nguyen, 2017), the pluralist view supports the idea that quality management practices or techniques should be built on heterogeneity of cultural dimensions. Prajogo and McDermott (2005), Zu et al. (2010) and Gambi et al. (2015) tested both views and concluded in favour of the pluralist view.

2.13 Empirical Studies

This section reviews studies that have been conducted on construction project management strategies and organisational culture within and outside Ghana in order to know what other scholars have already done as far as the research topic is concerned.

2.13.1 Effects of CMS Implementation on Project Performance

Majumder et al. (2021) examined the impact of effective construction planning in project performance improvement and found that effective construction planning helps to minimise the stress of the project team; provides confidence among team members, reduces the risk factors of the projects, prevent team overloads, enhances the level of profitability, and helps to meet project deadlines. Naeem et al. (2018) examined the impact of project planning strategy on project success with the mediating role of risk management

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and moderating role of culture. Data was collected from 100 project managers by using questionnaires. In order to analyse the relationship, regression and correlation techniques were used. The results indicate that project planning is positively associated with project success. Dvir et al. (2003) and Serrador (2013) empirically analysed the relationship between project planning and project success and found that project planning is positively related with project success.

In a study undertaken by Adebayo, Eniowo and Ogunjobi (2018) to examine project management techniques employed by Ondo State Agency for Road Maintenance and Construction, a construction company in Ondo State, Nigeria. The researchers used survey method where copies of a well-structured questionnaire were distributed to elicit appropriate information from respondents. The results showed that there is a relationship existing between project monitoring and control strategy used by a construction company and project delivery/success. Ofori (2013) and Fummey (2016) also opined that proper monitoring and control or evaluation of projects during execution phase enhances the success rate of the project. Mwangu and Iravo (2015), investigated how monitoring and evaluation affects the success of Constituency Development Fund Projects in Kenya - Gatanga Constituency being a case study. The aim of the study was to establish whether the project monitoring and control efforts of the contractors/construction managers contribute to an improved project outcome. The data were collected using structured questionnaires and analysed using descriptive and inferential statistics (frequencies, percentages and Pearson Correlation). The results of the study revealed that contractors and project supervisors apply monitoring tools to a certain level in their project operations, consequently producing satisfactory levels of success in terms of project team's meeting cost, time and product quality related criteria.

Deming (1986) asserts that top management is responsible for 94% of quality problems. In a study to investigate the relationship between multiple dimensions of top management support and project performance, Ahmed (2016) found that top management role of providing strong support, authority, finance, and resources to the project managers have significant positive influence on project performance in the public sector of Pakistan. Khang and Moe (2008), and Ofori (2013), also identified top management as a critical factor in project success.

Adebayo, Eniowo and Ogunjobi (2018) found that there is a relationship existing between project monitoring and control strategy used by a construction company and project delivery/success. They further found that the uses of Program Evaluation and Review Technique for time/schedule control and Earned Value Management for cost control are very effective in meeting set project objectives.

Gundecha (2012) and Hickson and Ellis (2014), all emphasised that use of skilled and experienced labour improves productivity. Ofori (2013) also found that use of competent personnel contributes to project success. Ramanayaka (2013) posits that reviewing past construction projects that have been implemented with similar scope, conducting workshops and meetings, collaborative programming, segmental programming, use of 3D modelling to review project drawings, allowing reasonable safety time and use of alternative construction methods contribute to the improvement of project performance in the construction industry.

Voght and Epstein (2019) also assert that reviewing project drawings (designs) for constructability before construction begins helps assure that the plans can be efficiently implemented in the field reduces, errors, unanticipated costs, delays, conflicts and claims. LetsBuild (2020) assert that collaborative delivery system, clear descriptions of tasks or roles and responsibilities of all the project team members and major stakeholders, provide

a better understanding of all the stakeholders involved in the project delivery and encourage the attainment of project objectives, reduces a lot of waste through direct data sharing among project stakeholders; thus, increasing construction productivity. LetsBuild (2020) further assert that use of construction software that supports cloud documentation for on-site processes encourages effective collaboration that facilitates efficiency and boosts productivity. Wysocki, Beck and Crane (2000), Ofori (2013), and Chinn (2020) all emphasised the importance of clarity of project mission, purpose and goals in project success. According to Chinn (2020), clear goals and objectives allow the workmen to monitor their own progress and also correct their errors as necessary; thus, enabling all parties of the project to be on the same page to avoid problems in completion time, and reduce inefficiencies on the job site.

Chinn (2020) further asserted that substantial training is vital for construction teams so that everyone is knowledgeable and prepared to complete tasks safely and efficiently to achieve project success. A study on impact of employee training on performance in construction industry in Kotabharu, Adik (2014) found that there is a positive relationship between employee training and project performance in the construction industry. In a study to establish whether the project monitoring and control efforts of the contractors contribute to an improved project outcome, Idoro (2012) found that the frequencies at which site visits and site meetings are conducted and programs of work are updated can reduce the cost overrun of projects executed by indigenous contractors; also, the frequencies at which financial statements are prepared reduces the cost overrun of projects executed by expatriate contractors.

In a study to establish whether the project monitoring and control efforts of the contractors and project supervisors contribute to an improved project outcome, Mwangu and Iravo (2015) found that the frequencies at which project supervisors conduct site visits

and meetings and prepare interim valuations and financial statements are significant to project outcomes/success. They also assert that regularly reviewing construction activities against the schedule, budget and quality elements of the project, allows problems to be identified early so that corrective action can be taken to keep the project on track. Kuwaiti et al. (2018) and Pownya et al. (2022) posit that the presence of quality assurance functions such as quality policy, objectives and management (Quality Manual); standard operating procedures, and quality assurance manager to conduct regular audit and reviews for compliance contributes to achieve quality compliance and ultimately improve project performance.

Kissi et al. (2019) and Chinn (2020) assert that use of project computer aided programs in project management allows managers to track their work easily, reduces inefficiencies, and also reduces too much paper work; thus, improving productivity. Kissi et al. (2019) further found that the use of computer and computer-aided programs in data analysis had a positive statistically significant relationship with construction project success criteria.

Njogu (2016) found that stakeholder's involvement in project planning influence stakeholders' involvement in budgeting for the project, identifying roles and responsibilities of personnel, availing of resources and intervene in securing donor funding influence project performance to a very great extent. Ondieki (2016) asserts that involvement of stakeholders in the process of resource specification resulted to identification of quality materials required for project development. According to Wamugu and Ogollah (2017), involvement of stakeholders in schedule planning leads to road construction projects completion within the stipulated time frame. Kobusingye (2017), found that a positive relationship exists between involvement of stakeholders and WASH project outcome.

Joaquin et al. (2010) mentioned that the stakeholder's participation is highly important to project success, and therefore taking account their claims and interests during the project implementation stages is largely required to achieve project objectives. Atkin and Skitmore (2008), report that practicing an appropriate stakeholder involvement strategy in project implementation will make easier to manage their needs and anticipate risks that may have possible influence on project success. Wamugu and Ogollah (2017) found that involvement of stakeholders in schedule planning leads to road construction projects completion within the stipulated time frame. Njogu (2016) established that stakeholder involvement in project monitoring and control of resources, taking action to collect errors that project require, identification of deviation in the project influence project performance. Ondieki (2016) asserts that involvement of stakeholders in the process of resource specification resulted to identification of quality materials required for project development. Buertey et al. (2016) found that good relationship, trust, agreeing on rules of engagement and adhering to advice from stakeholders are critical to the success or otherwise of project.

Coulter (2010) found a positive and strong relationship between stakeholder involvement and project performance. A study conducted by Mandala (2018) to determine the influence of stakeholder involvement in management of projects on performance of roads construction projects in Kenya, revealed that their involvement in the process of project implementation led to improvements in the performance of road construction projects. The reason for the improvement observed was because their inclusion ensured wider ownership of project implementation.

Magassouba et al. (2019) assert that stakeholders' involvement in planning, implementation, monitoring and control contributes in a very great extent to project success and it is an appropriate way to achieve an organisation goal. They also asserted

that a warm working relationship with stakeholders contributes to better project performance.

Waweru and Omwenga (2015) found that construction operation level (project level) strategy has high impact on operational efficiency and construction project performance. Similarly, Ramanayaka (2013) found that construction management strategy (in terms of effective planning, monitoring and control, and stakeholders' management) is positively associated with construction project cost, time, quality, client satisfaction, and overall success of construction project. Based on the theoretical and empirical review, the following hypotheses are postulated.

H1: Construction management strategy has significant, positive effects on project performance.

H1$_a$: Planning related strategy has significant, positive effects on project performance.

H1$_b$. Monitoring and control related strategy has significant, positive effects on project performance.

H1$_c$. Stakeholder management related strategy has significant, positive effects on project performance.

H1$_d$. Technology related strategy has significant, positive effects on project performance.

2.13.2 Culture Typology of Construction Organisations Based on OCAI

Literature suggests that construction industry has different pictures of culture profiles. The culture profiles within the construction industry reflect the construction market demand and business environment in each country, and the goals of each construction company.

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A study conducted by Cameron and Quinn (2006), on OCAI in the United States of America revealed that, the average culture profile of the construction industry is dominated by the market, followed by hierarchy, clan and adhocracy. Oney-Yazici et al. (2007) also revealed clan, hierarchy, adhocracy and market in descending order of dominance in the Turkish Construction Industry. Zhang and Liu (2003) used the same instrument to conduct a study among Chinese contractors and the study also revealed in order of dominance hierarchy, clan, market and adhocracy.

In their study in South African Construction Industry, Harinarain et al. (2013) revealed that medium-size construction organisations have a dominating culture profile of clan, hierarch, market and adhocracy; while the large-size organisations have a dominating market culture followed by clan, hierarchy and adhocracy. In China, a mixture of culture types exists, the culture profiles of Chinese contractors vary between geographical regions with hierarchy-market culture dominance being reported by Liu, Zhang and Leung (2006) and hierarchy, clan, market and adhocracy in order of dominance reported by Zhang and Liu (2003). Alao and Aina (2020) reported that the organisational culture of construction companies in Lagos State, Nigeria is predominantly market type. This is followed by hierarchy, adhocracy and clan culture.

Willar (2012) indicated that the predominant culture of large-size Indonesian construction companies is the clan type culture, followed by the market type culture, hierarchy type and, lastly, the adhocracy type culture. With respect to the cultural dimensions (elements), Willar further revealed that Indonesian construction companies emphasise clan culture type in the dimension of dominant characteristics, management of employees, organisation glue, and criteria of success. However, their "organisational leadership" is related to the dominant leadership style and approach used by leaders and managers in those companies which are more hierarchy-focused than the other three

culture types. This indicates that the leaders and managers are generally considered to exemplify coordinating, organizing, and smooth-running efficiency. With regard to 'strategic emphasis', the area of emphasis that drives their organisation's strategy, is in "market type dominant", wherein the company emphasises competitive actions and achievement. Hitting stretch targets and winning in the marketplace.

In the case of the construction industry in Ghana, there have been inconsistent findings requiring further investigation regarding the predominant culture of Ghanaian construction companies. For instance, while Wayem and Addo (2015) using a population of 600 from five regions (unspecific) reported that Ghanaian construction organisation exhibit competitive (market), bureaucratic (hierarchy), consensual (clan) and also entrepreneurial (Adhocracy); conversely, Atuahene (2016) using ABCECG members in Greater Accra and Ashanti regions as his population, reported that the predominant culture of large-size construction firms in Ghana is adhocracy culture, followed by clan, market and hierarchy cultures. The medium-size firms are dominated by adhocracy culture, followed by clan, hierarchy and market cultures; while the small-size firms are dominated by hierarchy, market, clan and adhocracy in that order. Atuahene (2016) further reports that overall, Ghanaian construction organisation is predominantly hierarchy, market, clan, and adhocracy in that order. This raised the question as to which organisational culture dominates the construction industry of Ghana.

2.13.3 Effects of Organisational Culture on CMS Implementation

According to Janicijevic (2012), organisational culture strongly influences both strategy formulation process, as well as strategy implementation process. The competing values framework suggests that different culture orientations would lead to different types of managerial practices (Cameron & Quinn, 2011). In the context of construction project delivery, the researcher expects that different culture orientations would be associated with

CMS implementation. To examine the possible relationship between organisational culture and use of CMS, the culture orientation or orientations from the CVF that are likely to be associated with each of the elements of the CMS is considered.

The first CMS is planning related strategy. Planning related strategy requires the use of formalised approach to plan and implement a project with clear instruction and tools recommended throughout the entire process. It also requires ensuring that vision and mission are well understood. Planning related strategy also involves collaboration with stakeholders and consensus in decision making. Cameron and Quinn (2006) explain that goal-setting and planning are crucial to a market culture. They argue that the market culture focuses on external interaction on relationship between suppliers, clients and regulators. According to Al-Jalahma (2013), the market-oriented leaders focus on developing clear objectives and aggressive strategies to influence practices and behaviours leading to high productivity and profitability. This implies that market-oriented culture would likely favour CMS implementation.

The second CMS element is monitoring and control related strategy. This involves top management commitment and support, use of competent team, provision of training for employees, conduct of site meetings, provision of quality assurance functions, regular update of program of works, regular review of construction activities, display of health and safety posters on site, and preparation of interim valuation and financial statement. According to Cameron and Quinn (2011), leaders of hierarchy culture manage their environment through effective monitoring and control. Impliedly, hierarchy culture would likely influence CMS implementation.

The third CMS element is stakeholder management related strategy. This requires involvement of stakeholders in decision making, effective communication and cooperation amongst all the parties involved. It also involves the use of customer's requirements as the

basis for quality, and a warm working relationship with stakeholders. These characteristics are associated with group or clan culture (Cameron & Quinn, 2011), so it is expected that clan culture would likely influence CMS implementation

Another proposed CMS is technology related strategy. This involves the use of software such as 3D modelling for visualisation and buildability; and for project planning, and resource management. It also includes the use of ICT for data processing and communication within the company and with the external stakeholders. This strategy would likely facilitate the innovation and creative problem-solving characteristics associated with adhocracy culture (Cameron & Quinn, 2011). It is therefore expected that adhocracy culture would likely influence CMS implementation.

In her study on the effect of organisational culture on strategy implementation in the construction sector in Kenya, Mwaura (2017) found that the clan, hierarchy, adhocracy, and market cultures all had significant effect on strategy implementation. However, the clan culture was found to be highly correlated with strategy implementation; which therefore implies that clan culture in an organisation is an important recipe in strategy implementation. Based on these theoretical and empirical findings, this hypothesis was developed to address the effects of organisational culture on CMS implementation.

H2:   Organisational culture has significant positive effects on CMS implementation.

2.13.4 Influence of Organisational Culture on Project Performance

Literature suggests that organisational culture is one of the catalysts of performance. However, it is revealed that different organisational culture types lead to different performance outcomes. In their study on "Strengthening Project Performance with Organisational Culture and Project Management Office (PMO) on the Construction of High-Rise Building", Darmanto and Husin (2019), found that organisational culture has a positive and significant influence on construction project performance.

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Alla and Hassan (2017) empirically determined the relationship between organisation culture and construction project performance in Sudanese context. Descriptive quantitative research methodology was adopted. Questionnaire was the main data collection tool. Data was analysed using descriptive and inferential techniques including SEM. The key finding of the study was: Organisational cultures selected dimensions (people and leadership, processes and systems, information management and business focus) of Sudanese construction industry projects are significantly correlated with overall project performance (ie; aggregation of cost, time quality, risk, and customer satisfaction). Yazici (2011) examined how an organisation's culture contributes to perceived project performance. Surveys collected from project managers, project engineers, and executives from 76 U.S. firms revealed the significance of Clan or group culture in improving project performance as measured by project time, budget targets, customer expectations, and team satisfaction. However, there was no significant relationship with market, hierarchy and adhocracy cultures.

Coffey and Willar (2010) employ Denison Organisational Culture Survey Instrument to examine the relationships between, and impacts of organisational culture on construction project performance within a Hong Kong context. The Pearson correlation analysis shows a positive relationship between each of three cultural traits of culture ('Consistency (hierarchy)', 'Adaptability (adhocracy)' and 'Mission' (market)) with the overall project performance at the 5% significance level. Out of these three trait measures of organisational culture strength, 'Adaptability' has the strongest correlation; 'Consistency' has the least correlation, whilst 'Mission' is of moderate significance. However, there was no correlation between 'Involvement' and overall project performance. Coffey and Willar further found that a high level of company effectiveness

is positively associated with the combined cultural traits represented by the dimensions of 'external focus" and "stable culture'.

Ankrah (2007) investigated the impact of culture on construction project performance of UK firms. Data was analyzed using descriptive and inferential techniques including factor analysis, correlation and multiple regression techniques. Data results revealed that workforce orientation and project orientation cultures are significantly and positively related to overall project performance in terms of (cost, time, quality, health and safety, client satisfaction with service, satisfaction of operatives, collaborative working, and productivity). Interestingly, there was no association found between the dimensions of performance orientation, team orientation and client orientation cultures and overall project performance.

Thomas et al. (2002), employ the standard competing values framework model and the instrument developed by Cameron and Quinn (1999) to assess the importance of project culture in achieving quality outcomes of thirteen Australian construction projects. The results indicate that clan-type cultures produce above average project performance, hierarchy and adhocracy cultures produce average project performance, whereas market cultures produce below average project performance. The authors thus suggest that construction project culture be shifted from the currently prevalent market culture to a clan culture.

Based on the theoretical and empirical studies discussed, this hypothesis was postulated.

H3:   Organisational culture has significant, direct positive effect on overall construction project performance.

2.14 Indirect Effects of Organisational Culture on Project Performance

In the development of H1, the researcher discussed the theoretical and empirical evidence that suggests that CMS implementation would be related to project performance. In the development of H2, the researcher discussed theoretical and empirical evidence suggesting that organisational culture is related to CMS implementation. In developing hypothesis H3, the researcher also discussed theoretical and empirical evidence that suggests that specific organisational culture orientations would be associated with project performance.

However, the effects of organisational culture on performance may be achieved through different mechanisms; one of these mechanisms would be the CMS implementation. It is therefore, expected that organisational culture affects project performance indirectly through CMS implementation. In other words, organisational culture is related to CMS and CMS is related to project performance. However, it is unlikely that all of the effects of organisational culture on project performance can be explained by this mechanism (CMS implementation). There are likely other organisational mechanisms through which organisational culture would affect project performance. Therefore, the researcher expect that CMS only partially mediates the relationship between organisational culture and project performance, Hence, the fourth major hypothesis follows:

H4.   CMS mediates the relationship between OC and project performance.

2.15 Construction Project Performance Measurement

Predicting the performance of a contractor is highly important for both the contractor and the client. Thus, effective performance measurement is critical to project success. Performance measurement may wear different look depending on angle from which it is measured, it may be evaluated from project, organisation, stakeholder or client's

perspective (Yang et al., 2010). However, studies indicate that there is no single performance measurement system that fits the construction industry (Willar, 2012). It is, therefore, an important task for every construction company in individual countries, to develop a comprehensive performance measurement that can help the construction industry to measure its existing performance.

This investigation considers the nine (9) performance indicators developed for Ghanaian contractors by Ofori-Kuragu (2014). They are: client satisfaction, cost, time, quality, health and safety, productivity, people, environmental impact, and business performance (Figure 2.2). However, for the purpose of this study, the business performance criterion is dropped because the study is delimited to project performance and not the organisational performance.
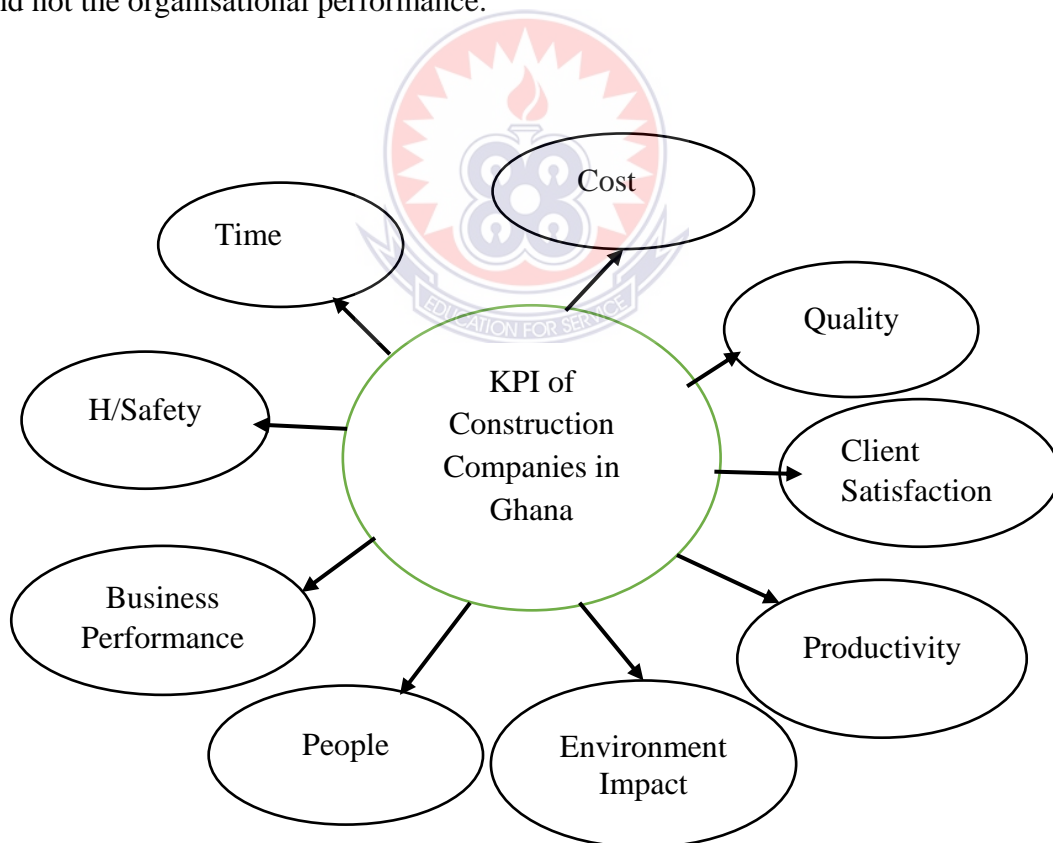
Figure 2.2: Key Performance Indicators of Ghanaian Construction Industry

Source**:** Ofori-Kuragu (2014).

2.15.1 Quality Performance

Quality performance is defined as the totality of features required by a product or services to satisfy a given need, or fitness for purpose (Ali et al., 1997). In other words, the emphasis of quality in construction industry is the ability to conform to established requirements. Requirements are the established characteristics of a product, process or service as specified in the contractual agreement and a characteristic is any specification or property that defines the nature of those products, processes or services, which are determined initially by the client (Rahman & Alzubi, 2015). In order to achieve a completed project that meets the customer's quality expectations, all parties to a project must acquire an understanding of those expectations, incorporate them into the contract price and other contract documents as possible, and commit in good faith to carry them out (Ganaway, 2006).

2.15.2 Clients' Satisfaction

According to Wayem and Addo (2015) and Ofori-Kuragu et al. (2016) client satisfaction is one of the most significant factors in project performance measurement in Ghana. In the construction industry, determination of client satisfaction could be achieved by measuring the degree to which a certain physical facility, also known as a product and a construction process, also known as a service, meet and/or exceed what the customer has expected (Rahman & Alzubi, 2015). As reported by Pmbok (1996), this demand combining both the conformance to specifications (The project's production should be the same as it was expected to be) and fitness for use (referring to satisfaction of the product or service to the real needs of the client).

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2.15.3 Adherence to Budget

According to Wayem and Addo (2015) and Ofori-Kuragu et al. (2016), cost performance is one of the most significant factors in project performance measurement in Ghana. Cost performance indicates a comparison between the actual and the budgeted cost of the project (Rivera et al., 2017). Cost overrun occurs when the resultant cost target of a project exceeds its cost limits where cost limit of a project refers to the maximum expenditure that the client is prepared to incur on a completed building project (Memon et al., 2012). This dimension is very important for client, and has a significant effect on project satisfaction level (Rahman & Alzubi, 2015). Hence, the ability of the contractor to manage project cost activities, providing lower cost alternatives where possible is very crucial. This dimension is used frequently to measure construction project performance (Wayem & Addo, 2015; Rahman & Alzubi, 2015; Ofori-Kuragu et al. 2016; Rivera et al., 2017).
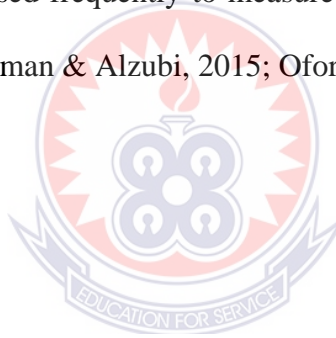
2.15.4 Adherence to Safety

With the increasing complexity of construction projects and the rapid increase of construction activities, construction safety has become a big concern because workers' injuries cause tremendous losses (Fang et al., 2004). Studies reveal that health and safety is a major aspect considered by construction stakeholders as an indicator of client satisfaction and project success. Many authors (Ali et al., 1997; Karna, 2004; Rahman & Alzubi, 2015; Ofori-Kuragu et al., 2016) mentioned safety considerations as a dominant factor in all phases of any construction project. The indicators used to measure project health and safety includes: the policies followed, commitment to safety rules and regulations, maintenance of safe work environment and employing workers with safe work habits (Rahman & Alzubi, 2015). Hinze (1997) mentioned that, in some project, the

contractor will be asked to comply, not only with applicable local laws governing health and safety, but also the client's requirements may simply echo provisions already contained in the company safety program.

2.15.5 Adherence to Schedule

Time performance is very important for construction projects as clients, users, stakeholders, and the general public usually looks at project success from the completion time of the project (Rahman & Alzubi, 2015; Wayem & Addo, 2015; Ofori-Kuragu et al., 2016; Rivera et al., 2017). The construction time can be defined as the time it takes to complete the project or can be regarded as the elapsed period from the commencement of site works to the completion and handover of a building to the client (Rahman & Alzubi, 2015). The construction time of a building is usually specified before the commencement of construction. The element of time could indicate to construction managers that the project is not running as smoothly as scheduled. Time performance is frequently used to measure construction project performance and project success (Ali et al., 1997; Rahman & Alzubi, 2015; Wayem & Addo, 2015; Ofori-Kuragu et al., 2016).

2.15.6 People/Competency in Human Resource Management

The people/group involved in provision of services to the client; their experience, skills, goals, and commitments will influence the quality services and finally client satisfaction and project success (Rahman & Alzubi, 2015; Ofori-Kuragu et al., 2016). Contractors in the construction industry do everything for excellence; may reward, and recognise in ways that build commitment and motivates staffs to use their experience and knowledge for the advantage of the company to achieve full potential of their group at team-based, individual and company level (EFQM, 2010). The people issue has a crucial

effect on service delivery and is seen as key criteria of measuring client satisfaction and project success (Ofori-Kuragu et al., 2016). The indicators used to measure this factor are: employee attitudes, employees' motivation, job satisfaction, qualifications, experience and skills, specific work-skills training, and working hours (Wayem & Addo, 2015; Ofori-Kuragu et al., 2016; Abbasbhai & Patel, 2020).

2.15.7 Productivity

Ofori-Kuragu et al. (2016) identified productivity as one of the key project performance indicators for construction project success in Ghana. Productivity is defined as the ability to convert input into output or a quantitative relationship between input and output (Bernold & AbouRizk, 2010). In construction, productivity is usually taken to mean labour productivity or efficiency, that is, output per hour worked (Ali et al., 1997).

2.15.8 Environmental Impact

Building operations and construction activities in general cause great damage to the environment, as well as natural resource depletion. Rapid urbanization and modernisation have increased the pressure of urban environmental development in Ghana. The urban natural environment is undoubtedly a crucial indicator of urban environmental sustainability. The natural environment refers to the environment formed by natural things, such as soil, water, and climate. According to Kylili et al. (2016), the environmental dimension consists of land use and ecology, water resources, noise and visual impact, energy performance, waste management, and material use. Aldairi and Tawalbeh (2017) proposed energy management, waste management, clean environment, and pollution control as the factors of a sustainable environmental assessment system.

2.16 Factors Militating Against Project Success in Ghana

In their study to identify the critical success factors for projects in Ghana, Ofori (2013) and Ofori-Kuragu (2014) found that the critical factors negatively affecting project success are:

i. Inadequate top management commitment and support

ii. Ineffective communication, coordination, and commitment of project teams

iii. Inadequate competent personnel

iv. Bureaucracy in public institutions

v. Delayed payment

vi. Inadequate consultation with project stakeholders

2.16.1 Top management commitment and support

Top management commitment and support refers to the willingness of top management to provide the necessary resources and authority for project success (Ofori. 2013). During the construction phase of a project, the site managers/supervisors need full support and commitment of the top management to make the necessary decisions to increase efficiency. This includes adequate funds, human engineering and material resources. In addition, the top management must offer training support to improve the construction team (Gunduz & Almuajebh, 2020). Ahmed (2016) also found that top management role of providing strong support, authority, finance, and resources to site/project managers have significant positive influence on project performance. According to Ofori (2013) and Ofori-Kuragu (2014) inadequacy of top management support and commitment is one of the critical factors negatively affecting project success in Ghana.

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2.16.2 Ineffective communication, coordination, and commitment of project teams

Communication in construction is vital to achieving a successful construction process from inception to completion. Good communication can improve teamwork leading to better project collaboration. However, poor communication can result in misunderstandings, delays, and project failure. Construction consists of many different elements. These include different roles, tasks and collaborations throughout the course of the project. Poor communication leads to mistakes and rework, which can waste many valuable resources, and ultimately affects project progress. Hence, well defined communication paths and workflows are so important in project delivery.

Coordination can be defined as "the process of managing dependencies among activities and linking together different parts to accomplish a collective set of tasks" (Malone & Crowston, 2009). Construction industry is recognised as highly fragmented. Effective coordination is therefore vital in construction projects delivery in order to achieve project success (Alaloul et al. 2016).

For the construction project to succeed, the construction organisation needs to be committed to achieving the stated objectives. The project team will need the support and engagement of top management to make resources available to achieve success. It will also need the commitment of other stakeholders outside the project team to engage in decision-making (Chang & Shen, 2014). Ofori (2013) found that inadequate communication, coordination and commitment among project team as well as lack of consultation with stakeholders negatively affect project success in Ghana.

2.16.3 Inadequate competent personnel

Mahsa et al. (2016) defined competency as the "underlying characteristics of an individual causally related to criterion-referenced effective and/or superior performance in a job or situation" and the clusters of skills, knowledge, abilities, and behaviours required

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for success. The knowledge areas of the project team are very vital to the success or failure of projects and an experienced site manager will possess particular uniqueness that will enhance the team performance and his planning, based on his project management skills (Mahsa et al., 2016). It is therefore, important that contractors be circumspect in the recruitment of project team members. Additionally, regular training of the project team members to upskill them of new technologies enhance their performance. In recent times, World Bank estimated a shortage of 60,000 skilled artisans and tradesmen in Ghana (Oxford Business Group, 2020).

2.16.4 Bureaucracy in public institutions

The construction industry in Ghana is heavily regulated by public institutions. Most public projects are facilitated by government departments and agencies at both national and local government level (Ofori-Kuragu, 2014; Wayem &Addo, 2015). Even private projects require government approvals before development commences. Numerous permits are often required. Where there are insufficient controls on how government officials behave, many visits are made before the final approval is obtained. This often makes it relatively easy for officials to extract bribes (Wayem & Addo, 2015).

2.16.5 Delayed Payment

Delayed payments of work done by clients on construction projects in the Ghanaian construction industry are considered to be a factor of significant concern (Ansah, 2011; Ofori-Kuragu, 2014). It causes severe cash-flow problems to contractors and this can have a devastating effect down the contractual payment chain (Ansah, 2011). This practice by clients, especially the government often compels contractors or sub-contractors to abandon projects or compromise quality. Delayed payment in construction projects delivery is a major factor that negatively affects project success in Ghana.

2.17 Conceptual Framework

Conceptual framework represents a visualized logical arrangement of relevant and related concept that displays how concepts are related and interconnected with each other in relation to the problem under study (Neuman, 2014). Conceptual framework of this study is based on resource-based theory. A resource-based theory contends that certain types of resources owned and controlled by firms have the potential and promise to generate competitive advantage and eventually superior firm performance (Barney, 1991).

From Figure 2.3, the OC has both direct (R2) and indirect (R3) effects on project performance. It further indicates that CMS mediates the relationship between OC and project performance. The linkages posit that project performance may occur through the effort of the implementation of CMS (R1). The OC also regulates the performance of the CMS. It is anticipated that the KPIs such as: client satisfaction, cost, time, quality, health and safety, productivity, employee satisfaction and environmental impact will also improve as a result of the effect of the OC on the CMS. There may however be key challenges constraining the effective implementation of the CMS. These challenges may limit both the performance of the CMS and the overall project performance. In situation where the performance of the CMSs outweighs the challenges, there will be improved overall performance. On the other hand, if the challenges overshadow the performance of the CMSs, there will be a decrease in the overall performance. This can also occur when the OC supporting the CMS is weak. It is proposed that strengthening of the OC or changing of existing OC into more suitable OC profile can minimise or overcome the existing organisational challenges; thus, improving the effectiveness of the implementation of the CMS and ultimately enhancing the performance.
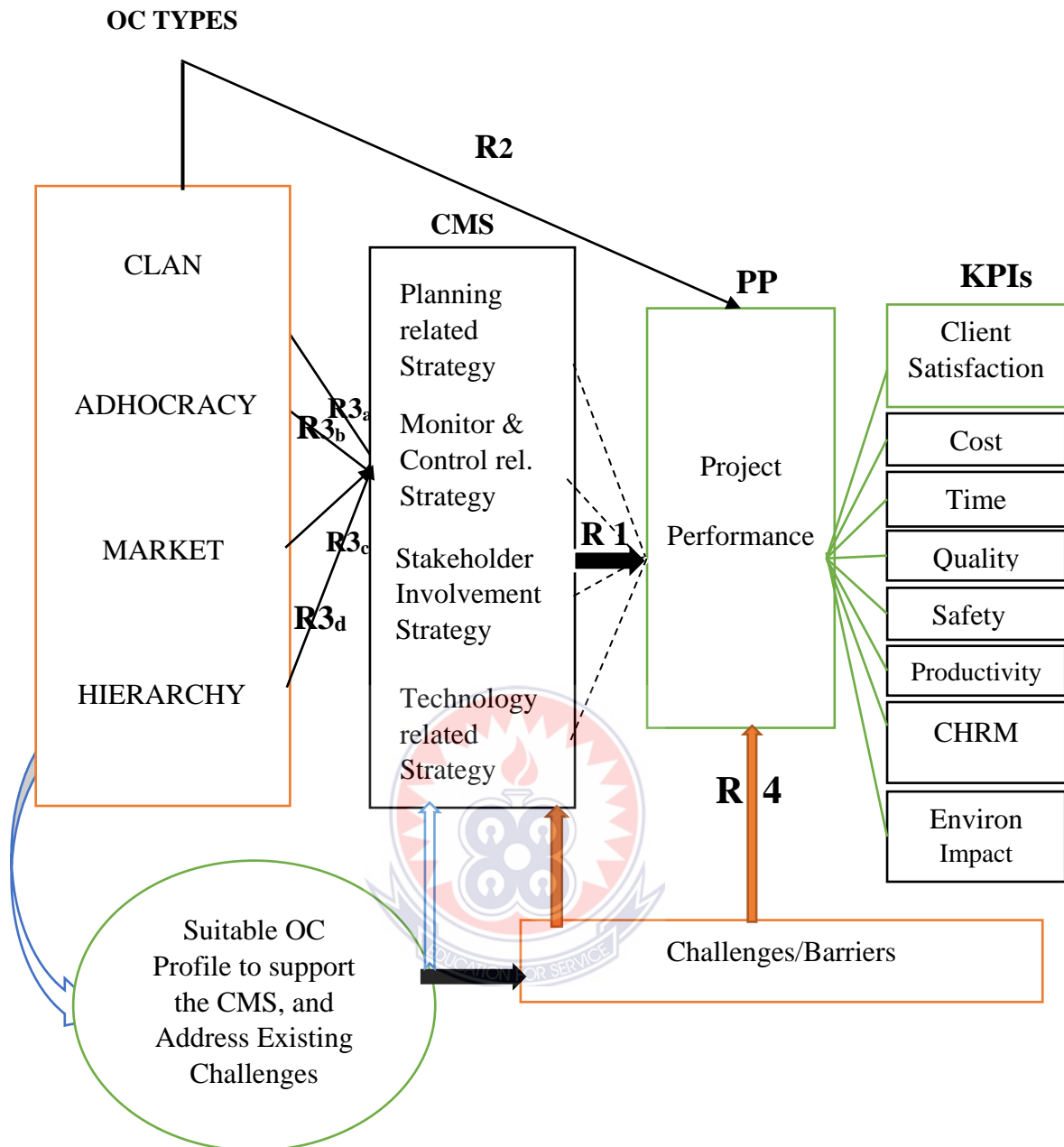
Figure 2.3: Conceptual framework: Based on Resource-Based Theory

Source: Author's Construct-2021

Keys
OC –   Organisational Culture
CMS –   Construction Management Strategy
PP -   Project Performance
KPI -   Key Performance Indicators
CHRM- Competency in Human Relationship Management

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2.18 Chapter Summary

This chapter has outlined the relationship between construction management strategies and project performance; organisational culture, strategy implementation and project performance in construction organisations. The chapter began by reviewing the socio-cultural life of Ghanaians, the Ghanaian economy, construction industry in Ghana, organisational structure, procurement methods in construction industry, and procurement system in Ghana. These were followed by the theories underpinning the study including resource-based view theory, theory of construction management (theory of planning, theory of execution, and theory of control), stakeholder theory, and CVF theory. Conceptual issues in construction project management were highlighted. Following that, organisational culture and CVF was introduced along with the four types of culture which make up its framework. The organisational culture in construction organisations was reviewed before focusing on related empirical studies on relationship between management strategies and project performance, organisational culture, strategy and performance relationship in the construction industry. Finally, the studies discussed the hypotheses developed on their relationships. It is widely believed that organisational culture has become more relevant to the concept of organisational effectiveness (Cameron and Quinn, 2011). Although the literature on management and organisation is divided on the concepts of culture and performance, the CVF brings a very solid theoretical basis into the culture-performance relationship, enabling researchers to posit that certain types of organisational culture are less or more likely to contribute to performance. There are few studies exploring the relationship between organisational culture and project performance variables in construction context. Therefore, as the CVF suggests, this study aims to extend the existing literature on the relationship among organisational culture, strategy and

construction project performance variable. The following gaps were identified in the literature on organisational culture-strategy-performance relationships.

i. Effects of CMSs on construction project performance is under explored.

ii. Mixed findings on the effects of OC types on project performance in construction setting.

iii. Mediating effects of strategy in the relationship between OC and project performance is under explored in construction setting. Prior studies had focused on manufacturing and service industries.

iv. There is scarcity of integrative model that links OC, strategy and project performance measures in one framework in the context of construction industry.

The chapter ends with a conceptual framework which serves as an embodied visualized blueprint of the study. In the next chapter, the chosen research methodology for this study is examined, and the research design, and method of data collection are presented in detail.
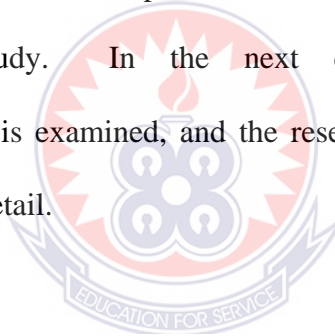
CHAPTER THREE

RESEARCH METHODOLOGY

This chapter outlines how the research work was carried out in order to meet the objectives of the study. The research philosophical paradigm is presented along with the specific choices of ontological, epistemological and methodological positions of the study. This philosophical consideration is followed by the research design adopted for the study. The chapter articulates how a mix-method facilitated the current investigation. The chapter continues with a description of how the study was conducted in terms of data collection and analysis, and concludes with the ethical considerations taken under this research study to comply with the University of Education, Winneba (UEW) Ethics Committee requirements.

3.1 Research Paradigm

The term paradigm is used to describe the basic belief system or world view of the researcher that guides his/her investigation (Mackenzie & Knipe, 2006). Chilisa and Kawulich (2012) indicate that the main philosophical paradigms influencing social science research are interpretivism, positivism and pragmatism. These paradigms serve as the basis for guiding the ontology, epistemology, methodology and methods of the research process.

3.1.1 Ontology

In research, ontology refers to the researcher's beliefs and perceptions about the nature of reality (Blaikie, 2010). It describes the nature of knowledge that is to be discovered. Ontological philosophy helps researchers to recognise the nature and existence of objects (or reality) they are researching. Saunders et al. (2019) suggest two fundamental ontological perspectives: objectivism and subjectivism. The objectivism perspective

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assumes that the social reality or phenomena exists independently from the researcher and others (referred to as social actors), while the subjectivism argues that social phenomena and their meanings are continually being created through the perceptions and actions of social actors.

In the current study, the researcher adopted an objectivist approach by considering that the phenomena being investigated exist separately from the researcher and the social actors. That is, the managers in the construction firms have a reality that exist independently from both the researcher and the managers' view and tend to be stable and patterning in character. Consequently, it is plausible to study them in the same way as a natural scientist would study.

3.1.2 Epistemology

Epistemology describes the philosophical positions related to relationship between the researcher and the knowledge to be discovered. Chia (2002) describes epistemology as the acquisition of the knowledge of reality through a set of methods and standards which satisfy certain standards of knowledge construction. The fundamental epistemological approaches most commonly applied in social science research are positivism, interpretivism and pragmatism (Saunders et al., 2019). Positivism is an epistemological stance that considers the social world as if it were a concrete, objective reality, in a way that laws can be found that explain this reality. Positivism, therefore, deals with credible data which can be observed and measured. Data collected in this way can produce law-like generalizations and frameworks (Saunders et al., 2019). Accordingly, Mertens (2005) considers that social science research can be elucidated by means of a cause-and-effect relationship in the same way as other scientific methodologies. To create this relationship, existing theories are applied in order to develop hypotheses.

Positivist epistemology considers theories as the paths along which systematic knowledge about the related issue can travel, and that hypotheses derived from the theories should be either confirmed or disconfirmed to better understand the knowledge of reality and the logic underlying it (Saunders et al., 2019). Furthermore, positivism underscores the idea of explaining important social phenomena by testing the relationships among and between them. This process is value-free, detached, neutral and independent of the researcher, and testable in different environments (Creswell, 2013; Saunders et al., 2019.

The main epistemological question underlying positivism is whether a hypothesised relationship in one research remains applicable when studying it in a different context. In the positivist paradigm, experiments, quasi-experiments and surveys are the most typical types of research strategies; while the instruments used for data gathering include; questionnaires, test and observations (Chilisa, & Kawulich, 2012; Saunders et al., 2019). Positivist analyse data mainly in descriptive and inferential statistics (Scotland, 2012). Advantages of positivism include the prospect to predict or test the strength of the relationship between variables and produce findings that are generalisable, replicable and verifiable. It also facilitates the confirmation or disconfirmation of previous empirical results and axiology for value free findings (Chilisa & Kawulich, 2012). The failure to ascertain the deeper meanings and explanations of social reality is a major limitation of the positivist paradigm (Rahman, 2017).

Interpretivism (or social constructionism) is another epistemological approach that describes the reality and the meaning of individual's behavior. Unlike the positivist perspective, interpretivism considers the importance of human interaction and its role in the research. According to business and management scholars, researchers using the interpretivist or social constructionist perspective obtain knowledge through human experiences or personal interaction with respondents (Chilisa & Kawulich, 2012; Saunders

et al., 2019). In this sense, researchers explore the meanings constructed by participant's different perspectives in order to gain deeper insights and greater understanding of a particular issue (Creswell, 2013). Unlike positivist analysis, interpretivist does not apply theory initially, producing theories instead from the results obtained.

Methodologically, interpretivists espouse a qualitative approach and adopt study strategies such as ethnography, action research and case study inquiries to studying social phenomena (Thomas, 2004; Saunders et al., 2019). The methods interpretivists mainly employ to gather data include interviews, documents, informal conversations, focus group discussion, observations, visual aids, artifact and photographs (Chilisa & Kawulich, 2012; Saunders et al., 2019). The obvious demerits of this paradigm encompass the limited focus for generalisability, and the inability to uphold optimal objectivity (Silverman, 2010; Rahman, 2017).

On the other hand, pragmatism considers that prioritizing epistemological and ontological positions over what the research exactly questions is meaningless in practice (Guba & Lincoln, 1994). The most important element of pragmatist research is to adopt approaches or methods which can help to answer the research question best. The research philosophy is employed as a continuum rather than opposite positions (Genc, 2017). Hence the pragmatist view refuses to embrace any specific philosophical position in determining research methods; instead, it concerns itself with offering practical and useful solutions to problems examined under specific circumstances in unique situations (Mertens, 2005; Creswell, 2013).

3.1.3 Epistemological Stance of the Study

Considering the three philosophical perspectives- positivism, interpretivism and pragmatism, this study seems to situate more with the standpoints of positivism. Firstly, this choice has been informed by the current study's focused on exploring relationships

between a set of conceptualised variables under a suitable theoretical basis. The current study investigates the relationships between management concepts, namely; organisational culture types, construction management strategies, and project performance. The study undertakes this examination employing resource-based view theory, theory of construction management, CVF theory, and stakeholder theory.

Secondly, research findings derived through positivist modes of investigation can reveal contradictions between the theories applied and hypotheses constructed in the study. This procedure offers a better opportunity to test the hypotheses developed. Thirdly, the positivist paradigm minimises any human contamination of its comprehension which can occur in the research process, as well as any bias on the part of the researcher, by defining and reducing organisational and social issues to more simplified descriptions (on numerical or hypothetical levels).

Fourthly, since the study examines the perceptions of senior site managers of their organisational culture, project management strategies as well as their project performance which might be considered as sensitive organisational and personal information, it is thought that less interaction between researcher and respondents could generate more reliable results. Finally, as positivistic epistemology allows theories and models to be tested in different settings, its application to this research would enable establishment of generalisable knowledge that could also be applicable in a wider context. This philosophical paradigm is also vital for the study because some of the earlier related empirical studies adopted it (Genc, 2017).

By choosing positivist epistemology, this study deviates from the other alternative epistemological approaches already explained (interpretivism, and pragmatism), Interpretivism mainly regards phenomena subjectively from the perspective of the researcher, and the associate's issues with a certain socio-cultural context with no aim of

generalising the study results. This epistemology allows development of new theories instead of testing existing ones by determining a range of hypotheses. However, the current research standpoint does not conform to the interpretivist approach because it aims to produce research results that are free from any bias or subjectivity as well as testing established theories and models concerning the related concepts.

In addition, interpretivist epistemology is more appropriate with research that aims to make an in-depth analysis of a smaller population, unlike the current study which intends to investigate a larger population across a wider area (ten regions of Ghana). Therefore, compared to interpretivism, positivism is more appropriate with the objectives of this research.

Lastly, the pragmatist approach does not necessarily prioritize one epistemological approach over others. Pragmatism encourages researchers to analyse organisational practices through experience as well as action (Kelemen & Rumens, 2008). However, this study is more focused on exploring existing relationships between concepts within the organisations.

3.2 Research Method

Research method describes the selection and use of a given method of data collection and analysis based on the researcher's ontological and epistemological viewpoint (Crotty, 1998; Marczyk et al., 2005). There are variety of research strategies that exist in business and management research. These include: quantitative, qualitative, and mixed-methods (Creswell, 2013).

3.2.1 Quantitative Research Method

Quantitative research method is based on the principles and practices of the natural sciences and therefore relies on the assumption of an objectivist ontology and positivist epistemology. According to Creswell (2013), quantitative research generally involves the collection and analysis of numerical or quantifiable data using statistical procedures and analysis with an aim to determine the truth or otherwise of hypotheses or theory by employing the principles of deductive reasoning. Thus, the method is important in developing generalisations that contribute to theory. The research hypotheses and or objectives may often be grounded in a theoretical framework based on past studies on the topic.

Quantitative research is generally based on two research methods namely survey research and experimentation (Saunders et al., 2019). Survey research involves either interviewing or administering questionnaires to samples of research respondents selected by means of sampling procedures from a defined population in which the phenomenon of interests occurs. In experimentation, observations of the phenomenon of interest occur under deliberately controlled conditions produced by the researcher.

Generally, quantitative methods employ standardized methods which allow for a high level of objectivity, reliability, validity and ease of replication of studies. The method provides descriptive information about the phenomenon that is being studied.

Creswell (2013) have pointed out the usefulness and limitations of quantitative methods in providing knowledge. In terms of usefulness, it is appropriate for large population, provide efficient data analyses, investigates relationships within data, and controls bias. Quantitative methodology however, has limitations in providing causal explanations. It can only offer statistical associations between variables. It may yield a

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relation such as variable X is associated with Y or the occurrence of X predicts the likelihood of Y occurring, but cannot explain why such associations occur.

3.2.2 Qualitative Research Method

In contrast to quantitative research method, qualitative research method mostly emphasises meanings, understandings and opinions about the world around them rather over numerical data (Sarantakos, 2005). It rejects the practices and principles of the natural scientific model and emphasises the interpretation of social world from a viewpoint of subjectivist ontology and interpretivist epistemology (Bryman & Bell, 2011).

Creswell (2013) highlights that qualitative methodology allows the researcher to rely on the views of respondents ask general questions, do data collection that consists of words of respondents and analyse the data. An important advantage of qualitative methodology is that it allows the investigator to interact with the research subjects in their language and on their own terms (Kheni, 2008). It also enables the researcher to obtain in-depth information from the respondents.

Qualitative research method is normally done on a limited scale, it may for instance, focus on a small number of individuals in a particular locality. It is argued by some authors that the inability to conduct qualitative research on larger scale limits the generalisability of findings to other settings (Bryman, 2004). It is therefore, difficult to replicate qualitative research.

3.2.3 Mixed-Methods Research

Mixed-method research is a research approach whereby researchers collect and analyse both quantitative (e.g., experiments, surveys) and qualitative (e.g., focus groups, interviews, observation) data, allowing investigation from both the inductive and deductive perspectives in a single study to address the research problem. Such research

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method benefits from the advantages associated with both quantitative and qualitative strategies, while at the same time compensates for any inherent weaknesses in each approach (Creswell, 2015; Saunders et al., 2016).

This study used mixed methods. However, quantitative method was the main stay of the study. The qualitative data (semi-structured interview) was used mainly to validate the framework developed. This methodology is deemed suitable for this study for several reasons. Firstly, the current study applies resourced-based theory, CVF theory, theory of construction management and stakeholder theory. In this direction, a quantitative approach is appropriate in order to test theories and models in order to reach generalised conclusions. Secondly, the quantitative data was used to analyse how organisational culture types and construction management strategy implementation influence project performance. While outcomes gathered from the quantitative investigation provide a generic picture of the research problem, the respondents for the second stage of the investigation were chosen specifically to validate the developed framework.
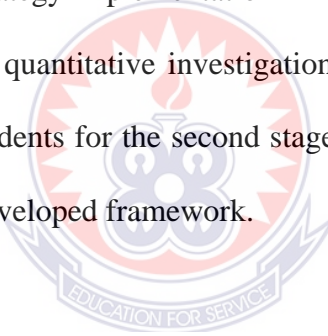
3.2.4 The Positivist Stance in Mixed-Methods Methodology

There are different world views determining the ontological and epistemological positions of mixed methods research (Creswell, 2015). The single paradigm approach (also called the alternate paradigm stance) argues that quantitative and qualitative methodologies can fit under a single paradigm in a study (Creswell, 2015; Genc, 2017). In such a situation, a study either mainly uses quantitative methodology (based on a positivist world view), or applies a qualitative one (grounded in social constructionism). It is also possible not to consider paradigms at all, or consider a multiple paradigm approach that applies more than one paradigm.

Hall (2008) argues that the single paradigm approach is the most defensible one, as it enables researchers to mix different methodologies under the heading of a single paradigm. The current study applies this single paradigm approach by combining quantitative and qualitative methodologies under the positivist paradigm. Although positivism is more strongly associated with quantitative methodology, this does not mean that it rejects the application of qualitative methodology entirely. It is often used as a complementary viewpoint to elucidate issues that the quantitative analysis has failed to explain (Creswell, 2015). Since mixed-method methodology within positivism is now a well-recognised way of conducting research into management studies (Jogulu & Pansiri, 2011; Willar, 2012; Ofori-Kuragu, 2014; Genc, 2017), it can form an appropriate standpoint for this study.

Greene et al. (1989) propose five main types of mixed methods research design: triangulation, complementarity, development, initiation and expansion. Triangulation studies aim to direct different methods onto a study in order to strengthen the results. Complementarity studies apply a second type of method in order to help elucidate, illustrate and elaborate the results that were collected using an initial methodological approach. In development studies, the first method is employed to assist and develop the formulation and direction of the second method. Initiation studies aim to explore something which is unknown, paradoxical or uses novel perspectives by reshaping questions or forming conclusions around a question. Lastly, expansion studies extend the scope and type of an investigation by applying a variety of methods to different elements of the investigation. This study follows a complementarity approach. The semi-structured interview validation was used to complement the results of the questionnaire data

3.3 Research Approach

Research approach is the procedure for collecting, analysing, interpreting, and reporting data in research studies that allows research objectives to be achieved in an optimum way (Creswell, 2015; Wilson, 2010). The first issue concerning research is to determine the nature of the relationship between theory and the research. There are two main approaches to this: deductive and inductive (Gill & Johnson, 2002). The deductive approach demands the development of a theoretical and conceptual framework prior to its empirical evaluation. The approach mainly involves developing hypotheses based on available theory before moving on to determine a research strategy to test the hypothesis. Deductive reasoning aims to approve or reject causal relationships between variables (Gill & Johnson, 2002). Lastly, this approach is based on scientific principles, which assert that the researcher should be independent of the research undertaken (Saunders et al., 2019).

Inductive approaches, on the other hand, are more concerned with collecting data and developing a theory from the data analysed. In contrast to the deductive approach, theory is proposed towards the end of the research process as a result of observations. This perspective may also be more applicable in situations where access to data is constrained or where there is insufficient previous knowledge in the research area (Saunders et al., 2019). This current study follows a deductive approach, because there is enough theory and related literature to develop and test research hypotheses; also, the researcher is independent of the research undertaken.

Another important aspect of mixed methods research design is determining the order and the priority of the methodologies. Johnson and Onwuegbuzie (2004) claim that there are two ways in terms of ordering the implementation of the methodologies: sequential and simultaneous. A sequential study design allows the researcher to perform methodologies one by one. In a simultaneous design, all methodologies used in the study

are implemented concurrently. As far as the priority of implementing the methodologies is concerned, equal priority can be given to quantitative and qualitative approaches or it can be quantitative-dominant (QUAN, qual), or qualitative dominant (quan, QUAL) (Molina-Azorin, 2012). In order to define these design elements more fully, there are frameworks available to document the methodologies used in a mixed method design. Morse (1991) set out the most popular typology, whereby the dominant methodology is identified by capital letters (QUAN or QUAL) and that the complementary methodology is set in lowercase (quan or qual), depending upon the study design. In addition, while the plus '+' symbol indicates the methodologies adopted for the study are performed simultaneously, the arrow symbol '-> 'shows that the methodologies are implemented respectively.

In terms of mixed methods design classification, one of the models presented by Creswell (2015) identifies three basic research designs: convergent, explanatory sequential and exploratory sequential. The convergent design involves the separate collection and analysis of quantitative and qualitative data. The intent is to merge the results of analyses of both types of data. The explanatory sequential design aims to begin with a quantitative strand and then conduct a second qualitative strand to explain or expand upon the initial quantitative results. The exploratory design also sets out to explore a problem through qualitative data collection and analysis, then develops an instrument or an intervention and follows this with a quantitative phase.

The current study employed a sequential explanatory mixed method research design. The main methodology—the numerical data collection and analysis—was performed first, and then qualitative data collection and analysis was undertaken subsequently to validate the quantitative findings acquired during the first stage of the research. As this study tested related theories and framework, it applied quantitative

methodology to test and generalise the results. Once a generic view on the research problem had been presented through quantitative analysis, additional data collection and analysis was undertaken to complement the quantitative findings by using semi-structured interview.

There are two ways of implementing research in terms of time orientation; these are longitudinal and cross-sectional design. Longitudinal study collect data on at least more than one occasion, while cross sectional study involves collection of data on one occasion (Bryman, 2012). The present study used a cross-sectional design because the variables were collected simultaneously. Cross-sectional design was chosen based on the reasons postulated by Levin (2006) and Genc (2017):

i.   Its data collection is cost effective and less time consuming.

ii.   Provides room to test hypothesised relationship between variables on a specific subject.

iii. It is the most frequently applied time orientation research design in construction organisations.
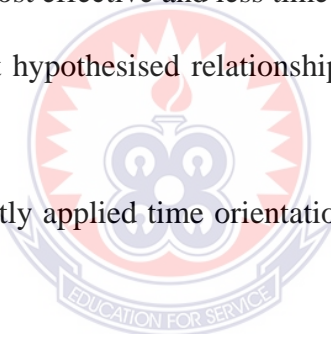
3.4 Target Population of the Study

The constituent members making up the population for the Ghanaian construction industry includes the clients, contractors, consultants and other stakeholders. The domestic contractors in Ghana belong to one of two associations; the Association of Road Contractors of Ghana and the Association Building and Civil Engineering Contractors of Ghana. The contractors registered with the Association of Building and Civil Engineering Contractors of Ghana (ABCECG) were the focus of the study and the population as well because ABCECG has memberships from different construction firms across the country and also serves as a merging point of construction contractors from different firms (Atuahene, 2016). Contractors were chosen for the study because they are implementers

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of the abstract ideas of the client. Association of Building and Civil Engineering Contractors of Ghana is a recognised body with a finite population size.

To reduce high level of variability, only D1K1 (large-scale) and D2K2 (medium-scale) contractors were selected. This is because the characteristics of D1K1 and D2K2 contractors are distinct from those of D3K3 and D4K4 (Atuahene, 2016). Also, the large and medium-scale contractors have professional expertise who can speak on the themes of this research (Tengan et al., 2014).

3.5 Sampling Frame

The study drew its sampling frame from the registered list of contractors kept by Association of Building and Civil Engineering Contractors of Ghana (ABCECG). According to the ABCECG secretariat, the total number of D1K1 and D2K2 construction companies (active members) in their ten administrative regions; Greater Accra, Ashanti, Eastern, Volta, Brong Ahafo, Northern, Central, Upper East, Upper West and Western regions registered with the association in 2021 was 607. Table 3.1 shows the details of the sample frame.

Table 3.1: Contractors in the selected Regions

S/N	Region	Number
1	Greater Accra	120
2	Ashanti	75
3	Volta	65
4	Upper West	65
5	Central	55
6	Eastern	52
7	Brong Ahafo	50
8	Northern	38
9	Upper East	57
10	Western	30
Total		**607**

Source: ABCECG Secretariate (February, 2021)

3.6 Sample Size Determination

The sample size for a survey has to be large enough to enable the researcher to identify statistically significant and meaningful results (Genc, 2017). Given that the number of construction companies was a little above 600, the entire population was used (census sampling) (Israel, 2009). However, 43 of the contractors declined to participate when contacted; hence, the total sample size of large and medium-scale contractors used was = 564

3.7 Questionnaire Respondents

The target respondents of this study were senior most site managers in each company. In the construction industry, site managers, often referred to as construction managers, are responsible for the day-to-day on site running of a construction project. They are responsible for the implementation of their firm's quality policies to achieve project success. With their managerial capacity, they are more likely to have exposure and better understanding of their organisational culture issues; thus, presumed can give relevant responses for the study. Table 3.2 shows the details of the sampled contractors in the selected regions.

Table 3.2: Selected Contractors

Region	Population	Site Managers
Greater Accra	120	117
Ashanti	75	73
Volta	65	63
Eastern	52	52
Central	55	54
Brong Ahafo	50	48
Northern	38	38
Upper East	57	35
Upper West	65	55
Western	30	29
Total	**607**	**564**

3.8 Data Collection Methods

3.8.1 Questionnaire Survey

The most commonly applied quantitative data collection method used in the social sciences is the survey. A survey is a research method used for data collection from a sample of individuals through their responses to questions to gain information and insights into various topics of interest (Check & Schutt, 2012). Survey data may be collected employing a number of techniques; telephone interviews, face-to-face interviews, postal, and electronic questionnaires.

In view of the COVID 19 pandemic social-distance-protocols, electronic questionnaire was deemed feasible option for the present study. Electronic questionnaire was designed using google form to collect data on organisational culture, construction management strategies, project performance, and barriers affecting project success in the large and medium-scale construction companies within the constraints of time.

3.8.2 Data Collection Instrument

Questionnaire was the main data collection tool. Questionnaire was considered to be the most suitable method of data collection instrument for the objectives of the current research, which investigates relationships among variables. Questionnaire was chosen based on the reasons postulated by the following authors (Denscombe, 2010; Saunders et al., 2016; Atuahene, 2016):

i. The number of contractors for the study: approximately 564 contractors participated in the study and the questionnaire serves the purpose of reaching them within the time frame of the study.

ii. Ability of the respondents to read and understand the contents of the questions: the language of communication was purely English and the surveyed firms accept the

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language as the official form of transacting business. Also, the targeted respondents (site managers) are highly literate.

iii. The required data are standardized: the information solicited from the respondents were closed ended which did not require the presence of or interference from the researcher in answering the questions, which in turn helps to preserve the objectivity of the study.

3.8.3 Format of the Questionnaire

The key constructs in the conceptual framework are Clan culture, Adhocracy culture, Hierarchy culture, Market culture, CMS elements, and Project performance outcome. Since the current study dealt with associations between variables, it is thought that closed questions are better suited to the nature of this research. Closed-ended questions are easier to answer, code, analyse, and also show the relationship between variables more straightforwardly (Bryman & Bell, 2011).

A six-page closed-ended questionnaire was designed for the study which was below the maximum of eight accepted to be the optimum for questionnaire (Naoum, 1998). A five-point Likert scale was used in order to offer respondents a wide range of answers. The questionnaire was divided into five sections (A, B, C, D and E) (see Appendix A). The section A requested for the demographic information of the respondents and the substantive organisation. Respondents were asked to indicate their years employed by the company. This gave an indication of the respondents' experience with their organisations. The next question asked respondents to indicate their academic qualification. This gave an indication of the calibre of human resources in the company. The respondents were also asked to indicate the number of years their companies have been operating. This question gave an indication of the experience the surveyed companies have in the Ghanaian construction industry; and their company classification (large-scale or medium scale).

Section B solicited information on the Competing Value Framework instrument developed by Cameron and Quinn (2011) and adapted by Atuahene (2016). Apparently, the only difference between the original OCAI and the designed one by Atuahene was how culture was measured. According to Atuahene the Likert scale approach is simpler and easier than the allocation of values to the various dimensions. The labels for the organisational culture ranged from "strongly disagree" to "strongly agree" for 1 to 5 size calibration.

Section C solicited information on the level of implementation of the construction management strategies in their companies; using a Likert scale of 1 to 5, where 1 meant "very low" and 5 meant "very high". Section D solicited information on project performance outcome of the large and medium-scale contractors in Ghana, using a Likert scale of 1 to 5 (1 very low and 5 very high). The last section (E) solicited information on the major difficulties affecting the project success of the respondent firms using a Likert scale of 1 to 5 (1 very low and 5 very high).
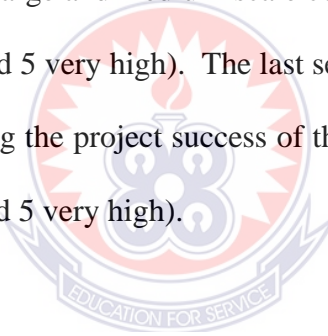
3.8.4 Preliminary Study

A working relationship was first established with the selected companies through their contact numbers from ABCECG secretariat (Accra) with the help of the national president and the administrative secretary. Names of the respondents and their phone numbers were obtained from their companies' CEOs after explaining to them regarding the purpose of the survey. By contacting the companies' CEOs by telephone first, the researcher was able to ensure that the survey was e-mailed to the appropriate persons. The respondents were first contacted on phone before sending the questionnaire to them through google form link via WhatsApp.

3.8.5 Pilot-testing of the main Questionnaire

A pilot test is a study that involves a small-size investigation or trial of the materials and methods adopted to achieve the aim of the study (Willar, 2012; Genc, 2017). The purpose of the pilot test was to test the designed survey in terms of its clarity, time taken to answer all of the questions and the comprehension of respondents regarding language and concepts. The pilot-testing of the questionnaire consisted of two phases, the first phase involved administration of the pre-questionnaire, and the second phase involved the conduct of a follow-up feedback interview in relation to pilot survey respondents' thoughts. The pilot respondents were asked whether they understood the instructions for completing the survey, and the average time required to complete the questionnaire, as it was acknowledged that if it would take a long time for the respondents to complete, they might be reluctant to participate and this would have a negative impact on collection numbers and nature of responses. The efficient and effective way for the distribution and collecting of the questionnaire were also emphasised in the follow-up feedback interview.

According to Fink (2009), for pilot testing to be effective, the respondents need to be similar to those who would form the sample population in the main survey. Hence, the respondents to this pilot questionnaire were drawn from four large-scale construction firms and six medium-scale firms in Central region. Fink (2009) asserts that for most small projects the minimum number for a pilot is 10 percent of the sample projected for the larger parent study and for large projects between 100 and 200 responses is usual. Fifteen site managers and forty gang leaders participated in the pilot survey. The pilot test was conducted in June, 2021 (from 12th to 28th June). The researcher personally delivered the pilot questionnaire to the respondents. All COVID 19 protocols were duly observed. A follow-up phone interviews were conducted to improve the clarity and reduce any ambiguity of the questions. The following lessons were learnt from the pilot survey:

i. Forty-six out of the fifty-five respondents indicated that the content of the questionnaire was clear and understandable.

ii. All the respondents indicated that the questionnaire covered the essential elements relating to construction management strategies, project performance, and barriers affecting construction companies.

iii. All the instructions were thought to be well-developed and were understood, except that of the organisational culture. Nine of the pilot respondents experienced some confusion regarding the instruction asking them to assess their organisational culture using ipsative scale. Therefore, this component of the questionnaire was re-scaled to Likert scale. No changes were made on the layout of the questionnaire, as all the pilot respondents indicated that it was clear.

iv. Construction managers usually have time constraints; hence, the pilot respondents recommended the questionnaire be sent to respondents through google form link via WhatsApp so that respondents can easily access the information with their mobile phones. This, they anticipated could enhance the response rate.

3.8.6 Administration of the Main Questionnaire Survey

In quantitative studies, paper-based survey instruments or electronic survey instruments are generally used for data collection (Al-Jalahma, 2013). Data obtained through paper-based surveys can be collected through personal interviews, telephone interviews or by sending the survey questionnaire through postal mail. Electronic surveys are commonly administered through google form link via WhatsApp or through email. In this research, an electronic survey method was selected and the survey questionnaire was administered to respondents through google form link via WhatsApp. This mode of questionnaire distribution was deemed appropriate in view of the COVID 19 pandemic-social-distance protocols as recommended by the pilot respondents.

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The google form link via WhatsApp used for the distribution provided significant advantages in terms of: convenience and ease of data collection, low financial resource implications, instant access to large respondents irrespective of their geographical location. Also, the data was directly loaded in the data analysis software, thus saving time and resources associated with the data entry process. Nevertheless, the choice of google form link via WhatsApp has limitations. One of the limitations of this technique is the lack of control over who actually completed the survey. Another limitation to this method concerns social desirability bias (respondents' frankness), which results in difficulty to get truthful answers, especially if questions are perceived as somewhat sensitive to the respondent. As an attempt to minimize these weaknesses, the researcher assured anonymity to every individual participating in the study. Also, the researcher used internal validity (PCA and CFA), external validation and reliability (Cronbach alpha) to establish the credibility of the data.
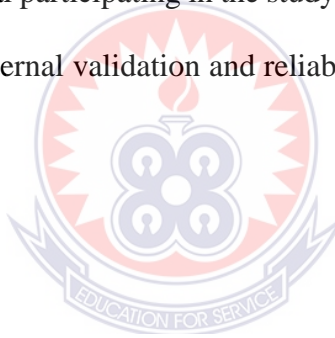
3.9 Data Processing

Prior to analysis, some preliminary data processing was conducted to ensure reliability. The data processing covered, 1) the profile of the respondents (to determine that the targeted sample is attained); 2) screening of the data by identifying and treating the missing values and outliers, and assessment of the normality of distributions, all of which are required prior to conducting factor analysis (Hair et al., 2010); and 3) establishing the validity and reliability of the survey instrument to evaluate how accurately the questionnaire used really measures the concept being studied and how consistently it can produce the same end result. The data was screened using IBM SPSS AMOS version 23 software.

3.9.1 Non-Response Bias

To deal with non-response bias, Gambi et al. (2015) and Genc (2017) suggest that responses of early respondents to the questionnaire be compared to the responses of late respondents, where late respondents are used to represent non-respondents. The first 10 % of the respondents were considered as early respondents while the last 10 % were considered as late respondents as prescribed by Genc (2017). T-test was performed in order to find out if there was any significant difference between the responses of these two groups. The analyses showed no significant differences between the groups ($p > 0.05$). Hence, non-response bias may not be a problem for this research.

3.9.2 Screening the Missing Data

Missing data most likely occurs when respondents are unsuccessful in answering some of the questions. Hair et al. (2010) indicate that missing data can cause a significant problem with the reliability and validity of the study outcomes. The screening of the data set for missing values was conducted utilizing the missing value analyses (MVA). The incomplete cases were deleted because they were very few.

3.9.3 Screening the Outliers

Outlier is a case with a considerably higher or lower score than most of the other observations (Sheskin, 2010). The presence of outlier can alter significantly the value of both mean and variance of a distribution, thus impacting on the accuracy of the statistics. Box-plot was used to check the problem of outliers. Data obtained did not have outlier problems.

3.10 Data Analysis

The quantitative data collected from the questionnaire survey were analyzed and interpreted by using IBM SPSS AMOS 23. This software tool allows data from SPSS analysis set to be directly used in the AMOS calculation (Byrne, 2010).

3.11 Descriptive Statistical Analysis

A descriptive statistical analysis of frequency distribution (numbers and percentages) was first undertaken to provide characteristics of the respondents and the firms. Mean and standard deviation were utilised to depict the levels of adoption of the construction management strategy, project performance, challenges (barriers) that affect project success, as well as the cultural profiles of the respondents' companies. While the mean shows the central tendency of the data, the standard deviation measures the dispersion which offers an index of the spread or variability in the data (Sekaran & Bougie, 2013). In other words, a small standard deviation for a set of values reveals that these values are clustered closely about the mean or located close to it; a large standard deviation indicates the opposite.

The level of adoption of each item was determined using Saeed and Hasan (2012) formula: (highest point in Likert scale − lowest point in Likert scale)/the number of the levels used $= \frac{5-1}{5} = 0.80$, where 1-1.80 reflected by "very low", 1.81 - 2.60 reflected by "low", 2.61-3.40 reflected by "moderate/average", 3.41 - 4.20 reflected by "high", and 4.21 - 5 reflected by "very high".

3.12. Checking the Normality Distribution

The normality of the data was examined on two components, skewness and kurtosis and comparing them with the 'rule of thumb values' of ±2 for Skewness and ±7 for kurtosis (Hair et al., 2010). Skewness is a measure of distortion or symmetry that deviates from the normal distribution in a set of data; whereas kurtosis is a statistical measure used to describe the degree to which scores cluster in the tails or the peak of a frequency distribution. The values of skewness ranged from −1.018 to − 0.604 and were thus inside the threshold, which indicated that the respondents answered the questions similarly. The kurtosis values ranged from −1.595 to + 0.420, again falling within the recommendation range as shown in Table 3.3. This result suggests that the distribution of the data used in this study can be considered normal.

Table 3.3: Normality Distribution of the Data

Variables	N	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
AC	375	-0.392	0.126	-1.573	0.251
HC	375	-1.018	0.126	0.420	0.251
MC	375	-0.355	0.126	-1.595	0.251
CC	375	-0.576	0.126	-0.798	0.251
CMS	375	-0.604	0.126	-0.808	0.251
PP	375	-0.588	0.126	-1.069	0.251
Valid N (listwise)	375				

3.13 Validity and Reliability of the Questionnaire

The measure of the organisational culture-profile (Section B) adopted the OCAI model by Cameron and Quinn (2011), which has been used across a range of cases previously. The sizes used to measure the organisational culture are reflective sizes, in that the items in each size reflect an underlying latent factor (Podsakoff et al., 2003; Stock et al., 2007). Each of the culture orientations therefore is an unobservable factor that gives rise to the indicators that are observed. Because they are reflective indicators, a

confirmatory factor analysis model also referred to as SEM-Measurement model is used with the culture-related questionnaire items to test the relationship between the observed and unobserved variables.

The elements of construction management strategy, project performance, and the barriers to project performance can be considered to be formative indicators, in that they are elements that form the underlying construct. All of the three construct measures were based on existing literature, and adjusted within the context of this study. Therefore, there was a need to assess the validity and reliability of these measures. The validity of the measures conducted included face and content validity. Content validity is an evaluation of the extent a measure can represent the theoretical basis of a construct (Woods & Carmines, 2004).

3.13.1 Validity of the Questionnaire

Before obtaining the final questionnaires used in the research, draft questionnaires were edited by project management experts (two academic researchers) to ascertain their effectiveness and applicability with regard to the current study. To further strengthen the validity, the construct validity of the items was gauged using correlation matrix and factor analysis (confirmatory factor analysis, and principal component analysis). In order to verify that each measure represents only one construct, a test of discriminant validity was further performed by comparing the bivariate correlations and the reliability coefficients. An instrument has discriminant validity if the bivariate correlations are smaller than the reliability coefficients (Kaynak, 2003; Gambi et al., 2015).

3.13.2 Reliability of the Questionnaire

Reliability is defined as the degree of consistency of a measure to produce the same result, if duplicated under similar conditions (Robinson, 2008). The reliability test was conducted using Cronbach's alpha, which provides 'a lower-bound estimate' of reliability more accurate than other estimation methods (Multon & Coleman, 2010). Nunnally (1978) asserts that the acceptable level of Cronbach's alpha is 0.70 or greater. Multon and Coleman (2010), provide a guideline for interpreting the value of Cronbach 's alphas, as follows:

    i.   0.90 or above = "high" reliability;

    ii.   0.80 to 0.89 = "very good"; and

    iii.   0.70 to 0.79. = "good" or "adequate".

Robinson (2008) indicates that Cronbach's alpha is closely related to the correlation between items, so, R^2 (the squared multiple correlation) can be employed to assess whether an individual item should be retained in a size. The larger R^2 value indicates that the item is contributing more to internal consistency. The reliability test at this stage functioned as the first screening to remove the unreliable items that may not proceed onto the next analysis.

3.13.3 One-Way Analysis of Variance

One-way Analysis of variance (ANOVA) was conducted to statistically test whether different profiles of organisational culture variables have different influence on the construction management strategy variable. The parametric test used in this study was assessed to fulfill the three main conditions noted by Bryman and Cramer (2009), these being the:

    i.   size of measurement be treated as interval size

    ii.   distribution of the data is normal; and

iii.   assumption of homogeneity of variance and multicollinearity is not violated.

Cameron and Quinn (2011) suggest that the interpretative OC-profile should be associated with the aim/ the objectives of the study. In this research, identification of the existing and the suitable organisational culture-profile dimensions is aimed to determine whether an adjustment of organisational culture-profile to a suitable profile is required to improve the effectiveness of the construction management strategy and ultimately the project performance.

3.13.4 Pearson Correlation and Regression Analysis

Pearson Correlation was used to statistically assess the associations between construction management strategy variables and project performance variable, including the combined effect. This statistical tool is typically used to assess the strength and direction of linear relationship between two or more continuous variables (Allen & Bennett, 2010). It was also used alongside the Cronbach alpha for discriminant analysis of the variables. Regression analysis was conducted to investigate the effects of organisational culture types on construction management strategy implementation; project performance; and the mediating effects of construction management strategy on the association between organisational culture and project performance.

3.14 Framework Validation

The framework developed was validated using both survey questionnaire and semi-structured interview.

3.14.1 Validation Questionnaire

The validation questionnaire (see Appendix C) consists of four main sections, which examine how:

i.   CMS - dimensions can actually impact the overall project performance

ii. Organisational culture - profile changes can impact the effectiveness of CMS implementation

iii. The set of (OC & CMS) framework can actually impact the overall project performance

iv. The set of (OC & CMS) framework can actually address the existing barriers

3.14.2 Respondents for the Validation Questionnaire

To validate research outcomes, Ahadzie (2007) recommends getting experts comments on relevant aspects of the research. This approach to validation is used in Agbodjah (2008) and Ofori-Kuragu (2014) where review meetings are held with experts to validate research outcomes. Agbodjah (2008) used a panel of twelve experts comprising eight industry professionals and trade associations and four academics while Ofori-Kuragu (2014) used ten experts including contractors, consultants, and academics researchers drawn from the construction industry.

In line with Agbodjah (2008) and Ofori-Kuragu (2014), twelve Ghanaian construction experts were used for the external questionnaire validation. These included ten site managers and two academic researchers (Senior Lecturers) that did not participate in the main survey. All the ten site managers had a minimum of ten years' working experience in the Ghanaian construction industry. Therefore, it is presumed that they provided more significant feedback to refine the organisational culture-based framework.

3.15 Semi-structured Interview

Semi-structured interview (face-to-face) using interview guide (see Appendix C) was used at this stage of the study to complement the questionnaire data. Data saturation principle was used to limit the participants to eight site managers. The interviewees

responded to questions in relation to the usability and applicability of the framework in the GCI, and the willingness to implement the respective strategies in their own organisations if they had the opportunity. Participants were given the opportunity to offer general suggestions for improving the OC-based framework.

3.15.1 Design of the Interview Schedule

The interview questions were prepared and presented to each of the participants two days before the interview day. The interview questions comprised the profile of the participants, company characteristics, and questions designed to gather information on the suitability, applicability, and willingness of the managers to adopt the OC-Based framework.

3.15.2 Validity and Reliability of the Interview Schedule

The interview schedule was validated by two Senior lecturers in construction management for its suitability and applicability with respect to the context of the study. It was further piloted on two site managers with HND qualifications in a medium-scale building firm before it was used on the targeted participants**.**

3.15.3 Qualitative Data Collection

The participants from Cape Coast metropolis who took part in the main survey were the population for the qualitative data. Purposive sampling technique was used to select 13 of the participants (6 from large-scale; 7 from medium-scale). With respect to their businesses, 3 were civil contractors, while 10 were building contractors. The selection was based on minimum HND qualification, 10 years work experience with large or medium-scale building/civil construction organisation; and willingness to participate in the interview (Etikan et al., 2016; Genc, 2017). Three out of the initial 13 targeted

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participants declined without tangible reason. Hence, 10 site managers finally participated. However, only 8 out of the 10 site managers were covered based on data "saturation principle". Each of the eight participants were given an identification code, an alphabet and a number. From A1 to A8. The first participant for example, was identified as A1.

Starting with an opening question to prepare the interviewee for further questions, main questions were on central topics, followed by questions probing the answers offered. The conversational style adopted facilitated the discussion of the topics which, in the opinion of the interviewees, were important. The interviews were concluded by asking the interviewee if he/she wished to talk on other issues, which might not have been covered by the researcher's questions, and if he/she wished to ask any questions. The interviews lasted between 30 and 35 minutes with each participant.

3.15.4 Data Analysis of the Qualitative Data

The qualitative data was recorded in a book and analysed by means of content analysis technique by identifying the number of times a statement / theme occurs.

3.16 Ethical Considerations

The study was conducted in conformity to ethical codes in social science research. According to Creswell (2013), the ethical considerations include ensuring informed consent, voluntary participation, causing no harm, privacy, anonymity and confidentiality of the respondents' data. This research also followed UEW Research Ethics guidelines, which also meets the Faculty of Technical Education requirements. Due attention was given to the following key aspects: Ensured that permission is obtained to conduct the research study from all involved companies. Covering letters attached to the questionnaires explaining the purpose of the research, and ensuring confidentiality and privacy of the respondents.

Table 3.4: Summary of the Research Methods Employed.

	Research Objectives	Data Collection Method	Data Collection instrument	Data Analysis
1	Determine the level of Implementation of the CMSs	Survey	Questionnaire	Descriptive Analysis, PCA & CFA
2.	Examine the Associations between CMSs on Project Performance.	,,	,,	Pearson Correlation Regression Analysis
3	Examine the effects of OC types on Project Performance	,,	,,	Correlation, Regression Analysis
4.	Examine the effects of OC types on CMS Implementation	,,	,,	Pearson Correlation, Regression Analysis
5.	Determine the mediating effects of CMS on the relationship between OC types and Performance	,,	,,	Regression Analysis
6	Develop OC - based framework for building the capacity of construction firms in Ghana to enhance their project performance.	Survey, Semi-Structured Interview	Questionnaire/ Interview Guide	Descriptive Analysis, Content Analysis (Framework Validation)

3.17 Chapter Summary

This chapter has explained the research methodology applied to design the current study. The ontology of the study was founded on objectivism, while the epistemological position was grounded in positivism. A mixed methods approach was employed for this study in order to facilitate the use of different methods together. In this direction, quantitative methodology was used to test the hypotheses examining the relationship between construction management strategies (CMSs) and project performance, organisational culture and CMS implementation, organisational culture and project performance, and the mediating role of strategy in organisational culture and project performance relationship.

Qualitative methodology using semi-structured interview was subsequently applied to validate the OC-Based framework developed regarding it suitability, applicability and acceptability in the GCI. Accordingly, the current study can be best described as a descriptive cross-sectional study based on a deductive approach. The nature of the relationship between key concepts was explored through questionnaire survey data. The target population of the study was site managers of D1K1 and D2K2 (large & medium-scale) firms belonging to ABCECG. The pilot study helped clarify the suitability of the questions and the direction of the study. A series of regression analyses were performed to test the hypothesised relationships between the variables. Furthermore, semi-structured interviews were undertaken with site managers from a sample of contractors in Cape Coast who took part in the main survey. Content analysis was used to analyse the data. The ethical side of the study was considered to make sure that there were no ethical constraints on the project.
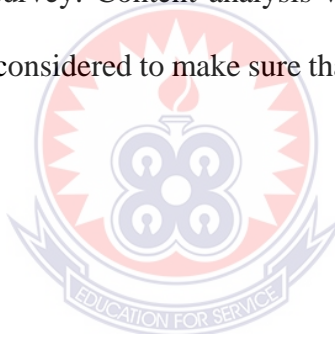
CHAPTER FOUR

CONSTRUCTION MANAGEMENT STRATEGIES IMPLEMENTATION AND THEIR EFFECT ON PROJECT PERFORMANCE

This chapter presents the results and discussions of construction management strategies implementation and their effect on project performance within the surveyed organisations, which provides the answers to the first and second research objectives i.e.: to

- determine the level of implementation of construction management strategies.
- examine the effects of construction management strategy implementation on overall project performance.

Results of the characteristics of the respondents are first presented and discussed to put the study into context. This is followed by site managers' responses on their firms' project performance, and level of barriers experienced. The level of implementation of the management strategies at the project level for ensuring project success is also presented. The results and discussion of the associations between construction management strategies and overall project performance is also presented. The results are discussed in the context of the literature reviewed in chapter two, to further explain the findings on the subject of construction management strategy implementation and its effectiveness, as applied specifically in the context of construction companies in Ghana, which is regarded to have relevance to other emerging and developing countries.

4.1 Response Rate

Out of 564 questionnaires distributed, 375 usable responses were received representing a response rate of 66.5%. This percentage is deemed adequate for analysis and generalisation (Mugenda & Mugenda, 2009). This good returned rate might be

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attributable to the follow up made and probably the interest of the respondents in the subject of the research.

4.2 Demographic Characteristics of the Respondents

The demographic characteristics of the respondents in terms of gender, educational qualification, years with their organisations, type of construction businesses, years of company's operation, and region were covered as shown in Table 4.1.

Table 4.1: Demographic Characteristics of Respondents

Characteristics	Frequency	Percentage
Gender		
Male	361	96
Female	14	4
Total	**375**	**100**
Educational Qualification		
Masters	41	11
Bachelor's Degree	281	75
Higher National Diploma	53	14
Total	**375**	**100**
Work Experience with Company (Years)		
Less than 5	23	06
5 – 10	90	24
11 – 15	146	39
More than 15	116	31
Total	**375**	**100**
Type of Business		
Building	259	69
Civil	52	14
Both Building & Civil	64	17
Total	**375**	**100**
Company's Operation (Years)		
Less than 10	30	08
10 – 15	225	60
16 – 20	60	16
More than 20	60	16
Total	**375**	**100**
Region		
Greater Accra	95	25
Ashanti	56	15
Volta	51	13
Central	43	12
Eastern	41	11
Brong Ahafo	35	9
Northern	22	6
Upper West	15	4
Upper East	10	3
Western	7	2
Total	**375**	**100**

Source**:** Field Survey (2021)

The gender distribution indicated that the majority (96%) of the respondents were males; while very few (4 %) were females. Martin and Barnard (2013) explained that organisational structures make it difficult for women to successfully integrate into male dominated sectors like construction. This study concurs with the findings of Ayarkwa et al. (2012) and Atuahene (2016) that Ghanaian construction industry is male dominated.

The result from the study showed that 281 (75%) possess Bachelor's degree, 53 (14%) possess Higher National Diploma; while 41 (11%) possess Master's degree. This finding implies that the respondents have the requisite qualifications for the construction industry. While this does not necessarily reflect performance levels, the lack of university level graduates may have an impact on management and administration in Ghanaian construction firms (Ofori-Kuragu, 2014). This finding confirms the assertion of Tengan et al. (2014) that large and medium-scale construction firms tend to have high human or professional expertise.

A satisfactory working experience with organisation offers the individual an understanding of the work environment as well as employer's expectations. About 94 percent of the respondents have had 5years or more working experience with their organisations. This implies that the respondents have vast experience with their organisations so they could be assumed to be familiar with the cultures of their firms. Therefore, their contributions are presumed to be very useful in achieving the objective of the study.

In Ghana, many construction businesses are registered as building firms (Kheni, 2008). Around 69 percent of the respondents indicated that their firms undertake only building works, 52 (14%) indicated that their firms undertake only civil works; while 64 (17%) indicated that their firms undertake both building and civil works. The ratio of the value of building works to the value of civil works (5:1) the surveyed contractors undertake

is characteristic of the volume of jobs in the two construction areas in developing economies. Contractors who specialise in both building and civil works may be doing so to diversify their business in order to take advantage of the volume of work in either area.

Years of company's operation was sought to determine the experience of the surveyed firms in the Ghanaian construction industry. About 92 percent of the respondents indicated that their firms have been involved in construction business for over 10 years. This finding corroborates with the findings of Kheni (2008) that most construction companies in Ghana are stable businesses with relatively little threat of exit from the sector. From Table 4.1, the highest number of the returned questionnaires (25%) were from Greater Accra region, while the least (2%) were from Western region. This finding means that the data received covered all the ten administrative regions of ABCECG.

4.3 Reliability of the Questionnaire

Table 4.2 shows the reliability results of strategy, performance and barrier elements. The overall alpha value of the mediating variable (CMS) is 0.801, while the reliability coefficient of the mediating variables (PS, MCS, SMS, and TS) ranges from 0.774 to 0.824. The alpha value of the dependent variable (PP Variable) is 0.842. Whereas the alpha value of the barriers is 0.788. This means that all the Cronbach's alpha values of the measurement used exceeded the cut-off threshold of 0.7 (Pallant, 2007; Multon & Coleman, 2010). Impliedly, all the measurement used had acceptable internal consistency.

The reliability test was conducted using Cronbach's alpha. Table 4.2 shows the reliability results of strategy, performance and barrier elements. The overall alpha value of the mediating variable (CMS) is 0.801, while the reliability coefficient of the mediating variables (PS, MCS, SMS, and TS) ranges from 0.774 to 0.824. The alpha value of the dependent variable (PP variable) is 0.842. Whereas the alpha value of the barriers is 0.788.

This means that all the Cronbach's alpha values of the measurement used exceeded the cut-off threshold of 0.7 (Pallant, 2007; Multon & Coleman, 2010). Impliedly, all the measurement used had acceptable internal consistency.

Table 4.2: Reliability test of Strategy, Performance and Barrier Elements

Elements	Number of Items	Cronbach alpha Coefficient
Planning related strategy	7	0.824
Monitoring and control related strategy	9	0.805
Stakeholder management related strategy	5	0.798
Technology related strategy	4	0.774
Construction management related strategy	25	0.801
Performance	8	0.842
Barrier	6	0.788

Source**:** Field data (2021)

4.4 Principal Component Analysis of the Management Strategies

The construction management strategy questionnaire items can be considered to be formative indicators, in that they are elements that form the underlying construct. For formative indicators, principal components analysis is recommended as the appropriate method of data reduction (Podsakoff et al., 2003; Stock et al., 2007). Principal Component Analysis was used to establish the underlying interrelations existing among the 32 management strategies. The PCA also made it possible to reduce the variables to a more meaningful framework to support effective management decisions. The result of the PCA is shown in Table 4.3.

Table 4.3: Principal Component Analysis of the CMSs

Item	1	2	3	4
Planning related strategy				
Review of past construction projects	0.790			
Design review for constructability	0.782			
Collaborative project planning (involves relevant stakeholders in project planning)	0.773			
Definition of the tasks of team members	0.745			
Clarity of project mission and goals	0.718			
Use of alternative construction activities/methodologies	0.705			
Applying reasonable buffer (safety time)	0.658			
Monitoring and control related strategy				
Top management commitment and support		0.763		
Use of competent team		0.678		
Update of programme of works		0.669		
Presence of quality assurance functions		0.667		
Enclose construction site from public		0.652		
Conduct of training workshop and site meetings		0.645		
Health and safety posters are displayed on site		0.631		
Regular review of construction activities		0.517		
Preparation of interim valuation and financial statement		0.505		
Stakeholder management related strategy				
Involvement of stakeholders in decision making			0.875	
Use of clients' requirements as the basis for quality			0.870	
Involvement of stakeholders in project M&E			0.823	
Effective stakeholders' communication (constant updates of project progress is communicated to the relevant parties)			0.805	
Maintaining a warm working relationship with stakeholders			0.689	
Technology related strategy				
Use of computer software for project planning				0.786
Use of 3D modelling software for visualisation and buildability				0.762
Use of computer aided software for data processing				0.674
Use of ICT for communication (i.e. Email, WhatsApp, Zoom)				0.645
KMO = **0.835,** Bartlett's Test = **3846.706,** Sig**. 0.000**				
Cumulative % Variance = 75.287				

The overall CMS had a KMO value of 0.835 and the Bartlett test of sphericity

showed overall significance of the correlation matrix at the 0.001 level. It is to be noted

that, in an earlier rotation, 5 out of the 32 sub-strategies: implement environmental

protection policy, provide health and safety manuals to workers, practice reward and incentive system, establish clear organisational structure and delegate authority, and ensuring that site workers wear protective clothing loaded unto two factors making the interpretation of the findings messy. Subsequently, these sub-strategies were deleted and factor analysis re-run. Following the re-run, two sub-strategies namely implement logistic and supply chain management and implement IT system for site security loaded onto two factors. These sub-strategies were also subsequently deleted and the factor analysis re-run for the third time. Thus, the final principal components analysis of the sub-strategies led to the extraction of four factors which cumulatively explained 75.287 percent of the variance. The first factor loaded very heavily onto a vector generating an eigenvalue of 6.433 and accounting for 26.805 percent of total variance. Given that these seven sub-strategies appeared to gauge the degree to which the companies implement planning strategy, the solution was accepted and ascribed the label planning related strategy.

The second factor loaded heavily onto a vector generating an eigenvalue of 5.773 and accounting for 24.054 percent of total variance. The nine sub-strategies appeared to gauge the degree to which the companies implement monitoring and control strategy; consequently, the solution is accepted and the factor labelled as monitoring and control related strategy. The third factor loads onto a vector generating an eigenvalue of 4.338. The five sub-strategies of the solution account for 18. 074 percent of the variance and appear to gauge the degree to which the companies implement stakeholder management strategy. Consequently, the third factor solution is accepted and given the label stakeholder management related strategy.

The final factor comprises those sub-strategies geared towards the measurement of the use of technology and digital tools. The fourth factor solution loads onto a vector generating an eigenvalue of 1.525. The four items of the final factor solution account for

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6.35 percent. Each of the 25 strategies has a loading above 0.5. Therefore, the loadings can be considered as statistically significant (Hair et al., 2010).

4.5 Confirmatory Factor Analysis of Organisational Culture Constructs

The scale used to measure the organisational culture constructs were reflective scale, in that the items in each size reflect an underlying latent factor (Stock et al., 2007; Hair et al., 2010). Hence, confirmatory factor analysis (CFA) was used to test the hypothesis that a relationship between observed variables (OC dimensions) and their underlying latent construct exist. The result shown in Figure 4.1 indicates that the factor loading for every item exceeded 0.6 threshold suggested by Awang (2014), for an established items. This means that a strong relationship exists between the observed variables (OC dimensions) and their underlying latent constructs.
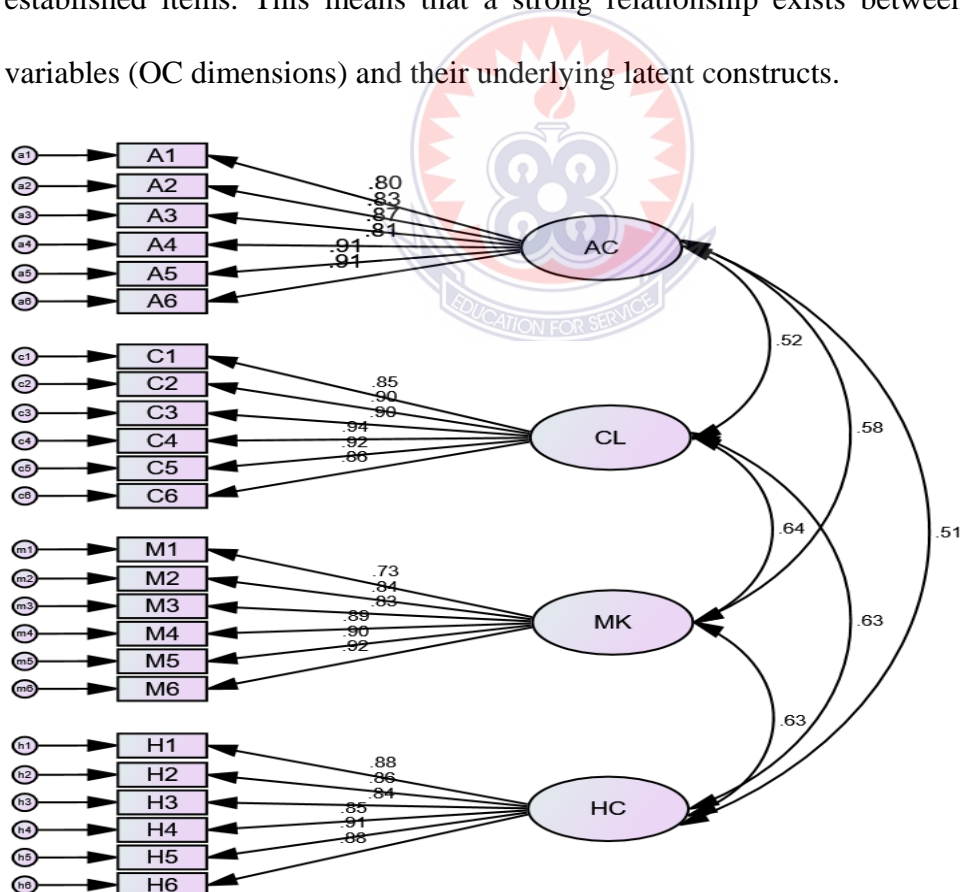
Figure 4.1: CFA of Organisational Culture Dimensions

The confirmatory factor analysis (SEM-measurement model) embodies the validity and reliability of the observed variables responses for the latent variables (Hair et al., 2010). Measures of the overall goodness-of-fit indices that are commonly used in the literature (RMSEA, χ^2, df, $\frac{\chi^2}{df}$, P, CFI, IFI, TLI and GFI) were calculated in IBM SPSS Amos 23. As a guideline, RMSEA< 0.05 (good model fit), RMSEA < 0.08 (reasonable model fit) and RMSEA > 0.08 (poor model fit) (Obeidat, 2016) were adopted. A ($\frac{\mathbf{x^2}}{\mathbf{df}}$) smaller than 2.0 is considered very good; between 2.0 and 3.0 is good; between 3.0 and 5.0 is acceptable (Hair et al., 2010). Incremental fit indices (CFI, IFI and TLI) range from 0.0 (no fit) to 1.0 (perfect fit) (Tabachnick & Fidell, 2007; Hair et al., 2010). Table 4.4 shows goodness of fit of the measurement models of the data.

Table 4.4: Overall Measurement Model Fit Indices

Goodness-of-fit Measures	Estimated Values
$\frac{\chi^2}{df}$	2.617
Incremental fit index (IFI)	0.917
Tucker-Lewis index (TLI)	0.905
Comparative fit index (CFI)	0.926
Goodness of fit Index (GFI)	0.914
Root mean square error of approximation (RMSEA)	0.066

Source: Field data (2021)

The results of the CFA indicated that the chi-square (χ^2) value of the model was 643.9, with 246 degrees of freedom (p < 0.05), which implies that the measurement did fit the data well (Hair et al., 2010). The other model fit indices used for this study were the relative Chi-square $= \frac{\mathbf{\chi^2}}{\mathbf{df}} = (\frac{643.9}{246}) = 2.617$; the Incremental Fit Index (IFI) of 0.917, Tucker-Lewis Index (TLI) of 0.905, Comparative Fit Index (CFI) of 0.926, the Goodness-of-Fit Index (GFI) of 0.914, and the Root Mean Square Error of Approximation (RMSEA) of 0.066. Based on these fit indices, the measurement model appeared to fit the sample data

well (Hair et al., 2010; Gambi et al., 2015; Obeidat, 2016; Panuwatwanich & Nguyen, 2017). The factor loadings, Cronbach alpha, composite reliability, and Average Variance Extracted (AVE) for the variables are shown in Table 4.5.

Table 4.5: Properties of the OC Measurement Model

Construct and Indicators	Factor loadings	Cronbach alpha	Composite reliability	AVE
Adhocracy		0.843	0.826	0.739
A1	0.805			
A2	0.833			
A3	0.870			
A4	0.813			
A5	0.912			
A6	0.917			
Clan Culture		0.859	0.850	0.797
C1	0.846			
C2	0.898			
C3	0.898			
C4	0.940			
C5	0.917			
C6	0.856			
Market		0.840	0.820	0.726
M1	0.728			
M2	0.837			
M3	0.829			
M4	0.885			
M5	0.901			
M6	0.919			
Hierarchy		0.848	0.834	0.758
H1	0.876			
H2	0.861			
H3	0.844			
H4	0.854			
H5	0.910			
H6	0.877			

Source: Field data (2021)

All the indicators of the factor loadings exceeded 0.60, thereby constituting evidence of convergent validity (Creswell, 2009). While the measurement reached convergent validity at the item level because all the factor loadings exceeded 0.60; all of

the composite reliability values exceeded 0.80, demonstrating a high level of internal consistency for the latent variables. In addition, since each value of AVE exceeded 0.70; the convergent validity was proved (Hair et al., 2010; Obeidat, 2016).

4.6 Discriminant Validity of the Constructs

In order to verify that each measure represents only one construct, a test of discriminant validity was performed by comparing the bivariate correlations and the coefficients' reliability (Kaynak, 2003; Gambi et al., 2015). An instrument has discriminant validity if the bivariate correlations are smaller than the reliability coefficients. Table 4.6 shows that this is the case for all the measures.

Table 4.6: Discriminant Analysis of the Constructs

Construct	1	2	3	4	5	6	Cronbach's α
AC	1						0.843
CC	0.708**	1					0.859
HC	0.638**	0.675**	1				0.840
MC	0.779**	0.569**	0.677**	1			0.848
CMS	0.745**	0.623**	0.655**	0.762**	1		0.801
PP	0.675**	0.612**	0.758**	0.782**	0.815**	1	0.842

*Notes: N =375; **p <0.01*

4.7 Construction Project Performance of the Surveyed Firms

Construction project performance refers to the carrying out of construction project according to requirements set out in a contract. The project performance requirements set out for this study were; quality of work (less rework), customer satisfaction, reduction in operational cost, delivering of project on time, safety of employees, competency in human resource management, labour productivity, and environmental protection. These

performance measurement criteria were developed by Ofori-Kuragu (2014) for Ghanaian construction industry. The respondents were asked to assess their company's project performance, particularly during the implementation of the management strategies. The results showed that the means of the project performance of the surveyed firms ranged from 2.55 to 3.60 as shown in Table 4.7. The result further suggested that the surveyed firms had high safety and quality performance. However, they had low performance reduction in their operational cost. The overall mean of the project performance was 3.16 with standard deviation of 0.52. This indicates that overall, the surveyed firms had average project performance.

Table 4.7: Descriptive Statistics of Project Performance Elements

SN	Project Performance Elements	N	Mean	Std	LoKPI
1	Safety of employees	375	3.60	0.62	High
2	Quality of work	375	3.48	0.58	High
3	Productivity	375	3.38	0.45	Average
4	Client satisfaction	375	3.36	0.50	Average
5.	Competency in human resource management	375	3.25	0.35	Average
6.	Environmental protection	375	2.95	0.42	Average
7.	Delivering of projects on time	375	2.72	0.68	Average
8.	Reduction in operational cost	375	2.55	0.55	Low
	Overall Project Performance	375	3.16	0.52	Average

Source: Field Survey (2021)

Note: 1 -1.80: "very low"; 1.81 - 2.60: "low"; 2.61 - 3.40: "moderate/average"; 3.41 - 4.20: "high"; 4.21 – 5: "very high" (Adopted from Saeed & Hasan, 2012).

4.8 Level of Barriers Experienced by the Surveyed Companies

Barriers in this study refer to challenges or problems that make it difficult to achieve project success. The survey result showed that the level of barriers experienced by the surveyed firms falls mainly into two categories, level '5' 'very high extent' (mean = 4.21 – 5.00), and '3' 'moderate extent' (mean = 2.61 – 3.40) as shown in Table 4.8. The mean rating of the barriers showed that the most considered barriers were delayed payment (mean = 4.35, std = 0.50), and bureaucracy in public institutions (mean = 4.24, std = 0.63).

Table 4.8: Barriers to Project Success

Barriers	N	Mean	Std	LoB
Delayed payment	375	4.35	0.50	V. High
Bureaucracy in public institutions	375	4.24	0.63	V. High
Inadequate communication, coordination, and commitment	375	2.78	0.54	Moderate
Inadequate top management /client support	375	2.76	0.62	Moderate
Inadequate competent personnel	375	2.72	0.59	Moderate
Inadequate consultation with stakeholders	375	2.68	0.59	Moderate

Source**:** Field Survey (2021)

Note: 1 -1.80: "very low"; 1.81 - 2.60: "low"; 2.61 - 3.40: "moderate/average"; 3.41 - 4.20: "high"; 4.21 – 5: "very high" (Adopted from Saeed & Hasan, 2012).

The barriers experienced by the surveyed firms were both external and internal in nature. The external barriers such as delayed payment and bureaucracy in public institutions were very high, while the internal barriers were moderate. This finding is not surprising. The possible explanations are that most Ghanaian contractors mainly rely on government sources for projects (Ofori-Kuragu, 2014; Wayem & Addo, 2015). The public projects are facilitated by government departments and agencies. Awarding departments and agencies may have to endorse completed projects before payments are sanctioned by Ministry of Finance for Bank of Ghana to effect payment.

More so, the Ghanaian construction industry tends to be heavily regulated at both national and local government level. Even private projects require government approvals for planning and development. According to Ofori-Kuragu (2014), where projects are located outside Accra (the national capital) several visits may need to be made to Accra to process documentation before payments are received. Arguably, where loans are contracted to construct projects, interest rates will increase significantly, thereby affecting the overall profits of contractors which in many cases are small to start with. Also, high inflationary trends devalue both the prime cost and the profits made by contractors where there are protracted delays in paying contractors.

The effect is worsened where there are insufficient controls on how government officials behave, their power– combined with the structural and financial complexity of the projects, makes it relatively easy for officials to extract bribes in order to facilitate the process (Wayem & Addo, 2015). Evidently, the difficulties in getting approval and other constraints which contractors face affect the progress of construction works. However, bureaucracy in public institutions and payment delays are often beyond the managerial capacity of the contractors and require government intervention.

4.9 Implementation of Construction Management Strategies

Construction management strategies are practices that construction managers employ in decision making and problem solving within the complexities, uncertainties, uniqueness, and dynamisms of any construction process. The first objective of this study related to the level of implementation of construction management strategies by construction firms in Ghana. The level of implementation of the construction management strategies (planning related strategy, monitoring and control related strategy, stakeholders' management related strategy and technology related strategy) by the surveyed firms ranged from 2.54 to 3.14 as shown in Table 4.9. The overall mean value of the combined management strategies was 2.97. This means that the construction management strategies had been utilised to a moderate extent. The standard deviations (std) were relatively small, indicating that the data points were close to the means (Field, 2009). This reflects a homogeneous data.

Table 4.9: Level of Implementation of Construction Management Strategies

SN	Construction Management Strategies	N	Mean	Std	Level
1	Planning related strategy	375	3.14	0.46	Moderate
2	Monitoring and control related strategy	375	3.10	0.50	Moderate
3	Stakeholder management strategy	375	3.08	0.51	Moderate
4	Technology related strategy	375	2.54	0.50	Low
	Overall Construction management strategy	375	2.97	0.49	Moderate

Source: Field Survey (2021)

Note: 1 -1.80: "very low"; 1.81 - 2.60: "low"; 2.61 - 3.40: "moderate"; 3.41 - 4.20: "high"; 4.21 – 5: "very high" (Adopted from Saeed & Hasan, 2012).

4.9.1 Implementation of Planning Related Strategies

Planning related strategies refer to the tactics and methods for achieving project objectives. The results indicated that the level of implementation of the planning related strategies ranged from 2.44 - 3.67 as shown in Table 4.10.

Table 4.10: Level of Implementation of Planning Related Strategies

SN	Planning related strategies	N	Mean	Std	Level
1	Definition of tasks of team members	375	3.67	0.42	High
2	Design review for constructability	375	3.52	0.35	High
3	Clarity of project mission and goals	375	3.38	0.56	Moderate
4	Review of past construction project	375	3.35	0.50	Moderate
5	Collaborative project planning	375	3.02	0.45	Moderate
6	Use of alternative construction activities	375	2.58	0.52	Low
7	Provision of reasonable buffer	375	2.44	0.45	Low
	Overall Planning related strategy	375	3.14	0.46	Moderate

Source: Field Survey (2021)

Note: 1 -1.80: "very low"; 1.81 - 2.60: "low"; 2.61 - 3.40: "moderate"; 3.41 - 4.20: "high"; 4.21 – 5: "very high" (Adopted from Saeed & Hasan, 2012).

The result revealed that definition of tasks of team members, and review of project drawings (designs) for constructability had been implemented to a high level; whilst adoption of collaborative project planning (involving relevant stakeholders in project planning), use of alternative construction activities and provision of adequate buffer had been implemented to a low extent. Other project planning related strategies such as: review of past construction projects that have been implemented with similar scope, and definition

of the mission and purpose of the project to the project team had been implemented to a moderate level. Overall, the planning related strategy had been utilised to a moderate extent.

4.9.2 Implementation of Monitoring and Control Related Strategies

Monitoring and control are very important management functions for ensuring that project objectives are fully achieved and that the project remains on course. It is therefore imperative for construction firms to employ the most effective monitoring and control techniques available to meet project objectives. The results revealed that the level of implementation of the monitoring and control related strategies ranged from 2.08 - 3.85 as shown in Table 4.11.

Table 4.11: Level of Implementation of Monitoring and Control Strategies

SN	Monitoring and Control Strategies	N	Mean	Std	Level
1	Management commitment & Support	375	3.85	0.52	High
2	Use of competent team	375	3.56	0.50	Moderate
3	Frequent preparations of interim valuation/Financial statement	375	3.52	0.48	Moderate
4.	Regular update of program of works	375	3.46	0.46	Moderate
5.	Regular review of const. activities	375	3.40	0.45	Moderate
6	H/Safety posters are displayed on site	375	2.86	0.50	Moderate
7	Enclose construction site from public	375	2.59	0.52	Low
8	Provision of quality assurance functions	375	2.56	0.48	Low
9	Conduct training and site meetings	375	2.08	0.55	Low
	Overall Monitoring and Control Strategy	375	3.10	0.50	Moderate

Source**:** Field Survey (2021)

Note: 1 -1.80: "very low"; 1.81 - 2.60: "low"; 2.61 - 3.40: "moderate"; 3.41 - 4.20: "high"; 4.21 – 5: "very high" (Adopted from Saeed & Hasan, 2012).

This finding suggests that the surveyed contractors/site managers had implemented monitoring and control related strategies to a moderate extent in their project operations. The results further revealed that top management commitment and support sub-strategy had been utilised to a high extent. However, enclose construction site from public,

provision of quality assurance functions (ie. quality policy, quality manual, standard operating procedures, quality audit team, and quality test) in project delivery, conduct of training workshops and site meetings for employees had been utilised to a low extent. Other monitoring and control related sub-strategies such as regular update of program of works, regular review of construction activities, preparation of interim valuation/financial statement, and display of health and safety posters on site had been implemented to a moderate extent.

4.9.3 Implementation of Stakeholder Management Strategies

The outcome of every project apparently affects its stakeholders. Impliedly, management of stakeholders in project delivery is of utmost important to achieve project success. The level of implementation of the stakeholder management related strategies by the surveyed firms ranged from 2.56 - 3.75 as shown in Table 4.12.

Table 4.12: Level of Implementation of Stakeholder Management Strategies

SN	Stakeholder Management Strategies	N	Mean	Std	Level
1	Client's requirements as basis for quality	375	3.75	0.52	High
2	Involvement of stakeholders in decision	375	3.35	0.48	Moderate
3	Effective stakeholder communication	375	2.87	0.56	Moderate
4	Warm working relation with stakeholders	375	2.85	0.50	Moderate
5	Involve stakeholders in project M&E	375	2.56	0.50	Low
	Overall Stakeholder Management strategy	357	3.08	0.51	Moderate

Source: Field Survey (2021)

Note: 1 -1.80: "very low"; 1.81 - 2.60: "low"; 2.61 - 3.40: "moderate"; 3.41 - 4.20: "high"; 4.21 – 5: "very high" (Adopted from Saeed & Hasan, 2012).

From the result in Table 4.12, the overall mean of the level of implementation of the stakeholder related strategy was 3.08. This finding suggests that contractors/site managers apply stakeholder related strategies to a moderate extent in their project operations. The result further revealed that the use of client's requirements as basis for

quality had been implemented to a high extent; while involvement of stakeholders in project monitoring and evaluation had been utilised to a low extent. Other stakeholder management sub - strategies such as involvement of stakeholders in decision making, effective stakeholder communication (prompt information to stakeholders), and warm working relation with stakeholders had been implemented to a moderate extent.

4.9.4 Implementation of Technology Related Strategies

The use of improved technologies is critical in managing construction projects as the right information needs to be delivered to the right person, at the right time, and at the right place. The technology related strategy covers all aspects of improved technologies easily available and in wide use in construction project delivery in other countries. The results of the study indicated that the level of implementation of the technology related strategies ranged from 2.42 – 2.62 as shown in Table 4.13.

Table 4.13: Level of Implementation of Technology Related Strategies

SN	Technology Related Strategies	N	Mean	Std	Level
1	Use of ICT for communication	375	2.62	0.50	Moderate
2	Use of software for project planning	375	2.58	0.46	Low
3	Computer software for data processing	375	2.55	0.55	Low
4	Use of 3D modelling for visualisation	375	2.42	0.48	Low
	Overall Technology related strategy	375	2.54	0.50	Low

Source**:** Field Survey (2021)

Note: 1 -1.80: "very low"; 1.81 - 2.60: "low"; 2.61 - 3.40: "moderate"; 3.41 - 4.20: "high"; 4.21 – 5: "very high" (Adopted from Saeed & Hasan, 2012).

From Table 4.13, the result revealed that the technology related strategies such as the use of Building Information Modelling, Project Evaluation Review Technique, and Earned Value Management for planning and management of construction timeline/schedule, budget, and resource control, use of computer aided software for data processing and documentation had been utilised to a low extent; while the use of ICT for communication had been implemented to a moderate extent.

Overall, top management commitment and support was the highest implemented management strategy. This finding is not surprising. The possible explanations are that the Government of Ghana is the largest client in the construction industry. Most government projects require contractors to pre-finance; with few available projects for large number of contractors. This trend exposes contractors and managers to intense competition. In order to outperform their rivals, management of firms desired and committed to providing adequate resource support in projects to achieve project success and gain competitive advantage in future projects.

Conversely, the surveyed firms attached less importance to the implementation of training workshop to project team. The reason for this attitude may be that, owners/managers fear the trained workers may leave to other construction firms in search of more lucrative employment conditions. It is therefore not surprising that the level of adoption of training workshop strategy was quite unsatisfactory.

The low level of utilisation of the technology related strategy and some other sub-strategies may partly be attributed to inadequate financial resource capacity of Ghanaian contractors. According to Ofori-Kuragu (2014) delayed payment of contractors and lack of support of banks to contractors because of their inability to repay loans on time, has a wide range of effects on other areas of contractors such as contractors' ability to invest in relevant technology. This was confirmed by two interview participants during the validation of the framework developed. This is what one of them said:

> "This framework is useful and easy to apply. I wish the government and other customers will pay for our services promptly to enhance our financial capacity to adopt most of the strategies "religiously" on site. I will surely implement the strategies when I get the opportunity" (Participant A8).

4.10 Association between Businesses Type and CMS Implementation

Literature suggests that organisational characteristics have effects on management strategy implementation (Kheni, 2008). Two-sample t-test (independent sample t-test) was used to test whether company size (large-scale, medium-scale), and business type (building, and civil) has effect on CMS implementation with respect to their mean scores.

4.10.1 Effects of Company type on CMS Implementation

Two-sample t-test (independent sample t-test) was used to test whether company type has effect on CMS implementation. The result showed a significant difference in the mean scores of the CMS implementation with respect to company type ($p < 0.01$). Large-scale firms had greater level of CMS implementation (mean = 3.12, std = 0.50) than the medium-scale firms (mean = 2.82, std = 0.48) as shown in Table 4.14. This implies that company type has effect on CMS implementation.

Table 4.14: Two-Sample T-test: Effect of Company type on CMS Implementation

Firm Type	Mean	Std	N	F	P
Large	3.12	0.50	165	73.5	$p < 0.01$
Medium	2.82	0.48	210		

Source**:** Field Survey (2021)

The result of Table 4.14 is not surprising. The possible explanation is that the large-scale construction firms have better financial, human, and technological resources than the medium-scale construction firms. These resources have high influence on management strategies application and consequently, achieving high project performance (Tengan et al., 2014; Ofori-Kuragu, 2014; Fummey, 2016).

4.10.2 Effect of Business Type on CMS Implementation

Table 4.15 shows that there is significant mean difference in the implementation of CMS based on business type ($p < 0.01$). Civil firms evidenced the highest levels of implementation of CMSs with a mean value of (M = 3.15; Std = 0.52). Building firms had a mean score of (Mean = 2.79, Std = 0.46). Impliedly, business type has effect on implementation of CMSs.

Table 4.15: Two-Sample T-test: Effect of Business type on CMS Implementation

Business Type	Mean	Std	N	F	P
Civil	3.15	0.52	52	211.68	$p < 0.01$
Building	2.79	0.46	259		

Source: Field Survey (2021)

This finding suggests that civil contractors are more likely than building contractors to implement construction management strategies. This finding is not surprising. Civil and road projects in Ghana require a significant commitment of public funds for which public accountability is a driving factor for public officers involved in such expenditure to adopt more stringent measures compared with most building contracts. According to Kheni (2008), the funding of civil infrastructure development in most countries of Africa is provided by international donor agencies such as Department for International Development (DFID), International Development Agency (IDA), International Monetary Fund (IMF), Danish Development Agency (DANIDA) and World Bank. These funding bodies have contributed to improving standards in the civil and road sectors of the construction industry through their involvement in the procurement process. These two factors provide plausible explanations of the popularity of the implementation of construction management strategy among civil contractors in the study compared with building contractors. Nonetheless, the interpretation of the results should be done with caution because the total number of civil contractors was comparatively very small.

4.11 Effects of CMS Implementation on Overall Project Performance

In order to determine the effects of the CMS variables on overall project performance, four hypotheses were developed relating to the four construction management strategies (planning related strategy, monitoring and control related strategy, stakeholder related strategy, and technology related strategy).

Pearson correlation analysis was used to determine whether an association exist between the CMS strategies (independent variables) and the overall project performance (dependent variable). Cohen (1998) correlation coefficient conventions was used to interpret the effect size of the associations. A correlation coefficient of 0.10 to 0.29 is thought to represent a weak or small association; a correlation coefficient of 0.3 to 0.49 is considered a moderate correlation; and a correlation coefficient of 0.5 or larger is thought to represent a strong or large association. The results of the correlation test showed that all the coefficients' values of the independent variables exceeded 0.5 level. Also, the dependent variable (overall project performance) and the independent variables (CMSs) were significantly associated as shown in Table 4.16.

Table 4.16: Association between Strategy Variables and Performance Variable

Strategy Variables	MCS	SMS	PS	TS	CMS
PP	0.798**	0.682**	0.782**	0.655**	0.815**

*Notes: N =375; **p <0.01*

PP: Project Performance; PS: Planning Strategy; SMS: Stakeholder Management Strategy; MCS: Monitoring and control Strategy; TS: Technology Strategy; CMS: Construction Management Strategy (combined)

From Table 4.16, a strong association existed between overall project performance and monitoring and control related strategy (r = 0.798, p < 0.01); planning related strategy (r = 0.782, p < 0.01), stakeholder management related strategy (r = 0.682, p < 0.01) and technology related strategy (r = 0.655, p < 0.01). The result also revealed that the combined

set of management strategies (CMS) had significant positive association with overall project performance (r = 0.815, p < 0.01). The results of the correlation implies that all the CMSs variables are likely to contribute to project performance. However, the correlation did not identify the extent of contributions of the variables. To achieve this objective, simple regression was conducted between CMS variables and overall project performance variable (PP). The summary of the result of the regression analysis is shown in Table 4.17. The results revealed that the R^2 adjusted value was 0.764. This indicates that the four CMS variables in the model (planning related strategy, monitoring and control related strategy, stakeholder related strategy, and technology related strategy) together can explain 76.4 percent of the variation in overall projects performance of the surveyed firms.

Table 4.17: Model 1- Regression Analysis of CMS and Project Performance

Dependent Variable	R	R-Square	Adjusted R Square	Standard Error
Performance	0.815	0.776	0.764	1.216

Analysis of Variance

Analysis of Variance	Sum of squares	Df	Mean Square	F	Significance
Regression	2966.172	4	741.543	501.798	0.000
Residual	548.254	371	1.478		
Total	3514.426	375			

Standard Coefficients

Variables in Equation	Beta	T	Significance	Collinearity Statistics	
				Tolerance	VIF
PS	0.267	9.601	0.000	0.419	2.384
SMS	0.212	4.796	0.000	0.204	4.904
TS	0.125	1.680	0.000	0.281	3.555
MCS	0.395	10.215	0.035	0.277	3.613

Source**:** Field data (2021)

The F-ratio of 501.798 (p < 0.01) indicates the regression of project performance on the CMS variables assessed, expressed through the adjusted R-squared is statistically significant. The beta coefficient, which is the standardized regression coefficient, is used as a direct comparison between coefficients as to their relative explanatory power of the

dependent variable (Hair et al., 2010). The findings of the results revealed that the monitoring and control strategy had the highest significant effects on overall project performance (dependent variable) with a beta coefficient of 0.395 ($p < 0.01$). The planning related strategy had the second highest effects on the overall project performance with a beta coefficient of 0.267 ($p < 0.01$), followed by stakeholder management strategy with a beta coefficient of 0.212 ($p < 0.01$), and technology related strategy with a lower beta coefficient of 0.125 ($p < 0.01$). These findings affirm hypotheses H1 and $H1_a$- $H1_d$ under study;

H1.   Construction management strategy has significant positive effects on overall project performance. Thus, H1 is confirmed.

$H1_a$.   Planning related strategy has significant positive effects on overall overall project performance (Confirmed).

$H1_b$.   Monitoring and control related strategy has significant positive effects on overall project performance (Confirmed).

$H1_c$.   Stakeholder management related strategy has significant positive effects on overall project performance (Confirmed).

$H1_d$.   Technology related strategy has significant positive effects on overall project performance (Confirmed).

The finding summarily implies that CMS is more likely to contribute to project performance. The findings of the results revealed that planning related strategy had significant positive effects on overall project performance. This finding supports the findings of Serrador (2013) and Naeem et al. (2018) who all found that project planning is positively associated with project success. The finding is also consistent with the findings of Majumder et al. (2021) that effective construction planning improves work efficiency,

helps to identify the owner's vision, enhances the level of profitability, and helps to meet project deadlines.

This result suggests that the planning related strategy utilised by the surveyed firms such as review of past construction projects prior to the execution of new project, review of project drawings (designs) and specifications for constructability, adoption of collaborative project planning, definition of the tasks/roles and responsibilities of all the project team members and major stakeholders, clarity of project mission and goals to project team, provision of reasonable buffer (safety time), and use of alternative construction activities/methodologies enhance project performance. For instance, Ramanayaka (2013) asserted that review of past construction projects that have been implemented with similar scope before new project begins helps the contractor to use previous experience or knowledge learnt previously to develop and create a more detailed project plan and schedule that suit the projects' time dimensions, and also reduces errors; thus, contributing to the improvement of the project performance.

Voght and Epstein (2019) emphasised that review of project drawings (designs) for constructability before construction begins helps ensure that the plans can be efficiently implemented in the field, reduces errors, unanticipated costs, delays, and conflicts; thus, leading to project success. Collaborative project planning (involvement of key stakeholders in project planning) had been found to lead to adequate funding from clients, reduces schedule delay, reduces waste through direct data sharing among project stakeholders, and results in identification of quality materials required for project development (Njogu, 2016; Ondieki, 2016; Wamugu & Ogollah, 2017; Mandala, 2018), leading to improvement in construction projects performance. LetsBuild (2020) asserts that clarity of tasks or roles and responsibilities of all the project team members and major stakeholders provide a better understanding of all the stakeholders involved in the project

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delivery and encourage the attainment of project objectives. According to Chinn (2020) clear goals and objectives allow the workmen to monitor their own progress and also correct their errors as necessary; thus, enabling all parties of the project to be on the same page to avoid problems and reduce inefficiencies on the job site.

A buffer or safety time in project management, is the extra time added into a time estimate to keep a project on track. The purpose of this leeway in planning is to allow project managers to be able to account for unforeseen situations without having to change the coordination of a project in a major way. Also, the use of alternative construction activities/methodologies in case of contingencies reduces project delays and contributes to project success (Ramanayaka, 2013).

The results further revealed that monitoring and control related strategy had significant effect on overall project performance revealed. This finding agrees with the views and findings of some project management scholars on the effects of monitoring and control strategy on project performance. For instance, Ofori (2013) and Fummey (2016) opined that proper monitoring and control or evaluation of projects during execution phase enhance the success rate of projects.

Adebayo, Eniowo and Ogunjobi (2018) found that a relationship exists between project monitoring and control strategy used by a construction company and project success. Mwangu and Iravo (2015) established that project monitoring and control efforts of contractors and project supervisors contribute to an improved project outcome in terms of project team's meeting cost, time and product quality related criteria. Ramanayaka (2013) found that monitoring and control strategy is positively associated with construction project cost, time, quality, client satisfaction, and overall success of construction project.

The result suggests that monitoring and control related strategies utilised by the surveyed firms such as top management commitment and support for projects, use of competent personnel for project, provision of quality assurance functions, training of employees, conduct of workshops and meetings, display of health and safety posters on site, regular update program of works, practice reward and incentive system, and preparation of interim valuation and financial statement enhance project performance. For instance, Deming (1986) asserted that top management is responsible for 94% of quality problems in projects. Ahmed (2016) also found that top management role of providing strong support, authority, finance, and resources to site/project managers have significant positive influence on project performance.

Hickson and Ellis (2014) found that the use of competent personnel in a project contributes to project success. This is because highly skilled and experienced workers assure well-performed work and fewer mistakes. Kuwaiti et al. (2018) and Pownya et al. (2022), asserted that the presence of quality assurance functions such as quality policy, quality manual, standard operating procedures, and quality audit team contributes to achieve quality compliance and ultimately improve project performance.

Adik (2014) found a positive relationship between employee training and project performance in the construction industry. Chinn (2020) emphasised that substantial training is vital for construction teams so that everyone is knowledgeable and prepared to complete tasks safely and efficiently to achieve project success. Mwangu and Iravo (2015) found that frequent conduct of site meetings significantly contributes to project outcomes/success. Regular conduct of workshops and meetings help construction managers create opportunities to integrate the tacit knowledge of others to determine the most appropriate construction methods and design solutions which contribute to the improvement of the project performance (Ramanayaka, 2013). Idoro (2012) found that

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frequent update of program of works significantly influences project outcome. Also, enclosing the construction site from public protects the environment and help prevent accident on site (Pownya et al., 2022).

Mwangu and Iravo (2015) asserted that regular review of construction activities and preparation of interim valuation and financial statement are significant to better project outcomes. Regular review of construction activities against the schedule, budget and quality elements of the project, allows problems to be identified early so that corrective action can be taken to keep the project on track; thus, contributing to the improvement of the project performance. Interim valuation of monitoring and control strategy is a detailed breakdown, prepared by a contractor that constitutes an application for part payment of work undertaken since the last valuation. Interim valuation certificate allows an interim payment to be made to ensure smooth progression of the project, while financial statements help contractors improve their cash flows. of the four CMSs evaluated, findings of the results indicated that monitoring and control related strategy had the greatest effects on overall project performance. Another observation was that monitoring and control related strategy prevailed over planning related strategy. This was an interesting outcome. This observation means that although planning in project management is very important, the monitoring and control of the implementation process is the most important management function requiring optimum attention.

The results also indicated that stakeholder management related strategy has significant positive effect on overall project performance. This finding suggests that the stakeholder management related strategies utilised by the survey firms such as involvement of stakeholders in decision making, use of clients' requirements as the basis for quality, involvement of stakeholders in the process of monitoring and evaluation, effective stakeholder communication, and warm working relationship with stakeholders

contribute to better project performance. For instance, Fummey (2016), highlighted the significance of involving stakeholders in decision making for project success. Imbeah (2012) posited the use of clients' requirements as the basis for quality of product. Mandala (2018) and Magassouba et al. (2019) also found that stakeholder's involvement in the process of monitoring and evaluation influence project performance. Ofori (2013) emphasised that effective stakeholder communication is highly important to project success. Magassouba et al. (2019) asserted that maintaining a warm working relationship with stakeholders generally contributes to better project performance.   .

The regression results showed that technology related strategy has relatively low effects on overall project performance. This finding suggests that the technology related strategy utilised by the surveyed firms such as the use of project management software for planning and management of construction timeline, schedule of resources, quality and cost control, use of 3D modelling software to review project drawings, use of computer aided software for data collection, analysis and documentation, and use of ICT for communication has relatively low significant effect on project performance. Nonetheless, its significance to project performance cannot be neglected.

This finding supports the assertions and findings of Ramanayaka (2013), Kissi et al. (2019), and LetsBuild (2020). For instance, Adebayo, Eniowo and Ogunjobi (2018) found that the use of Program Evaluation and Review Technique (PERT) for time/schedule control and Earned Value Management (EVM) for cost control is very effective in meeting project objectives. Ramanayaka (2013) found that the use of visualisation strategy such as 3D modelling software to review drawings helps to understand complex areas of the project and errors addressed timely; thus, contributing to project performance.

Kissi et al. (2019) and Chinn (2020) asserted that the use of project computer aided software in project management allows managers to track their work easily, reduces inefficiencies, and also reduces too much paper work; thus, improving productivity. LetsBuild (2020) posited that the use of construction software that supports cloud documentation for on-site processes encourages effective collaboration that facilitates efficiency and boosts productivity. Kissi et al. (2019) emphasised that the use of ICT for communication had a positive statistically significant relationship with construction project success criteria. Impliedly, development of well-integrated IT support would be beneficial for managing information and for accelerating information transfer process related to the projects to the relevant stakeholders.

The result also revealed that combined set of construction management strategies (planning related strategy, monitoring and control related strategy stakeholder related strategy, and technology related strategy) contributes to higher project performance. This finding lends support to the theory of construction project management by Koskela and Howell (2002) and APM (2015) who all contend that effective planning, monitoring and control, and stakeholder management contribute to achieving project performance criteria.

4.12 Relationships among Strategy, Performance and Barriers

Pearson's correlation (or Pearson's r) was used to determine the effects of the barriers experienced (moderator) by the construction firms on management strategy and project performance. The results indicated that there were significant negative associations between the presence of project success barriers and CMS implementation ($r = -0.41$, $p < 0.01$), and between the presence of project success barriers and contractors' project performance ($r = -0.56$, $p < 0.01$). The results also indicated that the presence of the CMS practices was significantly positively associated with the contractors' project performance ($r = 0.815$, $p < 0.01$) as shown in Table 4.18.

Table 4.18: Correlation test of Strategy, Performance and Barriers

Variables	CMS	PP	Barrier
Strategy Pearson Correlation	1		
Sig (2- tailed)			
Performance Pearson Correlation	0.815**	1	
Sig (2 – tailed)	0.000		
Barriers Pearson Correlation	-0.41**	- 0.56**	1
Sig (2 –tailed)	0.000	0.000	

Source: Field Survey (2021)

This finding suggests that higher levels of the barriers experienced (especially, the external barriers) by construction firms in Ghana have a negative effect on CMS implementation, resulting in lower performance of the construction firms in Ghana.

In summary, the surveyed firms implement construction management strategies to a moderate extent. Also, effective planning efforts, monitoring and control, stakeholder's engagement, and use of technology and digital tools contribute to improving project performance in the Ghanaian construction industry.

CHAPTER FIVE

EFFECTS OF ORGANISATIONAL CULTURE AND MANAGEMENT

STRATEGY ON PERFORMANCE OF CONSTRUCTION PROJECT

Organisational culture and strategy have been highlighted as critical internal resources of an organisation which influence project performance. This chapter presents the results and discussion of the current cultural profiles of the surveyed firms, the effects of organisational culture types on construction management strategy implementation, and the effects of organisational culture types on performance of construction projects which provide the answers to the third and fourth research objectives. The mediating role of the set of management strategy in cultural context of construction project is also examined to address the fifth objective.

5.1 Current Cultural Profiles of the Surveyed Firms

With the rapid and remarkable growth rate in the Ghanaian construction industry, it is important for the sector to recognise its individual and collective cultural patterns, in order that they can be used to evaluate companies' current operational activities, achievements, and future successes. A cultural profile score of the surveyed firms were obtained by averaging the respondent's rating for each cultural type across the six dimensions. This provided an indication of the cultural orientation of the surveyed firms based on the four cultural types. The average scores for the surveyed firms are shown in Table 5.1 - 5.3.

Keys:

N	Number of Respondents
M	Mean
SD	Standard Deviation
DC	Dominant Ecteristics
OL	Organisational Leader
ME	Management of Employees
OG	Oganisational Glue
SE	Strategic Emphasis
CS	Criteria of Success

5.1.1 Cultural Profiles of the Large-Scale Firms

From Table 5.1, the respondents perceived that the large-scale firms (D1K1) have a dominating adhocracy culture, followed by clan, hierarchy and market.

Table 5.1: Cultural Profiles of the Large-Scale Firms (N =165)

Culture Profiles	Clan type		Adhocracy type		Market type		Hierarchy type	
	M	SD	M	SD	M	SD	M	SD
1st (DC)	3.75	0.55	4.38	0.45	3.72	0.55	4.01	0.50
2nd (OL)	3.98	0.45	4.16	0.52	4.02	0.65	4.24	0.54
3rd (ME)	3.66	0.65	3.57	0.50	3.90	0.53	3.54	0.55
4th (OG)	4.18	0.60	4.24	0.45	3.45	0.50	3.48	0.53
5th (SE)	3.82	0.50	3.70	0.62	4.08	0.52	4.03	0.42
6th (CS)	3.72	0.55	3.78	0.48	3.70	0.50	3.70	0.45
Average	3.85	0.55	**3**.97	0.50	3.81	0.54	3.83	0.50

Source: Field data (2021)

5.1.2 Cultural Profiles of the Medium-Scale Firms

From Table 5.2, the respondents perceived that the medium-scale firms (D2K2) also have a dominating adhocracy culture followed by clan, market and hierarchy. The findings of the cultural profiles (Table 5.1 and 5.2) indicate that averagely, both the large and medium-scale firms surveyed have similar dominant cultural orientations.

Table 5.2: Cultural Profiles of the Medium-scale Firms (N = 210)

Culture Profiles	Clan type		Adhocracy type		Market type		Hierarchy type	
	M	SD	M	SD	M	SD	M	SD
1st (DC)	3.58	0.52	3.86	0.55	3.70	0.50	3.45	0.45
2nd (OL)	3.68	0.45	3.96	0.52	3.46	0.55	3.72	0.55
3rd (ME)	3.62	0.55	3.54	0.60	4.02	0.54	3.78	0.60
4th (OG)	4.12	0.48	3.82	0.55	3.72	0.50	3.70	0.50
5th (SE)	3.72	0.45	3.78	0.50	3.75	0.55	3.54	0.52
6th (CS)	3.60	0.52	3.68	0.60	3.52	0.60	3.58	0.52
Average	3.72	0.50	3.77	0.55	3.70	0.54	3.63	0.52

Source: Field data (2021)

5.1.3 Overall Cultural Profiles of the Surveyed Firms

Overall, the respondents perceived that the dominant characteristics (DC) or the core value of the surveyed construction firms is most represented by "adhocracy culture" as shown in Table 5.3. The core value of "adhocracy culture" in this first dimension is dynamic, creative and entrepreneurial. People are willing to stick their necks out and take risks. In reference to the style of the organisation leader (OL), most of the surveyed firms are strongly adhocracy oriented. The leaders exemplify entrepreneurship, innovation and risk taking. The management style used to manage employees (ME) is market culture which is characterised by hardworking, competitiveness, high demands and achievement.

Table 5.3: Overall Cultural Profiles of the Surveyed Firms (N = 375)

Culture Profiles	Clan type		Adhocracy type		Market type		Hierarchy type	
	M	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**
1st (DC)	3.67	0.54	4.12	0.50	3.71	0.53	3.73	0.48
2nd (OL)	3.83	0.45	4.06	0.52	3.74	0.60	3.98	0.55
3rd (ME)	3.64	0.52	3.56	0.55	3.96	0.54	3.66	0.58
4th (OG)	4.15	0.56	4.03	0.50	3.59	0.50	3.59	0.47
5th (SE)	3.77	0.48	3.74	0.56	3.92	0.54	3.79	0.52
6th (CS)	3.66	0.60	3.73	0.54	3.61	0.55	3.64	0.49
Average	3.79	0.53	3.87	0.53	3.76	0.54	3.73	0.52

Source**:** Field data (2021)

The organisation glue (OG) that holds the respondent construction firms together is clan culture with emphasis on loyalty, mutual trust, and participation. The companies' strategic emphasis (SE) is market culture, with emphasis on competitive actions and achievement, hitting stretch target and winning in the market place. The success criteria (SE) of the companies as perceived by the respondents is the adhocracy culture that believes that their success lies on the basis of having the most unique or innovative product. Overall, adhocracy culture was the predominant culture type of the surveyed firms, followed by clan, market and hierarchy cultures. The result further revealed that the surveyed firms focus on external orientation with flexibility and discretion. From Table

5.3, the surveyed firms did not have a single dominant culture type, indicating lack of true congruence in the six cultural profiles. This reflects that various element of cultural values exist in the surveyed firms. The possible reasons for the presence of the incongruent culture might be the complexity of the business environment requiring multiple emphases in different areas of organisational culture (Willar, 2012).

Comparing the findings to similar studies done in Ghana, the findings of this study reflect the finding of Atuahene (2016) in terms of the most emphasised culture types (adhocracy and clan cultures) and the least culture (market and hierarchy types) in medium and large-size construction organisations in Ghana. The finding is however, inconsistent with Wayem and Addo's (2015) finding that the Ghanaian Construction organisation exhibits competitive (market), bureaucratic (hierarchy), consensual (clan) and entrepreneurial (adhocracy). Wayem and Addo (2015) study, however, did not focus specifically on large and medium-scale construction firms.

In the global contexts, the culture typologies of the large and medium-scale contractors surveyed do not reflect that of other nations. For instance, in their study in South African Construction Industry, Harinarain et al. (2013) revealed that medium-scale construction organisations have a dominating culture profile of clan, hierarch, market and adhocracy; while the large-scale organisations have a dominating market culture, followed by clan, hierarchy and adhocracy. Also, Willar (2012) indicated that the predominant culture of large-scale Indonesian construction companies is the clan type culture, followed by the market type culture, hierarchy type and lastly, the adhocracy type culture. This, organisational cultural differences may probably be due to differences in the operating and legislative environment of the study context as well as the strategic orientations of the firms.

5.2: Effects of Organisational Culture on CMS Implementation

Regression analysis was employed to test the effects of organisational culture variables on the set of CMS variable. The regression was conducted between organisational types (clan, adhocracy, market, and hierarchy) as they were the independent variables, and the CMS variable as the dependent variable. The summary of the result of the regression analysis related with $H2_a$ – $H2_d$ hypotheses is shown in Table 5.4. The results revealed that the R^2 adjusted value was 0.718. This indicates that the four organisational culture types in the model (clan, adhocracy, market and hierarchy) together can explain 71.8 percent of the variation in CMS implementation.

Table 5.4: Model 2-Summary of Regression Analysis between OC Types and Management Strategy Variable

Dependent Variable	R	R-Square	Adjusted R Square	Standard Error
CMS	0.780	0.722	0.718	0.17614

Analysis of Variance

Analysis of Variance	Sum of Squares	df	Mean Square	F	Significance
Regression	20.707	4	5.177	166.867	0.000
Residual	7.973	371	0.031		
Total	28.680	375			

Standard Coefficients

Variables in Equation	Beta	T	Significance	Collinearity Statistics	
				Tolerance	VIF
Clan	0.164	2.864	0.005	0.328	5.142
Adhocracy	0.264	5.869	0.000	0.535	4.084
Hierarchy	0.233	3.202	0.000	0.349	3.226
Market	0.335	6.124	0.000	0.361	6.075

Source**:** Field data (2021)

The F-ratio of 166.867 ($p < 0.01$) indicates the regression of construction management strategy implementation on the constructs assessed, expressed through the adjusted R-squared is statistically significant. The market culture had the highest contribution towards implementation of management strategy (dependent variable) with a

beta coefficient of 0. 335 (p < 0.01). The adhocracy culture had the second highest contribution of the dependent variable with a beta coefficient of 0.264 (p < 0.01), followed by hierarchy culture with a beta coefficient of 0.233 (p < 0.01), and clan culture with a beta coefficient of 0.164 (p < 0.005). Hence, hypotheses H2$_a$-H2$_d$ are supported.

H2$_a$:   Clan culture orientation has significant association with CMS implementation.

H2$_b$:   Adhocracy culture orientation has significant association with CMS implementation.

H2$_c$:   Market culture orientation has significant association with CMS implementation.

H2$_d$:   Hierarchy culture orientation has significant association with CMS implementation

The values of variance inflation factor (VIF) and Tolerance showed no multicollinearity between the variables as VIF values less than 10 and tolerance values more than 0.10 as suggested by Hair et al. (2010). Therefore, multicollinearity problem did not occur in this model. The results further showed that normality was also not a problem as is evident from P-P Plot of regression standardized residual; all points lie in a reasonably straight line from bottom left to top right (see Fig. 5.2 Appendix E).

This finding implies that organisational culture is more likely to influence construction management strategy implementation. More specifically, stronger effect is found between the market culture, which focuses on the external environment and is control oriented and implementation of CMS than for any of the other cultural types. This culture is characterised by task focus, clarity of objectives, result-oriented, competitiveness and achievement focus, goal-oriented leadership, higher efficiency and productivity (Prajogo & McDermott, 2005; Cameron & Quinn, 2006, 2011). This finding is not surprising as market culture had been found to have positive association with quality management and quality techniques (Gambi et al., 2015).

The results also indicated a significant positive effect between adhocracy culture and implementation of CMS. This result is also not surprising as TQM literature provides strong support for the important role of adhocracy culture for successful quality management implementation as identified by many previous studies (Gimenez-Espin et al., 2013; Panuwatwanich & Nguyen, 2017). The adhocracy culture is oriented toward flexibility and adaptation to the external environment, innovation and creativity, entrepreneurship, risk taking and resource acquisition (Prajogo & McDermott, 2005, 2011; Cameron & Quinn, 2006, 2011; Zu et al., 2010).

The hierarchy culture, which is control and stability oriented and focusses on the internal organisation, also had a significant relationship with CMS implementation. This culture is characterised by a focus on internal efficiency and predictable outcomes, control and stability, all of which are supported by formal rules and regulations, permanence and stability, dependable delivery, smooth scheduling, and low-cost production, and centralised, technically oriented "leadership" (Denison & Spreitzer, 1991; Prajogo & McDermott, 2005, 2011; Cameron & Quinn, 2006, 2011; Zu et al., 2010). This finding is consistent with prior literature on the relationship between hierarchy culture and quality techniques (Gambi et al., 2015).

The clan culture, which is internally focused and is flexibility oriented had significant positive effect on implementation of CMS. Thus, the stronger the characteristics describing this culture, the higher the use of CMS. This finding is also not surprising because prior literature suggests that organisations characterised by internal and flexibility focus is more favourable for TQM implementation (Gimenez-Espin et al., 2013; Panuwatwanich & Nguyen, 2017). Key characteristics of the clan culture include teamwork, participation and belonging, empowerment and trust, concern with human relations, participative leadership,

and development of human potential and employee commitment (Prajogo & McDermott, 2011; Cameron & Quinn, 2011; Zu et al., 2010).

5.3 Effects of Organisational Culture on Construction Project Performance

Regression analysis was employed to test the effects of organisational culture variables on construction project performance. The regression was conducted between organisational culture types (clan, adhocracy, market and hierarchy) as they were the independent variables, and the overall project performance variable as dependent variable. The summary of the result of the regression analysis related with $H3_a$ – $H3_d$ hypotheses is shown in Table 5.5. The results revealed that the R^2 adjusted value was 0.789. This indicates that the four organisational culture types in the model (clan, adhocracy, market and hierarchy) together can explain 78.9 percent of the variation in overall projects performance of the surveyed firms.

Table 5.5: Model 3 - Summary of Regression Analysis of OC and Project Performance

Dependent Variable	R	R-Square	Adjusted R Square	Standard Error
Performance	0.822	0.805	0.789	1.176

Analysis of Variance

Analysis of Variance	Sum of squares	df	Mean Square	F	Significance
Regression	2026.965	4	506.741	366.722	0.000
Residual	355.126	371	1.382		
Total	2382.091	375			

Standard Coefficients

Variables in Equation	Beta	T	Significance	Collinearity Statistics	
				Tolerance	VIF
Clan	0.169	4.015	0.186	0.485	3.049
Adhocracy	0.209	6.648	0.084	0.362	1.868
Hierarchy	0.282	6.925	0.000	0.275	2.776
Market	0.402	10.032	0.000	0.426	2.868

Source: Field data (2021)

The F-ratio of 366.722 ($p < 0.01$) indicates the regression of project performance on the organisational culture constructs assessed, expressed through the adjusted R-squared is statistically significant. The beta coefficient, which is the standardized regression coefficient, is used as a direct comparison between coefficients as to their relative explanatory power of the dependent variable (Hair et al., 2010). The findings of the results revealed that market culture had the greatest contribution towards achieving the overall project performance (dependent variable) with a beta coefficient of 0.402 ($p < 0.01$), followed by hierarchy culture with a beta coefficient of 0.282 ($p < 0.01$). However, adhocracy culture with a beta coefficient of 0.209 ($p > 0.05$) and clan culture with a beta coefficient of 0.169 ($p > 0.05$) had no significant contribution to the overall project performance. Hence, hypotheses $H3_c$ and $H3_d$ are supported; while hypothesis $H3_a$ and $H3_b$ are not supported.

$H3_a$: Clan culture has significant, direct and positive effect on overall construction project performance (Disconfirmed).

$H3_b$: Adhocracy culture has significant, direct and positive effect on overall construction project performance (Disconfirmed).

$H3_c$: Market culture has significant, direct and positive effect on overall construction project performance (Confirmed).

$H3_d$: Hierarchy culture has significant, direct and positive effect on overall construction project performance (Confirmed).

The collinearity statistics showed that the data did not exhibit high multicollinearity which often decreases the size of multiple regressions. From Table 5.5, the tolerance is greater than 0.1 and variance inflation factor (VIF) less than 10. Hence, the data did not have multicollinearity problem (Hair et al., 2006). The results further showed that normality was also not a problem as is evident from P-P Plot of regression

standardized residual; all points lie in a reasonably straight line from bottom left to top right (see Fig. 5.3 Appendix F).

The findings imply that market and hierarchy cultures are more likely to contribute to overall project performance. However, clan and adhocracy cultures are less likely to contribute to overall project performance. In sum, organisational culture partially contributes to project performance.

The possible explanation for the superior predictive power of the market culture might be the emphasis on meeting goals and achieving results of the market culture organisations (Denison & Spreitzer, 1991; Cameron & Quinn, 2011). For instance, if the construction firm recognises the importance of project performance as an organisational goal, the market culture orientation would be likely to emphasis efforts to reach that goal.

The result further revealed that certain types of culture could enhance project performance than others (see Table 5.5); supporting the claims of the following scholars (Thomas et al., 2002; Ankrah, 2007; Coffey & Willar, 2010; Alla & Hassan, 2017). For instance, Coffey and Willar (2010) found a positive relationship between each of the three cultural traits of culture 'Consistency (hierarchy)', 'Adaptability (adhocracy)' and 'Mission' (market)) and overall project performance at the 5% significance level. Out of these three trait measures of organisational culture strength, 'Adaptability' had the strongest correlation; 'Consistency' had the least correlation, whilst 'Mission' had moderate significance. However, there was no correlation between 'Involvement' and overall project performance. The findings of this result partly support the findings of Coffey and Willar (2010).

The finding of this result however, contradicts the findings of Thomas et al. (2002) and Yazici (2011) argument that firms with a clan culture produce better project performance than firms with hierarchy, market and adhocracy cultures. For instance,

Thomas et al. (2002) found that clan-type cultures produce above average project performance, hierarchy and adhocracy cultures produce average project performance, whereas market cultures produce below average project performance. Yazici (2011) also revealed the significance of Clan or group culture in improving project performance as measured by project time, budget targets, customer expectations, and team satisfaction. However, there was no significant relationship with market, hierarchy and adhocracy cultures. The possible reason for the inconsistent findings could be attributable to the differences in the socio-cultural, economic and political environment of the study context

The implication of the findings is that the existing culture of the surveyed firms be shifted from the current prevalent adhocracy and clan cultures to a market culture in order to achieve better project performance. This result provides additional empirical evidence from large and medium-scale construction firms in Ghana to the research stream on organisational culture - project performance relationship.

5.4 Mediating Role of Strategy in Cultural Context of Construction Project

Mediation is a hypothesised causal chain in which one variable affects a second variable that, in turn affects a third variable. A mediating variable is an intervening variable that transmits the effect of an independent variable on a dependent variable. To understand the mechanism by which organisational culture and project performance are related, the mediating role of management strategy in cultural context of construction project was determined.

Four regression models were tested using Baron and Kenny (1986) approaches. The first step is that the independent variable (adhocracy, or clan, market, and hierarchy) predicts the dependent variable (project performance). The second step is that the independent variable predicts the mediating (CMS) variable. The third step is that the

mediating variable predicts the dependent variable. The fourth step is that the independent variable and the mediating variable together predict the dependent variable.

No mediation is the case in which the mediator has no significant relationship with the dependent variable. Partial mediation is the case in which there is not only a significant relationship between the mediator and the dependent variable, but also some direct relationship between the independent variable and dependent variable, also the effect of the independent variable on the dependent variable must reduce when the mediating variable is included in the regression equation. Full mediation is the case in which the independent variable no longer demonstrates significant effect on the dependent variable when the mediator is included in the equation or has been controlled (Baron & Kenny, 1986). In this study, the researcher hypothesised that CMS partially mediates OC and project performance relationship.

As shown in Model 4 of Table 5.6, the third condition for partial mediation is met for market and hierarchy culture types; the two organisational culture types and the mediator (CMS) showed significant and positive relationships with overall project performance. In addition, the effects of the independent variables (OC types) were reduced when the mediator (CMS) was included in the equation, which is shown by the decreased in the coefficient of the organisational culture types (market culture from 0.402 ($p < 0.01$) in Model 3 to 0.279 ($p < 0.01$) in Model 4; hierarchy culture from 0.282 ($p < 0.01$) in Model 3 to 0.197 ($p < 0.01$) in Model 4; The clan and adhocracy cultures had no significant effect on project performance when the mediator (CMS) was included in Model 4. Thus, the data support partial mediation for market and hierarchy cultures and full mediation for adhocracy and clan cultures.

H4$_a$:   CMS partially mediates the relationship between clan culture and project performance (Disconfirmed).

H4$_b$:   CMS partially mediates the relationship between adhocracy culture and project performance (Disconfirmed).

H4$_c$:   CMS partially mediates the relationship between market culture and project performance (Confirmed).

H4$_d$:   CMS partially mediates the relationship between hierarchy culture and project performance (Confirmed).

Table 5.6: Test of mediation between Organisational Culture and Performance by CMS

Variable	Model 2 DV: CMS		Collinearity Statistics		Model 3 DV: PP		Collinearity Statistics		Model 4 DV: PP		Collinearity Statistics	
	Beta	Sig	Toler	VIF	Beta	Sig	Tole	VIF	Beta	Sig	Tole	VIF
CC	0.164	0.005	0.328	5.142	0.169	0.186	0.485	3.049	0.109	0.214	0.35	4.15
AC	0.264	0.000	0.535	4.084	0.209	0.084	0.362	1.868	0.122	0.076	0.47	5.12
HC	0.233	0.000	0.349	3.226	0.282	0.000	0.275	2.868	0.197	0.000	0.33	6.26
MC	0.335	0.000	0.361	5.075	0.402	0.000	0.426	2.771	0.279	0.000	0.62	5.78
CMS									0.366	0.000	0.48	6.60
PP												
Overall F	F = 166.867; P= 0.001				F = 366.722; P= 0.001				F = 406.769; P = 0.001			
Adjusted R^2	0.718				0.789				0.836			

Source: Field data (2021)
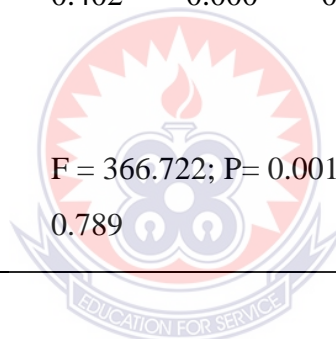
The overall finding suggests that CMS partially mediates the relationship between organisational culture and overall project performance. More specifically the finding revealed that management strategy partially mediates the link between market and hierarchy culture types and overall construction project performance; but fully mediates the relationship between clan and adhocracy culture types and overall project performance. This implies that management strategy does not only have a significant relationship with project performance, but serves as a central mechanism that leverages organisational cultural influence on project performance. The finding also implies that the surveyed organisations with dominant clan and adhocracy cultural orientations should strengthen the adoption of the management strategies in order to achieve favourable project performance. This is because their performance level depends on the use of CMS and not their cultural environment.

5.5 Relationships between CMS Variable and OC Dimensions

This examination was conducted in order to determine most suitable cultural dimensions that could strengthen the implementation of construction management strategy. A One-way Analysis of Variance (ANOVA) test is used to test for statistically significant differences between three or more independent sample means (Allen & Bennett, 2010). The independent variable in this section is the four distinct culture types in each cultural dimension, while the dependent variable is the total score of the management strategies. Analysis of variance (ANOVA) test was conducted to examine whether there are significant differences in the mean scores of the management strategy implementation across the four different culture types (clan, adhocracy, market, and hierarchy); the test was used to study the influence of construction firms' organisational culture dimensions on implementation of CMS; in order to determine most suitable cultural dimensions that could support effective implementation of CMS.

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Analysis for homogeneity of variance assumption testing was conducted through Levene's test. This tests whether the variance is the same for each of the four culture types. The assumption of homogeneity of variance is not violated if the p-value for Levene's test is greater than 0.05 (Pallant, 2011). From the Levene's test results, it can be concluded that the assumptions of homogeneity of variances were not violated for the current analysis (see Table 5.7, Appendix G).

Six analyses were conducted with the CMS scores under the six cultural dimensions (1st) Dominant characteristics-DC, (2nd) Organisational leadership-OL, (3rd) Management of employees-ME, (4th) Organisation glue-OG, (5th) Strategic emphasis-SE, and (6th) Criteria of success-CS). For example, the first analysis tested whether CMS practices scores in the DC dimension differ across the four culture types. In this analysis, the independent variables are the culture types in the DC dimension, while the dependent variable is the overall CMS. The ANOVA analysis was conducted in SPSS Amos 23.

The result of the ANOVA test is summarised in Table 5.8. The result indicated a significant difference in the use of CMS across the different types of organisational culture in the first dimension (Dominant characteristics-DC) (F= 16.25, p < 0.01). Tukey post-hoc analysis revealed that in the first dimension, the implementation of CMS was significantly higher in the market type (m=3.90, std = 0.52) and clan type (m=3.84, std = 0.55) cultures than both hierarchy culture (m=3.55, std= 0.55) and adhocracy culture (m=3.54, std= 0.54). However, market and clan cultures were not significantly different from each other.

Table 5.7: ANOVA Results: Implementation of CMS on the Six Cultural Dimensions

Culture Profiles	Clan		Adhocracy		Market		Hierarchy		ANOVA	
	M	SD	M	SD	M	SD	M	SD	F	Sig
1st (DC)	3.84	0.55	3.54	0.54	3.90	0.52	3.55	0.55	16.25	0.000*
2nd (OL)	3.70	0.52	3.73	0.56	3.68	0.54	3.73	0.54	10.18	0.573
3rd (ME)	3.82	0.52	3.51	0.54	3.84	0.52	3.58	0.55	10.90	0.000*
4th (OG)	3.75	0.53	3.61	0.56	3.92	0.59	3.57	0.58	9.65	0.000*
5th (SE)	3.76	0.52	3.56	0.56	3.58	0.54	3.91	0.49	12.14	0.000*
6th (CS)	3.59	0.53	3.51	0.55	3.81	0.58	3.87	0.55	11.72	0.000*

Source**:** Field data (2021)

The result showed that there was no significant difference in the use of CMS across the different types of organisational culture in the second dimension (Organisational leadership-OL) (F = 10.18, p < 0.573). There was a significant difference in the use of CMS across different types of organisational culture in the third dimension (Management of Employees-ME) (F = 10.90, p = 0.01). Tukey post-hoc analysis revealed that in the third dimension, the implementation of CMS was significantly higher in the market type (m=3.84, std = 0.52) and clan type (m=3.82, std = 0.52) cultures than both hierarchy culture (m=3.58, std = 0.55) and adhocracy culture (m=3.51, std= 0.54). However, market and clan cultures were not significantly different from each other.

There was a significant difference in the use of CMS across different types of organisational culture in the fourth dimension (Organisation Glue-OG) (F = 9.65, p = 0.01) as shown in Table 5.7. Tukey post-hoc analysis revealed that in the fourth dimension, the implementation of CMS was significantly higher in the Market type culture (m=3.92, std = 0.59) than Clan culture (m=3.75, std = 0.53), Adhocracy culture (m=3.61, std = 0.56) and Hierarchy culture (m=3.57, std = 0.58). There was a significant difference in the use of CMS across different types of organisational culture in the fifth dimension (Strategic Emphases-SE) (F = 12.14, p = 0.01). Tukey post-hoc analysis revealed that in the fifth dimension, the implementation of CMS was significantly higher in the hierarchy type

culture (m=3.91, std = 0.49) than clan (m=3.76, std = 0.52), market (m=3.58, std = 0.54) and adhocracy culture (m=3.56, std = 0.56). The result revealed a significant difference in the use of CMS across different types of organisational culture in the sixth dimension (Criteria of success-CS) (F = 11.72, p = 0.01). Tukey post-hoc analysis revealed that in the sixth dimension, the implementation of CMS was significantly higher in the hierarchy type (m=3.87, std = 0.55) and market type (m=3.81, std = 0.58) than clan type (m=3.59, std = 0.53), and adhocracy type (m=3.51, std = 0.55).

Evidence from the findings suggests that implementation of CMS differ across the four culture types. In the analysis of the six cultural dimensions of the surveyed contractors, market type culture was significant in three dimensions, Dominant characteristics-DC, Organisation glue-OG, and the Management of employees. Hierarchy culture was also significant in two dimensions, Strategic emphasis-SE and the Criteria of success-CS. However, there was no significant difference in mean in the second dimension, organisational leadership-OL. Considering the mean values and the standard deviations in the leadership dimension, hierarchy culture had advantage over other culture types. The findings of this study reveal the need for culture change in the Ghanaian construction industry from the predominant adhocracy and clan orientation to a hybrid-market-hierarchy orientation to enhance project performance. The finding also supports the idea of the pluralist view that management practice/technique is supported by heterogeneity of cultural dimensions (Prajogo & McDermott, 2005; Zu et al., 2010; Gambi et al., 2015), but contradicts the unitarist view that management practice/technique is associated with a single 'homogeneous' culture (Panuwatwanich & Nguyen, 2017). Therefore, hypothesis 5a is supported.

Table 5.8: Hypotheses Tested

Hypotheses	Hypothesised Relationship	Results
H1	CMS → Project Performance	Supported
H2	OC → CMS	Supported
H3	OC → Project Performance	Partially Supported
H4	OC → CMS→ Project Performance	Partially supported
H5a	Management Strategy is Supported by Heterogeneity of cultural dimensions.	Supported
H5b	Management Strategy is Supported by Single Homogenous culture.	Unsupported

In summary, organisational culture fully contributes to construction management strategy implementation. However, it partially contributes to overall project performance in the GCI. Also, construction management strategy partially mediates the relationship between organisational culture and overall project performance.
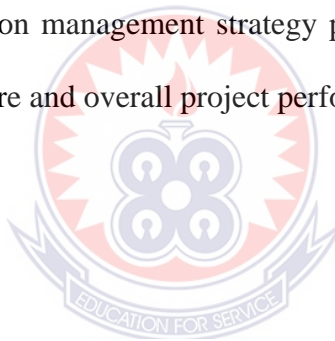
CHAPTER SIX

CULTURE-BASED FRAMEWORK

This chapter provides description of the culture-based framework components. The main aim of the development of a framework is to facilitate Ghanaian construction companies in achieving better managed and controlled processes to achieve improved outcomes in terms of meeting customers' needs and requirements, reflecting a better-quality project which will offer companies competitive advantage.

The data from the findings from the principal component analysis, examination of the associations between management strategy variables and project performance, and the influence of different organisational culture dimensions on management strategy implementation were used to develop culture-based framework for Ghanaian construction firms. The development of the framework responds to the final research objective (sixth objective). This chapter also covers the evaluation of the usefulness and applicability of the framework.
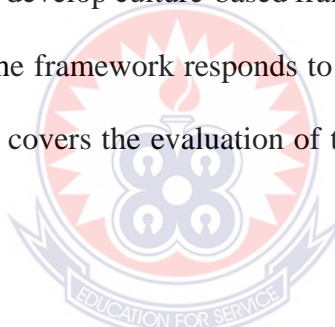
6.1 Construction Management Strategies for Improving Project Performance

The findings in section (4.6) suggest that project performance of the surveyed firms can be improved if firms take into consideration or strengthen the level of adoption of the management strategies that particularly emphasise the four CMS-dimensions: (planning related strategy, monitoring and control related strategy, stakeholder management strategy, and technology related strategy). In a more detailed assessment, the findings of this study suggest that:

i. **Planning related strategy** includes: review of past construction projects; design review for constructability; adoption of collaborative project planning; definition of tasks of team members; clarity of project mission and goals; use of alternative construction activities/methodologies; provision of reasonable buffer (safety time).

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ii. **Monitoring and control related strategy** includes: top management commitment and support; use of competent team; presence of quality assurance functions (such as quality policy, quality manual, standard operating procedures, quality audit team, and quality test); conduct of training workshops and site meetings; enclose construction site from public ; regular update of program of works; regular review of construction activities; display of health and safety posters on site, frequent preparation of interim valuation and financial statement.

iii. **Stakeholder management related strategy** includes: involvement of stakeholders in decision making; use of clients' requirements as the basis for quality; involvement of stakeholders in project monitoring and evaluation; effective stakeholders' communication (constant updates of project progress is communicated to the relevant parties); maintaining a warm working relationship with stakeholders.

iv. **Technology related strategy** includes: use of software for project planning (ie. schedule, cost, quality and resource planning); use of 3D modelling software for visualization and buildability; use of computer aided software for data processing; and use of ICT for communication (i.e. Email, WhatsApp, Zoom).

6.2 Suitable OC-Profiles that Support Effectiveness of CMS Implementation

As identified in the results (see Table 5.8), there were two culture profiles that significantly influenced the effectiveness of CMS implementation: the "market culture", and the "hierarchy culture" which are less prominent in the surveyed construction firms (see Table 5.3). This means that the existing predominant cultures (ie. adhocracy and clan) in the Ghanaian construction industry are unsuitable and requires to be changed in order to achieve higher project performance. Thus, a hybrid market-hierarchy culture is proposed as the best-fit culture profiles for driving the successful implementation of the

construction management strategy in the surveyed construction firms. Evidently, presence of these CMS-dimensions and OC profiles can lessen the existing barriers particularly related to inadequate, i.e., top management support, communication and coordination, competent personnel, consultation with stakeholders inside and outside the organisation. Thus, implementing the elements of this OC-based framework can provide better project performance leading to project success. Figure 6.1 shows the "OC-based Framework" proposed for improving construction project performance.

Hybrid Market -Hierarchy Culture

- Emphasis on result/meeting goals
- Emphasis on hard work.
- Focus on external partnership
- Focus on customer preferences
- Focus on competitiveness and achieving results
- Creation of motivation for higher levels of productivity
- Management exemplifying coordinating and organising
- Emphasis on efficiency, control and smooth operations
- Emphasis on dependable delivery, smooth scheduling, and low-cost production

Construction Management Strategy

Planning related strategy
- Review past construction projects
- Design review for constructability
- Adoption of collaborative project planning
- Definition of tasks of team members
- Clarity of project mission and goals
- Use of alternative construction activities / methodologies
- Provision of reasonable buffer (safety time)

Monitoring & controlling related strategy
- Management commitment and support
- Use of competent team
- Presence of quality assurance functions
- Provision of regular training and site meetings for employees
- Display of H/Safety posters on site
- Enclose construction site from public
- Regular update of program of works
- Regular review of construction activities
- Preparation of interim valuation and financial statement

Technology related strategy
- Use of software for planning (ie. schedule, cost, quality and resource planning)
- Use of 3D modelling for visualization and buildability
- Use of computer aided software for data processing
- Use of ICT for communication systems

Stakeholder management strategy
- Involvement of stakeholders in decision making
- Use of clients' requirements as the basis for quality
- Involvement of stakeholders in project monitoring and evaluation
- Effective stakeholder communication
- Maintaining a warm working relationship with stakeholders

Performance

Quality of work

Client satisfaction

Cost

Time

Safety

CHRM

Productivity

Environmental protection

Figure 6.1: OC-Based Framework for improving project performance

Source: Author (2021)

6.3 Validation of the OC-Based Framework

In this section, the key findings and outputs of this research are subjected to review by experts and key industry stakeholders to test their robustness. This section also reports the feedback received from the validation process.

In order to provide external validation that this framework is relevant to enhance project performance, two validations were conducted, A survey questionnaire validation was first conducted to assess the suitability and applicability of the framework. This was complemented with semi-structured interview (face-to-face interview) using interview guide to obtain qualitative data from the site managers on the usability, applicability and suggestions for improving the framework.

6.3.1 Validation Questionnaire

The validation questionnaire (see Appendix B) involved 12 respondents representing two academic researchers and ten hold up site managers. Two site managers were selected from civil contractor firms. Four site managers each were selected from large and medium-scale building contractor firms. These ten site managers did not take part in the main questionnaire survey. A major criterion for selecting the respondents was to choose professionals with more than ten years' experience of working in the Ghanaian construction industry. The aim of the validation questionnaire was to obtain the respondents' opinions related to the proposed OC-based framework. The respondents were asked to state their agreement using a Likert scale of 1 to 5, where 1 represented "strongly disagree" and 5 represented "strongly agree" whether the proposed OC-based framework that comprised: CMS elements and the organisational culture profile, would likely improve construction project performance. The validation questionnaire consists of four main parts. The results are summarised in Table 6.1 - 6.4.

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6.3.2 CMS-Dimensions Related to Project Performance

The respondents were asked to state their agreement of the strength of the CMS-dimensions (planning related strategies; monitoring and controlling related strategies; stakeholder management related strategies; and technology related strategies) to improve construction project performance. Table 6.1 suggests that the respondents indicated a high level of importance (the mean scores were higher than the mid-point (3). This means that the respondents believed that all the four CMS dimensions could improve overall project performance.

In terms of planning related strategy, the CMS dimensions necessary to improve projects performance include the following elements (as shown in Table 6.1):

i.   Review of past construction projects

ii.   Design review for constructability

iii. Adoption of collaborative project planning

iv.   Definition of tasks of team members

v.   Clarity of project mission and goals

vi.   Use of alternative construction activities/methodologies

vii. Provision of reasonable buffer (safety time)

In terms of monitoring and control, the CMS dimensions necessary to improve overall project performance included the following dimensions as shown in Table 6.1:

i.   Top management commitment and support

ii.   Use of competent team

iii. Presence of quality assurance functions

iv.   Provision of regular training and site meetings for employees

v.   Enclose construction site from public

vi.   Display of health and safety posters on site

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vii.   Regular update of program of works

viii. Regular review of construction activities

ix.   Preparation of interim valuation and financial statement

In terms of stakeholder management related strategy, the CMS dimensions necessary to improve overall project performance include the following dimensions (as indicated in Table 6.1):

i.   Involvement of stakeholders in decision making

ii.   Use of clients' requirements as the basis for quality

iii.   Involvement of stakeholders in project monitoring and evaluation

iv.   Effective stakeholders' communication

v.   Maintaining a warm working relationship with stakeholders

In terms of Technology related strategy, the CMS dimensions necessary to improve overall project performance include the following (as shown in Table 6.1):

i.   Use of software for project planning (ie. schedule, cost, quality and resource planning)

ii.   Use of 3D modelling software for visualisation and buildability

iii.   Use of computer aided software for data processing

iv.   Use of ICT for communication

Table 6.1 Validation of CMS-Dimensions Related to Project Performance

1	CMS-Dimensions	N	Mean	SD
A	Planning related strategy	12	4.02	0.52
B	Monitoring and control related strategy	12	4.04	0.50
C	Stakeholder management related strategy	12	3.98	0.49
D	Technology related strategy	12	3.91	0.51
2-A	**Planning Related Strategy**			
A-1	Reviewing of past construction projects	12	4.33	0.42
A-2	Design review for constructability	12	3.83	0.56
A-3	Adoption of collaborative project planning	12	3.92	0.48
A-4	Clarity of project mission and goals	12	4.16	0.50
A-5	Definition of tasks of team members	12	4.24	0.50
A-6	Use of alternative construction activities / methodologies	12	3.90	0.55
A-7	Provision of reasonable buffer (safety time)	12	3.75	0.62
2-B	**Monitoring & Control Related Strategy**			
B-1	Top management commitment and support	12	4.38	0.35
B-2	Use of competent team	12	4.33	0.55
B-3	Presence of quality assurance functions	12	4.16	0.48
B-4	Provision of regular training and site meetings for employees	12	3.75	0.50
B-5	Enclose construction site from public	12	3.92	0.46
B-6	Regular update of program of works	12	4.12	0.62
B-7	Display of health and safety posters on site	12	3.85	0.50
B-8	Regular review of construction activities	12	3.82	0.55
B-9	Preparation of interim valuation and financial statement	12	3.87	0.48
2-C	**Stakeholder Management Related Strategy**			
C-1	Involvement of stakeholders in decision making	12	4.15	0.38
C-2	Use of clients' requirements as the basis for quality	12	4.25	0.54
C-3	Involvement of stakeholders in project monitoring and evaluation	12	3.80	0.42
C-4	Effective stakeholder communication	12	3.78	0.62
C-5	Maintaining a warm working relationship with stakeholders	12	3.92	0.50
2-D	**Technology Related Strategy**			
D-1	Use of software for planning (schedule, cost, quality and resource planning)	12	4.02	0.36
D-2	Use of 3D modelling for visualization and buildability	12	3.82	0.66
D-3	Use of computer aided software for data processing	12	3.86	0.48
D-4	Use of ICT for communication system	12	3.92	0.54

Source: Field data (2021)

6.3.3 OC Profiles Related to CMS Implementation

The respondents were asked to state their agreement of the importance of the following organisational culture profiles to support management strategy implementation. As depicted in Table 6.2, the respondents indicated a high level of agreement that a hybrid market-hierarchy culture will provide strong support to the construction management strategy implementation.

Table 6.2: Validation of OC Profile Related to CMS Implementation

No.	OC-Profiles	N	Mean	SD
3A	**Market Culture - Dominant Characteristics, Management of Employees and Organisational Glue**			
	Emphasis on results/meeting goals	12	4.12	0.52
	Emphasis on hard work	12	3.95	0.45
	Focus on external partnership	12	3.92	0.56
	Focus on customer preferences	12	4.34	0.38
	Focus on competitiveness and achieving results	12	3.60	0.48
	Motivation for higher levels of productivity	12	4.22	0.50
3B	**Hierarchy Culture - Organisational Leadership, Strategic Emphasis and Criteria of Success**			
	Management exemplifying coordinating and organising	12	4.08	0.56
	Emphasis on efficiency, control and smooth operations	12	4.02	0.52
	Emphasis on dependable delivery, smooth scheduling, and low-cost production	12	3.92	0.65

Source**:** Field data (2021)

In terms of the dominant characteristics, management of employees and organisational glue, the organizational culture profiles necessary to provide strong support to the construction management strategies included the following profiles of market culture:

i.   Emphasis on results/meeting goals

ii. Emphasis on hard work

iii. Focus on external partnership

iv.   Customer focus

v.   Competitive and achievement focus

vi.   Motivation for higher levels of productivity

In terms of the organisational leadership, strategic emphasis and criteria of success, the OC-profiles necessary to provide strong support to the construction management strategies include the following profiles of hierarchy culture (as indicated in Table 6.2):

i.   Top management exemplifying coordinating and organising

ii.   Emphasis on efficiency, control and smooth operations

iii.   Emphasis on dependable delivery, smooth scheduling, and low-cost production.

6.3.4 Applicability of the OC-Based Framework to Improve Projects Performance

The respondents were asked to state their agreement of the strength of the organisational culture-based framework (the set of CMS-dimensions and the OC-profiles) to improve performance of construction projects. The respondents indicated a high level of agreement that this framework will contribute to improve overall project performance as shown in Table 6.3.

The feedback showed that by emphasising on planning related strategy; monitoring and control related strategy; stakeholder management related strategy and technology related strategy, and establishing market-hierarchy culture could improve the overall performance of construction projects in terms of quality of work, client satisfaction, reduction in operational cost, delivering project on time, safety of employees, competency in human resource management, productivity, and environmental protection.

Table 6.3: Validation of the OC-Based Framework to Improve Project Performance

No.	Performance of Construction Project	N	Mean	SD
1	Quality of work	12	3.92	0.55
2	Client satisfaction	12	4.24	0.48
3	Reduction in operational cost	12	3.83	0.56
4	Safety of employees	12	3.70	0.52
5	Delivering projects on time	12	3.92	0.48
6	Competency in human resource management	12	3.75	0.62
7	Productivity	12	4.16	0.46
8	Environmental protection	12	3.60	0.54

Source: Field data (2021)

6.3.5 Applicability of the OC-Based Framework to Address the Barriers

The respondents were asked to state their agreement on the strength of the organisational culture-based framework to reduce the existing internal barriers. The feedback from the respondents indicated a high level of agreement that the OC-based framework would help address the existing four main barriers related to:

i.   Inadequate communication, coordination, and commitment within the organisation (barrier-1)

ii. Inadequate top management /client support (barrier -2)

iii. Inadequate competent personnel to perform tasks appropriately (barrier -3)

iv. Inadequate consultation with stakeholders (barrier -4) as shown in Table 6.4

Table 6.4: Validation of the Applicability of the OC-Based framework to Address the Barriers to Project Success

No.	Barriers (Internal)	N	Mean	SD
Barrier 1 - Inadequate Communication, Coordination, and Commitment within the Internal and External Organisation				
A	Enhance communication among project stakeholders (ie: Clients, Consultants, Employees, Suppliers, and Regulators)	12	3.92	0.48
B	Reduce the difficulties to communicate project objectives to project respondents to achieve better project outcome.	12	3.98	0.52
C	Improve coordination among project respondents, hence leading to better project outcome	12	3.80	0.46
D	Improve commitment of project respondents to perform task properly to achieve better project outcome.	12	3.85	0.64
Barrier 2 - Inadequate Top Management /Client Support				
E	Improve top management commitment and support for project delivery	12	4.16	0.42
F	Improve client's commitment for project delivery	12	3.87	0.50
Barrier 3 -Inadequate Competent Personnel				
G	Identify the proper skills to perform the task.	12	3.78	0.55
H	Improve the competency and effectiveness of project personnel	12	4.05	0.62
Barrier 4 - Inadequate Consultation with Stakeholders				
I	Improve meaningful consultation of project stakeholders	12	3.92	0.35

Source: Field data (2021)

Following the quantitative data collection and analysis, complementary qualitative data was collected on the usability, applicability and suggestions for improving the framework. In the next section, the qualitative data is presented and analysed using content analysis.

6.3.6 Semi-Structured Interview Validation

Semi-structured interview was conducted using interview guide. The participants for the interview were eight site managers from Cape Coast Metropolis. These participants took part in the main survey. Data saturation principle was used in limiting the number of participants to eight. Data saturation used in this sense refers to a point at which no additional information was obtained from the participants. The eight site managers interviewed provided saturation data regarding the validation questions posed. Site managers working with large and medium construction firms with at least 10 years working experience were selected due to the fact that these large and medium-scale firms are experienced firms that are likely to make the effort to implement the developed framework. The selected interviewees were therefore experienced in the GCI and thus, their views were considered reliable and credible.

The participants were taken through face-to-face interview using interview guide. This provided the participants opportunity to elaborate more on the subject matter being discussed. Prior to the fixing of the interview date, the framework developed was sent to all the interviewees. To allow for convenience of the interviewees. The interviews section took place in the offices and residence of the interviewees. The verbatim text of each participant was recorded in a note book. The qualitative data (face-to-face interview) were analysed by means of content analysis technique by identifying the number of times a statement occurs. The interviewees material was analysed by proof reading to identify the themes that emerged from the interview participants answers. Each of the eight participants were given an identification code, an alphabet and a number. From A1 to A8. The first participant for example, was identified as A1. The interviewees responded to questions in relation to the usability and applicability of the framework in the GCI, and the willingness to implement the respective strategies in their own organisations if they had

the opportunity. Again, respondents were given the opportunity to offer general suggestions for improving the OC-based framework.

6.3.7 Feedback from the Semi-Structured Interview

The interviewees revealed that the framework was suitable. For example, Participant A1and A4 indicated that:

"In my own view, I think the management strategies are relevant and that it could help improve practice" (Participant A1). This was corroborated by participants A3 and A5:

"The aggressive and competitive environment we operate, I think the hybrid market-hierarchy culture framework is suitable and timely. It will help meet the expectations of our clients" (Participant A3).

"If site managers adopt the management strategies in the framework it will have a good effect on project performance" (Participant A5).

With respect to the ease of use, one participant said:

"Well, I think the framework will be easy to use and will improve performance as well" (Participants A2)

"The framework is easy to understand and can easily be implemented" (Participants A6 corroborated).

On whether the site managers will be willing to use the OC-based framework in their own organisations if they had the opportunity. Three participants had this to say:

"I am willing, the framework is useful, simple and easy to understand. It will help reduce the internal challenges faced by my firm" (Participant A7).

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"This framework is useful and easy to apply. I wish the government and other customers will pay for our services promptly to enhance our financial capacity to adopt most of the strategies "religiously" on site. I will surely implement the strategies when I get the opportunity" (Participants A8).

Amongst the key suggestions were:

i.   Examples of the quality assurance functions (such as quality policy, quality manual, standard operating procedures, quality audit team, and quality test) be provided,

ii. There was also a suggestion that the model be piloted in some selected construction firms to determine the conditions that could facilitate easy adoption of it.

iii. Two participants suggested that implementation plan of the framework could be added for effective implementation of the culture shift.

iv. Five respondents suggested that the stakeholder management strategies on the OC-based framework be given a separate box outside and be linked to the other management strategies to illustrate a better order of precedence in the CMS implementation. On this, one interview participant has this to say:

"Stakeholder management strategy flows through all the CMSs implementation in project delivery" (Participant A6).

6.3.8 Summary of the Validation of the OC-Based Framework

The mean scores of the validation questionnaires ranged from 3.60 – 4.38 on the Likert scale of 1 to 5 used. This suggests that responses were generally positive for the respective framework in terms of its suitability and applicability. The results of the interviews corroborate these findings as can be seen from two site managers' response on the usefulness of the framework, thus:

"The aggressive and competitive environment we operate, I think the hybrid market-hierarchy culture framework is suitable and timely. It will help meet the expectations of our clients and gain better corporate image" (Participant A3).

"In my own view, I think the management strategies are relevant and that it could help improve practice" (Participants A1).

With the growing competition, and different customers and stakeholders' requirements, and the urge for a community responsible image, large and medium-scale contracting organisations are being enthusiastic to improve their management practices. The site managers interviewed expressed their willingness to implement the strategies in their firms when they get the opportunity. They also expressed the need for government and other clients to pay for their services promptly to enhance their financial capacity to easily implement most of the strategies enshrined in the framework "religiously" as emphasised by two interview participants:

"I am willing, the framework is useful, simple and easy to understand. It will help reduce the internal challenges faced by my firm" (Participant A7).

"This framework is useful and easy to apply. I wish the government and other customers will pay for our services promptly to enhance our financial capacity to adopt most of the strategies "religiously" on site. I will surely implement the strategies when I get the opportunity" (Participants A5).

The suggestions made by the interview participants had been incorporated into the developed framework as required (See Fig. 6.1).

6.3.9 OC--Based Framework Implementation Plan

In order to implement the developed framework successfully in contractor organisations, Cameron and Quinn (2011), five potential steps for organisational culture change must be followed. These steps are:

i. Reach a consensus on the current culture in order to foster involvement and to minimise resistance to the culture change.

ii. Reach consensus on the desired future culture, to clarify for all concerned what the new cultural emphases will be.

iii. Determine what the changes will and will not mean, to identify what is to remain unaltered in the organisation in the midst of change.

iv. Develop a strategic action plan.

v. Develop an implementation plan to generate specific action steps that can be initiated to create momentum toward culture change.

In summary, the proposed organisational culture-based framework provides two-pronged approaches contractors/construction managers can adopt to improve overall project performance. The first approach is to try to encourage the development and maintenance of a hybrid market-hierarchy culture profile. The second approach, which will be aided by the success in the first approach, is to implement the identified construction management strategies in the framework. This organisational culture-based framework could enhance the capacity of construction firms to improve their project performance.

CHAPTER SEVEN

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

This chapter provides the summary of key findings, conclusions and recommendations of the study. The first section presents the summary while the second section covers the conclusions. The third section presents the recommendations based on the main findings, followed by the contributions to existing knowledge, and directions for further research.

7.1 Summary of the Study

The following are the findings based on the objectives of the study:

7.1.1 Objective 1: To determine the level of implementation of the construction management strategies

The study revealed that the surveyed construction firms implement construction management strategies (planning related strategy, monitoring and control related strategy, stakeholder management related strategy and technology related strategy) to a moderate extent. Top management support and commitment was the highest implemented sub-strategy. Technology related strategy, and training of employees, involvement of stakeholders in monitoring and evaluation, conduct of site meetings, presence of quality assurance functions, use of alternative construction activities, and provision of reasonable buffer sub-strategies were unattractive in the surveyed firms.

7.1.2 Objective 2: To examine the effects of construction management strategy on overall project performance

Management strategy does appear to be an explicit predictor of project performance. The study revealed that all the management strategies identified (planning related strategy, monitoring and control related strategy, stakeholder management related

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strategy and technology) had significant positive effects on overall project performance. Also, the combined set of the management strategies had a significant positive association with the overall project performance.

7.1.3 Objective 3: To examine the effects of organisational culture types on implementation of construction management strategy

Using Competing Value Framework, the dominant organisational culture type of the surveyed firms was adhocracy culture. This was followed by clan, market, and hierarchy cultures. All the organisational culture types (market, hierarchy, adhocracy, and clan) had significant association with implementation of management strategy. However, market culture type had the highest predictive effects. Also, findings of this study support the idea of the pluralist view that management practice/technique is supported by heterogeneity of cultural dimensions (Prajogo & McDermott, 2005; Zu et al., 2010; Gambi et al., 2015), but contradicts the unitarist view that management practice/technique is associated with a single 'homogeneous' culture (Panuwatwanich & Nguyen, 2017).

7.1.4 Objective 4: To examine the effects of organisational culture types on performance of construction projects

The study revealed that market and hierarchy culture types had significant positive effects on overall projects performance. However, clan and adhocracy culture types had no significant effects on overall project performance.

7.1.5 Objective 5: To determine the mediating role of management strategy in organisational culture and project performance relationship

The study revealed that management strategy partially mediates the relationship between market and hierarchy culture types and project performance; and fully mediates clan and adhocracy culture types and project performance.

7.1.6 Objective 6: To develop culture-based framework for building the capacity of construction firms to improve their project performance

The organisational culture-based framework had been developed. This was done by changing the existing predominant adhocracy culture to a set of hybrid market-hierarchy culture and CMS-dimensions. This framework has been externally validated and deemed suitable, applicable and capable of improving project performance.

7.2 Conclusions of the Study

Based on the objectives, this research concludes that:

i. Contractors in Ghana implement construction management strategies to moderate extent.

ii. Effective planning efforts, monitoring and control, stakeholder's engagement, and use of technology and digital tools contribute to improving overall project performance in the Ghanaian construction industry.

iii. Organisational culture fully contributes to construction management strategy implementation.

iv. Organisational culture partially contributes to overall project performance in the Ghanaian construction industry.

v. Construction management strategy mediates the relationship between organisational culture and overall project performance.

vi. Organisational culture-based framework developed could enhance the capacity of construction firms in Ghana to improve their project performance.

In conclusion, organisational culture types (market and hierarchy) and management strategies (effective planning, monitoring and control, stakeholder involvement, and use of technology and digital tools) positively and significantly affect construction project performance in Ghana.

7.3 Recommendations

Based on the conclusions of this study, the following recommendations are made to enhance the project performance of construction firms in Ghana:

i. Awareness should be created among construction organisations and public institutions such as government agencies and professional bodies about the importance of organisational culture, project planning related strategies, monitoring and controlling related strategies, stakeholder's engagement, and use of technology and digital tools in project delivery.

ii. Contractors should:

- attach importance to project planning efforts, monitoring and controlling, stakeholder's engagement, use of technology and digital tools as well as their organisational culture in project delivery.

- Construction organisations should strengthen their market and hierarchy cultures so as to support their CMSs implementation and project performance.

- Adopt the strategies presented in the framework to assess their project management strategies in their respective firms. Based on the outlook of their management performance, the management could facilitate appropriate change or not in their project management approaches.

iii. Policy makers whose policies affects the Ghanaian construction industry such as (MMDA, MRH and MWRWH) recognising the importance of corporate culture and project management strategies in project delivery, should consider the framework in the assessment and procurement of contractors for project.

iv. Recognised construction associations like ABCECG, Ghana Institution of Engineers (GhIE), Institution of Engineering and Technology, Ghana (IET-GH), Ghana Institution of Construction (GIOC), and Ghana Institution of Surveyors (GIS) should provide professional training for their members to develop their project management skills on the culture-based framework developed in this study to enhance their capacity to integrate the framework in their operations.

7.4 Contributions to Knowledge

This research has introduced a culture-based framework for construction firms in Ghana, which has never been previously developed. This section presents the contributions of the study in terms of theory, management decision-making, practice, and policy. In terms of contribution to theory, the current study combines construction management theory, CVF theory and project performance measures into a coherent whole under a resourced-based view theory framework. This study is the first in the area of construction project management to explore the effects of organisational culture and management strategy on project performance concepts in construction setting. Previous researchers examined such concepts separately (Coffey & Willar, 2010; Yazici, 2011; Ramanayaka, 2013; Nguyen & Watanabe, 2017; Panuwatwanich &, Nguyen, 2017; Adebayo, Eniowo & Ogunjobi, 2018), and there is no existing research dealing with the direct and indirect relationship of these concepts when considered together. A unique strength is found in terms of the mediating role of strategy in the relationship between organisational culture and overall project performance.

Also, the combined effects of the set of management strategies (planning, monitoring and control, stakeholder involvement and use of technology and digital tools) on overall project performance examined in this study has not been previously determined. This study also extends previous studies of the relationship between organisational culture, quality management/technique and performance by focusing on construction setting; and confirms the pluralist view at the level of management strategy / technique.

In terms of management decision-making, the provision of the set of management strategies and a hybrid market-hierarchy culture framework will enable quicker decisions by managements when considering organisational or project areas to improve and enhance value judgments by decision makers. Improved and faster decision making will improve project completion times leading to overall cost savings, and increased productivity. In terms of the contribution to practice, this study serves as a checklist for construction firms (especially underperformed contractors) to assess their organisational cultures and management practices which will inform management decisions to re-orient their strategy to achieve better project performance.

In the context of the contribution to policy, the proposed framework provides best practices of project management strategies which will enable policy makers such as the Ministry of Road and Highways (MRH), the Ministry of Works and Housing (MWH), The Ministry of Special Development Initiatives (MSDI), Metropolitan, Municipal and District Assemblies responsible for the policies that have an effect on the construction industry in Ghana to assess the capacity and performance of construction contractors.

7.5 Limitations of the Study

This research has certain limitations, each of which suggests a need for further research. First, the study asked for perceived data about organisational culture, management strategies and project performance in the surveyed firms. The willingness of the respondents to reveal weaknesses in their respective firms was uncertain. Also, there was lack of control over who actually completed the survey.

7.6 Directions for Future Research

A number of future researches can be considered. First of all, future research should use different methodologies, qualitative design to develop a deeper understanding of the mechanisms behind the statistical relationships reported in this study.

Second, future study could look at how organisational culture and strategy affect employee performance. Third, this research has considered the effects of organisational culture on project performance. Some research in operations management explores how national cultures affect the management of different areas of operations. In this vein, the organisational culture perspective of this study could be extended to consider the effects of national culture on project performance. Fourth, future research could benefit from disaggregating the performance variable to understand their relationships with CMS implementation. Thus, research can be conducted on the relationship between construction management strategies and specific project outcomes such as quality of work, cost, customer satisfaction, delivery time, and safety of employees, competency in human resource management, labour productivity, and environmental protection.

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APPENDICES

APPENDIX A

QUESTIONNAIRE SURVEY

The purpose of this questionnaire is to examine the effects of organisational culture and strategy on performance of construction firms in Ghana. This study is solely for academic purposes and your responses will be treated as strictly confidential. All information collected will only be used for academic research. Your participation is entirely voluntary and you can decide to withdraw from further participation without comment or penalty.

Please click (√) the appropriate box that describes the circumstances and in ways that are usually occurred and done in your organisation. After all information is collected and analyzed, the findings from this study will be provided based on request to the organisations that participated in this study. If you have any question regarding this survey, please do not hesitate to contact me (the researcher):

Frank Ackon

PhD Student – University of Education, Winneba

Mobile: 0243942867

Email: frankackon@gmail.com
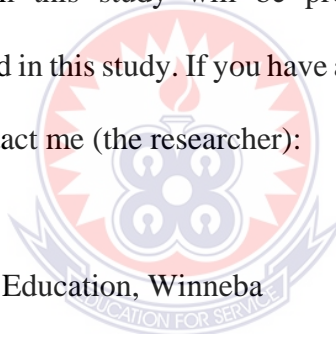
SECTION A: DEMOGRAPHIC INFORMATION

Please respond to the following questions by clicking (√) the appropriate box, or in the space provided.

Q1. Gender

Male [ ]   Female   [ ]

Q2. How long have you been employed by the company?

Under 5 years [ ];   5 – 10 years [ ]; 11 - 15years [ ]; More than 15 years [ ]

Q3. What is your highest academic qualification?

 (a) Construction Technician Certificate [ ] (b) Higher National Diploma [ ]

 (c) Bachelor's Degree [ ]   (d) Master Degree [ ]   (e) PhD Degree [ ]

Q4. What type of construction work does your company undertake?

(a) Civil [ ]   (b) Building Construction [ ]   (c) both Building & Civil [ ]

Q5. How long has the company been operating?

   (a) Less 10 years [ ];   (b) 10 - 15years [ ];   (c) 16 – 20 years [ ];

   (d) Above 20 years [ ]

Q6. What is your company classification based on MWRWH?

   (a) D1K1 [ ];   (b) D2K2 [ ];   (c) D3K3 [ ];   (d) D4K4 [ ]

SECTION B

ORGANISATIONAL CULTURE ASSESSMENT INSTRUMENT (OCAI)

For the following statements please indicate the option that matches your view most closely. **(**1 – Strongly disagree; 2 – Disagree; 3 – Neither agree nor disagree;

4 – Agree; 5 – Strongly agree)

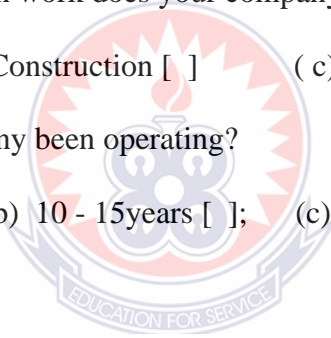| SN	Organisational Culture Variables	1	2	3	4	5
1	**Dominant Characteristics**					
A	This firm is a very personal place. It is like a family. People seem to share a lot of themselves	1	2	3	4	5
B	This firm is a very dynamic and entrepreneurial place. People are willing to stick their necks out and take risks	1	2	3	4	5
C	This firm is very results-oriented. A major concern is with getting the job done. People are very competitive and achievement-oriented	1	2	3	4	5
D	This firm is very controlled and structured place. Formal procedures generally govern what people do	1	2	3	4	5
2	**Organisational Leadership**					
A	The leadership in this firm is generally considered to exemplify mentoring, facilitating, or nurturing	1	2	3	4	5
B	The leadership in this firm is generally considered to exemplify entrepreneurship, innovation or risk taking	1	2	3	4	5
C	The leadership in this firm is generally considered to exemplify a no-nonsense, aggressive, results-oriented focus.	1	2	3	4	5
D	The leadership in this firm is generally considered to exemplify coordinating, organizing, or smooth-running efficiency	1	2	3	4	5
3	**Management of Employees**					
A	The management style in this firm is characterized by teamwork, consensus, and participation	1	2	3	4	5
B	The management style in this firm is characterized by individual risk taking, innovation, freedom and uniqueness	1	2	3	4	5
C	The management style in this firm is characterized by hardworking competitiveness, high demands and achievement	1	2	3	4	5
D	The management style in this firm is characterized by security of employment, conformity, predictability, and stability in relationships	1	2	3	4	5

4	**Organisational Glue**					
A	The glue that holds this firm together is the loyalty and mutual trust. Commitment to this organisation runs high	1	2	3	4	5
B	The glue that holds this firm together is commitment to innovation and development. There is an emphasis on being on the cutting edge	1	2	3	4	5
C	The glue that holds this firm together is the emphasis on achievement and goal accomplishment	1	2	3	4	5
D	The glue that holds this firm together is formal rules and policies. Maintaining a smooth-running organisation is important	1	2	3	4	5
5	**Strategic Emphases**					
A	This firm emphasizes human development. High trust, openness, and participation persist	1	2	3	4	
B	This firm emphasizes acquiring resources and creating new challenges. Trying new things and prospecting for opportunities are valued	1	2	3	4	
C	This firm emphasizes competitive actions and achievement. Hitting stretch targets and winning in the marketplace are dominant	1	2	3	4	
D	This firm emphasizes permanence and stability. Efficiency, control and smooth operations are important	1	2	3	4	
6	**Criteria of Success**					
A	This firm defines success on the basis of the development of human resources, teamwork, employee commitment, and concern for people	1	2	3	4	5
B	This firm defines success on the basis of having the most unique or newest products. It is a product leader and innovator	1	2	3	4	5
C	This firm defines success on the basis of winning in the marketplace and outpacing the competition. Competition market leadership is key	1	2	3	4	5
D	This firm defines success on the basis of efficiency. Dependable delivery, smooth scheduling, and low-cost production are crucial	`1	2	3	4	5

SECTION C: CONSTRUCTION MANAGEMENT STRATEGIES

Based on your experience in your company, please rate to what extent (using a scale of 1–5) the following management strategies are implemented in your company.

1= very low   **2**= low   **3** = moderate   **4** = high   **5** = very high

SN	Construction Management Strategies	1	2	3	4	5
1	Our top management provides the needed commitment and support	1	2	3	4	5
2	Our site managers clearly define the tasks of team members	1	2	3	4	5
3	Our site managers involve stakeholders in in decision making	1	2	3	4	5
4	Our site managers apply reasonable buffer (safety time) in project management	1	2	3	4	5
5	Our site managers review past construction projects before implementing a new project	1	2	3	4	5
6	Our site managers use competent project team	1	2	3	4	5
7	Our managers use clients' requirements as the basis for quality	1	2	3	4	5
8	Our site managers regularly update program of works	1	2	3	4	5
9	Our site managers adopt collaborative planning technique (ie. schedule, budget, quality, materials, and equipment planning etc.)	1	2	3	4	5
10	Our site managers enclose construction site from public	1	2	3	4	5
11	Our site managers use computer aided software for data processing	1	2	3	4	5
12	Our site managers ensure that project mission and goals are well understood	1	2	3	4	5
13	Our site adopts alternative construction activities /methodologies	1	2	3	4	5
14	Our site managers maintain a warm working relationship with stakeholders	1	2	3	4	5
15	Our site managers provide training workshop and site meetings.	1	2	4	5	5
16	Managers in this company uses 3D modelling for visualization and buildability	1	2	3	4	5

17	Managers in the company uses software for planning (schedule, cost, quality and materialsequipment	1	2	3	4	5
18	Our site managers regularly review construction activities	1	2	3	4	5
19	We have quality assurance functions on site	1	2	3	4	5
20	Our site managers review project drawings and specifications prior to authorisation for construction works	1	2	3	4	5
21	Managers uses ICT for communication	1	2	3	4	5
22	Our site managers ensure prompt information to project stakeholders	1	2	3	4	5
23	Our site managers implement environmental protection policy	1	2	3	4	5
24	Our site managers provide health and safety manual to workers on site	1	2	3	4	5
25	Our company practice reward and incentive system	1	2	3	4	5
26	Our site managers frequently prepare interim valuation and financial statement	1	2	3	4	5
27	Managers display health and safety posters on site	1	2	3	4	5
28	Our workers wear protective clothing on site	1	2	3	4	5
29	Our site managers establish clear organisational structure and delegate authority	1	2	3	4	5
30	Our site managers involve key stakeholders in project monitoring and evaluation	1	2	3	4	5
31	Our site managers implement logistic and supply chain management	1	2	3	4	5
32	Our site managers implement IT system for site security	1	2	3	4	5

SECTION D

QUESTIONS RELATED TO COMPANY'S PROJECT PERFORMANCE

DURING THE IMPLEMENTATION OF THE MANAGEMENT STRATEGIES

The following statements indicate several project performance indicators of a construction

organisation. How would you assess your company's project performance, particularly

during the implementation of the management strategies? Please respond to each statement

by clicking (√) the appropriate box.

5 = Very   high   4 = High   3=Average   2 = Low

1 = Very low

ID	Project Performance Indicators	1	2	3	4	5
P1	**Quality of work** (e.g. quality of work done by your company is accepted by the client at the first time);	1	2	3	4	5
P2	**Cost** (e.g. In your company, projects are completed within budget)	1	2	3	4	5
P3	**Client satisfaction** (e.g. clients are generally satisfied with the company's performance);	1	2	3	4	5
P4	**Safety of employees** (e.g. in your company, the number of accidents at work place has reduced over the last five years);	1	2	3	4	5
P5	**People** (e.g. in your company, human resources are managed effectively; employees are generally satisfied in the company)	1	2	3	4	5
P6	**Productivity** labour efficiency (e.g. in your company, labour is used efficiently)	1	2	3	4	5
P7	**Project delivery time** (e.g. in your company, projects are generally delivered on time)	1	2	3	4	5
P8	**Environmental impact** Environmental protection policies are implemented on site	1	2	3	4	5

SECTION E: PROBLEMS MILITATING AGAINST PROJECT SUCCESS

The following statements relate to problems militating against project success in Ghana.

Please indicate the extent to which your company experience these problems.

1 = Very high   2 = High   3 = Moderate   4 = Low   5 = Very low

ID	Barriers	1	2	3	4	5
B1	Bureaucracy in public institutions	1	2	3	4	5
B2	Delayed payments	1	2	3	4	5
B3	Inadequate top-management commitment and support	1	2	3	4	5
B4	Inadequate consultation with stakeholders	1	2	3	4	5
B5	Inadequate experience and competent project personnel	1	2	3	4	5
B6	Inadequate communication, coordination, and commitment among stakeholders	1	2	3	4	5

Thank You for your participation

APPENDIX B

VALIDATION QUESTIONNAIRE

SECTION A

Construction Management Strategy Dimensions

How important is the following CMS-dimensions to improve project performance?	**0**	**1**	**2**	**3**	**4**	**5**
	No	**Yes**				
A Planning related strategy	0	1	2	3	4	5
B Monitoring and Control related strategy	0	1	2	3	4	5
C Stakeholder Management related strategy	0	1	2	3	4	5
D Use of Technology related strategy	0	1	2	3	4	5
2-A **How important are the following elements of "Planning related strategy" in enhancing project performance?**						
A-1 Review of past construction projects	0	1	2	3	4	5
A-2 Design review for constructability	0	1	2	3	4	5
A-3 Adoption of collaborative planning (ie. material, quality, time, budget, health and safety)	0	1	2	3	4	5
A-4 Clarity of project mission and goals	0	1	2	3	4	5
A-5 Definition of tasks of team members	0	1	2	3	4	5
A-6 Use of alternative construction method	0	1	2	3	4	5
A-7 Provision of buffer (safety time)	0	1	2	3	4	5
2-B **How important are the following elements of "Monitoring & Control related strategy" in enhancing project performance?**						
B-1 Top management commitment and support	0	1	2	3	4	5
B-2 Use of competent team	0	1	2	3	4	5
B-3 Provision of quality assurance	0	1	2	3	4	5
B-4 Provision of regular training and site meetings	0	1	2	3	4	5
B-5 Enclose construction site from public	0	1	2	3	4	5
B-6 Regular update of program of works	0	1	2	3	4	5
B-7 Display of health and safety posters on site	0	1	2	3	4	5
B-8 Regular review of construction activities	0	1	2	3	4	5
B-9 Preparation of interim valuation and financial statement	0	1	2	3	4	5

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2-C	How important are the following elements of "Stakeholder management related strategy" in enhancing project performance?						
C-1	Involvement of stakeholders in decision making	0	1	2	3	4	5
C-2	Use of clients' requirements as the basis for quality	0	1	2	3	4	5
C-3	Involvement of stakeholders in project monitoring and evaluation	0	1	2	3	4	5
C-4	Effective stakeholders' communication	0	1	2	3	4	5
C-5	Maintaining a warm working relationship with stakeholders	0	1	2	3	4	5
2-D	How important are the following elements of "Technology related strategy" in enhancing project performance?						
D-1	Use of software for planning (Schedule, budget, quality and materials and equipment planning etc.)	0	1	2	3	4	5
D-2	Use of 3D modelling for visualization and buildability	0	1	2	3	4	5
D-3	Use of computer aided software for data processing	0	1	2	3	4	5
D-4	Use of ICT for communication	0	1	2	3	4	5

Note for the value/size of level of significance: No /not important = 0; Yes= range from 1

– 5, indicates the level of significance from "very low" to" very high"

SECTION B

Organisational Culture-Profiles Related to CMS Implementation

N	How important is the following OC-profiles to support CMS Implementation?	0	1	2	3	4	5
A	**Market Culture** Dominant Characteristics, Management of Employees and Organisational Glue						
1	Results oriented - Concern with getting the job done. People are very competitive and achievement oriented	0	1	2	3	4	5
2	Hard - driven competitiveness, high demands, and achievement	0	1	2	3	4	5
3	Emphasis on achievement and goal accomplishment	0	1	2	3	4	5
4	Focus on customer preferences and external partnership	0	1	2	3	4	5
6	Motivation for higher levels of productivity	0	1	2	3	4	5
B	**Hierarchy Culture** Organisational Leadership, Strategic Emphasis and Criteria of Success						
1	Top management exemplifying coordinating and organizing	0	1	2	3	4	5
2	Emphasis on efficiency, control and smooth operations	0	1	2	3	4	5
3	Emphasis on dependable delivery, smooth scheduling, and low-cost production	0	1	2	3	4	5

Note for the value/size of level of significance: No /not important = 0; Yes= range from 1 – 5, indicates the level of significance from "very low" to" very high"

SECTION C

Applicability of the OC-Based Framework to Improve Construction Project

Performance

N	Can the OC based framework improve the construction project performance, in terms of;	0	1	2	3	4	5
		No	Yes				
1	Quality of work	0	1	2	3	4	5
2	Customer satisfaction	0	1	2	3	4	5
3	Reduction in operational cost	0	1	2	3	4	5
4	Safety of employees	0	1	2	3	4	5
5	Delivering projects on time	0	1	2	3	4	5
6	Competency in human resource management	0	1	2	3	4	5
7	Productivity	0	1	2	3	4	5
8	Environmental impact	0	1	2	3	4	5

Note for the value/size of level of significance:

No /not important = 0, Yes= range from 1 – 5, indicates the level of significance from "very low" to" very high"

SECTION D

Applicability of the OC-Based Framework to Address the Existing Internal Barriers

Barrier 1: Inadequate communication, coordination, and commitment within the internal and external organisation. The implementation of the framework will:	**0**	**1**	**2**	**3**	**4**	**5**
	No	**Yes**				
A	Enhance communication among project stakeholders (ie: Clients, Consultants, Employees, Suppliers, and Regulators)	0	1	2	3	4	5
B	Reduce the difficulties to communicate project objectives to project respondents to achieve better project outcome.	0	1	2	3	4	5
C	Improve coordination among project respondents, hence leading to better project outcome	0	1	2	3	4	5
D	Improve commitment of project respondents to perform task properly to achieve better project outcome.	0	1	2	3	4	5
Barrier 2: Inadequate top management/client support. The implementation of the framework will:						
E	Improve top management commitment and support for project delivery	0	1	2	3	4	5
F	Improve client's commitment for project delivery	0	1	2	3	4	5

Barrier 3: Inadequate competent personnel.							
The implementation of the framework will:							
G	Identify the proper skills to perform the task.	0	1	2	3	4	5
H	Improve the competency and effectiveness of project personnel	0	1	2	3	4	5
Barrier 4: Inadequate consultation with stakeholders. The implementation of the framework will:							
I	Improve meaningful consultation of project stakeholders	0	1	2	3	4	5

Note for the value/size of level of significance:

No /not important = 0, Yes= range from 1 – 5, indicates the level of significance from "very low" to" very high"
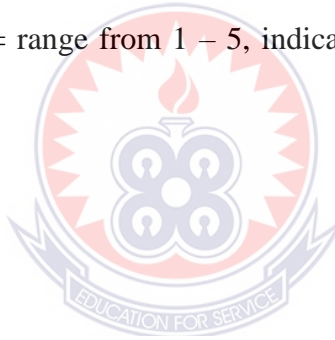
APPENDIX C

SEMI-STRUCTURED INTERVIEW GUIDE

FOR FRAMEWORK VALIDATION

1. Could you please tell me years you have worked in the GCI?

2. Could you please tell me your academic qualification (ie: HND, BSc, Masters) ?

3. Could you please tell me your company classification- (D1/K1, D2/K2, D3/K3, D4/K4) ?

4. Could you please explain the nature of works undertaken by your company?

5. In your opinion, how relevant is the hybrid market-hierarchy culture strategy as outlined in the developed framework?

6. Are the management strategies advocated by the developed framework relevant given the prevailing circumstances of Ghanaian construction companies?

7. Would the framework help to improve construction project delivery when implemented by a construction company?

8. Can the framework be modified to enhance its applicability or implementation?

9. What are your suggestions for making the developed framework most appealing to practitioners?

10. Do you have any question you wish to ask me?

11. I hope I will be accorded the same opportunity the next time I call upon you.

Thank you
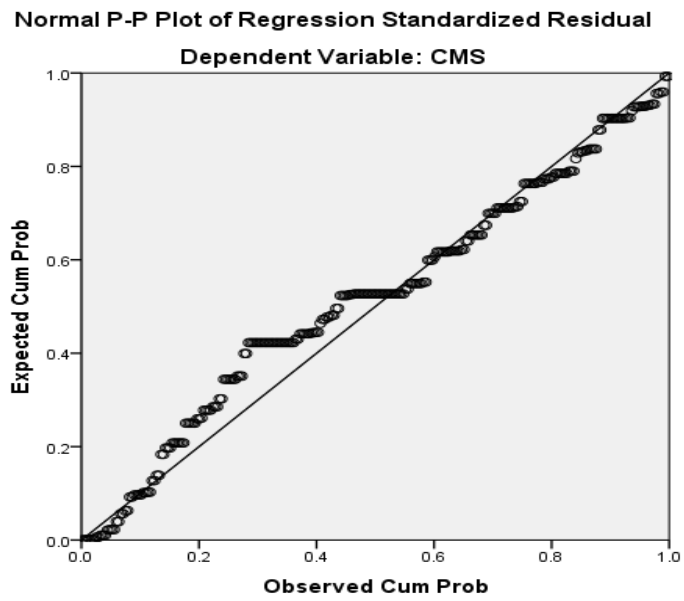
APPENDIX D

NORMAL P-P PLOT OF CMS AND PERFORMANCE
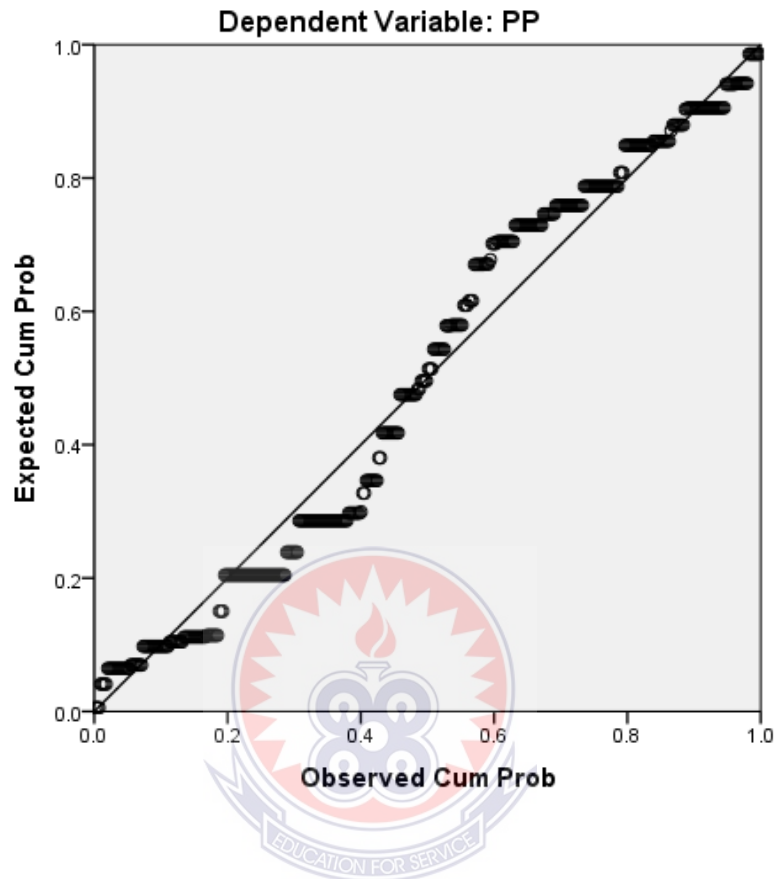
Normal P-P Plot of Regression Standardized Residual of CMS Variables and Project Performance

APPENDIX E

NORMAL P-P PLOT OF OC TYPES AND CMS

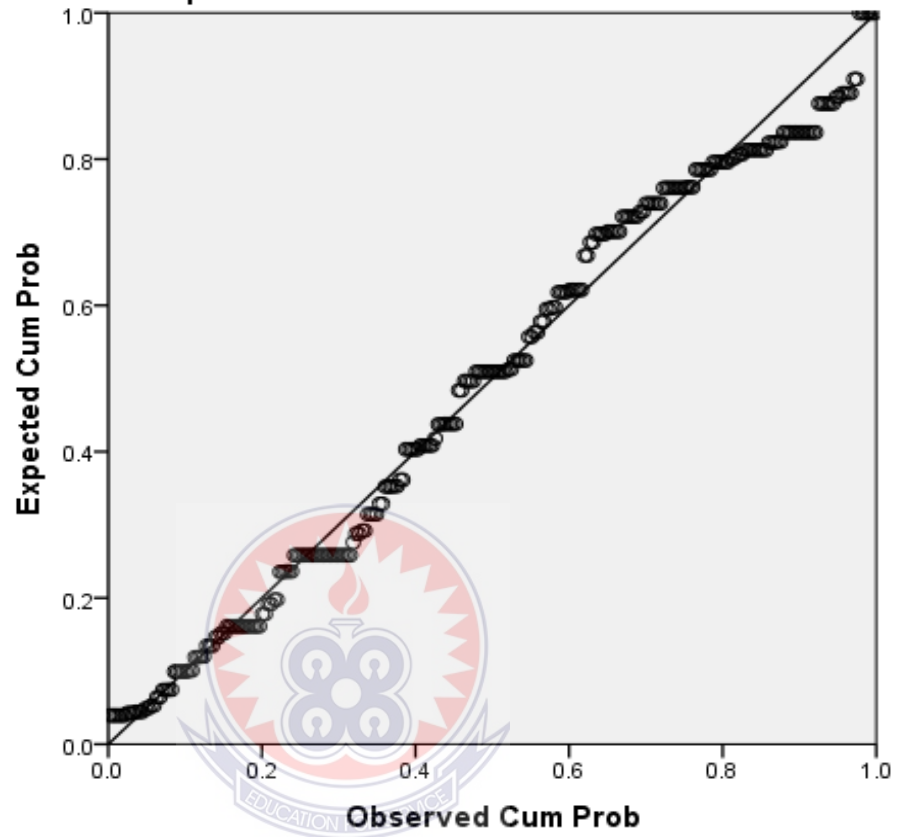**Normal P-P Plot of Regression Standardized Residual of OC types and CMS**

APPENDIX F

Normal P-P PLOT OF OC TYPES AND PERFORMANCE

Normal P-P Plot of Regression Standardized Residual of OC types and Performance

APPENDIX G

Levene's Test of Homogeneity

No	Cultural Profile	Levene Statistic	df1	df2	Sig
1	Dominant Characteristics	13.192	3	258	0.235
2	Organisational Leadership	1.123	3	258	0.340
3	Management of Employees	12.163	3	258	0.283
4	Organisation Glue	18.485	3	258	0.415
5	Strategic Emphasis	14.634	3	258	0.146
6	Criteria of Success	14.483	3	258	0.0876

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