UNIVERSITY OF GHANA

FACTORS INFLUENCING THE ACHIEVEMENT OF IT-BUSINESS ALIGNMENT IN DEVELOPING ECONOMIES: EVIDENCE FROM GHANA'S PUBLIC INSTITUTIONS OF HIGHER LEARNING

BY:

OFOSU DICKSON

(10636776)

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DECLARATION

I do hereby declare that this work is the result of my own research and has not been presented by anyone for any academic award in this or any other university. All references used in this work have been fully acknowledged.

I therefore bear responsibility for any shortcomings.

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Ofosu Dickson Date

(10636776)

CERTIFICATION

I hereby certify that this thesis was supervised in accordance with procedures laid down by the University.

_____ _____

Prof. Richard Boateng Date

(Supervisor)

_____ _____

Dr. Acheampong Owusu Date

(Co-Supervisor)

DEDICATION

I dedicate this to God Almighty and to all who one way or the other helped make this possible.

God bless you all

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First and foremost, my greatest appreciation goes to almighty God for his grace and mercies. I owe this to him.

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LIST OF ACRONYMS AND ABBREVATIONS

IT	Information Technology
IS	Information Systems
ICT	Information Communication Technology
SAM	Strategic Alignment Model
GoG	Government of Ghana
IGF	Internally Generated Funds
ERP	Enterprise Resource Planning
LMS	Learning Management System
NCTE	National Council for Tertiary Education
NAB	National Accreditation Board
CSF	Critical Success Factors
CIO	Chief Information Officer

ABSTRACT

Application of IT in institutions of higher learning has become unavoidable and remains constantly increasing. Many institutions are investing heavily in IT in order to stay competitive. Studies have however shown that majority of these investments do no deliver value. The higher education sector is believed to be one of the sectors with high IT investment wastage. It is for this reason the concept of IT-Business alignment which involves finding harmony between IT, and business strategy and objectives has become a concern for both IT and Non-IT executives. Despite the popularity of the concept, review of available literature shows the concept is not only less popular in developing economies and the education sector but also factors influencing its achievement remain underexplored. It is for this reason that studies which attempt to identify factors influencing the achievement of IT-Business alignment and generate new knowledge have become necessary.

The purpose of this study is to examine the nature of IT, the state of IT-Business alignment, as well as factors influencing the achievement of IT-Business alignment in Ghanaian public institutions of higher learning using Schlosser and Coltman's (2012) IT-Business alignment dimensions model as a lens. Based on the assumptions of the interpretivism research paradigm and qualitative research principles, a two round online Delphi survey was employed to elicit responses from persons in IT leadership position in Ghanaian public institutions of higher learning. These persons were purposively selected in line with the principles of Delphi Technique.

Findings show that publicly owned Ghanaian institutions of higher learning have well-structured IT functions and are investing heavily in IT just like other sectors. IT-Business alignment is also greatly achieved in most of their core operational areas despite few challenges. Factors identified to influence the achievement of the various dimensions of the concept include: IT and Business artifact mapping, IT Success, Decentralization of IT function, IT-Business Partnership, Closing IT-Business communication gap through cross functional skill/knowledge acquisition, Mutual trust and respect. Other factors include: Common understanding and appreciation of institutional goals, Technical skills and knowledge of IT staff, Cross-functional knowledge and skills of IT and non-IT staff, Top management commitment, Leadership skills of IT executives, Future-Proof IT investment, and Investment in desired future environment.

This study has contributed to research by extending Schlosser and Coltman's (2012) IT-Business alignment dimensions model further to include an environmental dimension thereby broadening the understanding of factors that influence the achievement of the concept. In terms of recommendations, IT staff should seek business knowledge in order to understanding the implications of their actions on the performance of their institutions. Likewise, Non-IT staff should also be interested in gaining knowledge and skills IT as this help them understand the value of IT investments. Secondly IT-Business alignment should be an organization-wide concern not just a tactical issue.

Key limitations of this study include the scarcity of IT-Business alignment literature in the context of developing economies as well as the higher education sector, time constraint, and narrow research scope. Future studies should consider widening the net to include privately owned institutions of higher learning. And in terms of methodology, a different methodology may perhaps produce different results.

CHAPTER ONE

INTRODUCTION

1.1 Research Background

> *''Information Technology is a very important aspect of higher education institutions (HEI) in both teaching, research and administration. The managers of those intuitions are more and more aware that IT is a strategic tool for their institutions.''* (Khouja, Rodriguez, Ben Halima, & Moalla, 2018)

Though education is the most crucial tool for development (Paul, Bhuimali, & Aithal, 2017a), traditional educational models in many developing economies arguably do not stand a chance of delivering the needed development in this age of technological advancement. The rapid takeover of information technologies is quite enormous and has left individuals, societies and institutions no choice but to conform or be left behind (Tierney & Drury, 2013). More specifically, IT has been identified as one of the most efficient and effective tools for educational management (Shah, 2014). It is of no surprise its application has increased astronomically, leading to the rapid and continuous transformation we see in the educational sector today (Alghamdi & Sun, 2017). According to Mazumder (2015) IT and Business have become so entwined that it will not be wrong to suggest that leveraging IT has become a major source of competitive advantage and profitability in this digital age. From an administrative and support role, IT currently plays a strategic role in businesses both small and large (Coltman, Tallon, Sharma, & Queiroz, 2015), by providing the data and tools required for decision making and implementation.

It is however important to note that IT sophistication and application varies across industries, economies, countries and continents. Though ranked with the lowest IT development index, Africa has seen the fastest development in IT in recent years (Howell, van Beers, & Doorn, 2018). The advancement in the use of computers, internet, radio and television has not only connected Africa to the rest of the world but also changed how business is done and how public institutions are managed (Adams & Adams, 2019). All sectors of Africa's economy are gradually being transformed by Technology (Adams & Adams, 2019). Specifically in higher education, IT is gradually becoming inevitable as its importance has been laid to bear with several institutions showing evidence of its positive transformative effect (Lubega, 2017). This explains the heavy IT investment we see in the sector today (Salim & Seman, 2013). Studies have however shown that majority of these investments do not deliver value. The higher education sector is believed to be one of the sectors with high IT investment wastage (Alghamdi & Sun, 2017).

One strategy however known to help navigate the mysteries surrounding IT investment value realization is Strategic IT-Business Alignment. Luftman (2000) postulate Strategic IT-Business Alignment as the appropriate and timely application of IT in line with business objectives. The concept is believed to have a positive relationship with performance and capable of creating competitive advantage as well as helping organizations realize the value of their IT investment (Alaceva & Rusu, 2015). According to Mazumder (2015), IT-Business alignment ensures that various IT infrastructure and processes leverage and sustains a firm's business strategy. Tanriverdi *et al*. (2010) cited IT-Business Alignment among the three main directions in information systems research.

1.2 Research Problem

Strategic IT-Business Alignment is known to be one of the means by which institutions can improve IT usage at the same time identify the true value of IT investment in order to maximize returns (Charoensuk, Wongsurawat, & Khang, 2014). Studies have shown that a firm is unlikely to enjoy competitive advantage if its IT Strategy and Business strategy are not aligned (Aversano, Grasso, & Tortorella, 2012). The struggle of many researchers and practitioners has therefore been to understand what Strategic IT-Business Alignment really entails and how it can be achieved and maintained (Carvalho & Sousa, 2008). It is for this reason the concept has received a great deal of attention over the past decades. Though several management and measurement models have been proposed by researchers (Bhattacharya, 2017; Aversano *et al*., 2012; Beimborn, Schlosser, & Weitzel, 2009), the components, achievement principles and maintenance of the concept still remain unclear (Gerow, Thatcher, & Grover, 2015). IT-Business alignment has remained a major challenge for both researchers and business professionals. Kappelman *et al*. (2015) for instance saw Strategic IT-Business Alignment emerging the number one IT management issue among IT leaders in their 2015 survey on IT trends and issues. Deloitte LLP in their 2016-2017 Global CIO Survey also ranked Strategic IT-Business Alignment among the top three challenges of CIOs.

Part of the problem is believed to be the aged nature of IT-business alignment models and constructs (Coltman *et al*., 2015). This is because of the constant advancement in technology which leads to the continuous surfacing of new innovations forcing legacy systems to be disposed completely or extended every now and then. Same applies to business strategies: competition among businesses and the constantly changing business environment has led to the continuous adjustment of business strategies by organizations in order to stay competitive. This

in essence makes Strategic IT-Business alignment a dynamic process requiring retesting of proposed model and constructs as well as generations of fresh knowledge at all times.

Furthermore, some key aspects of the concept such as factors influencing its achievement and maintenance remain under-explored despite the expansive research attention the concept has received (Alaceva & Rusu, 2015; Coltman *et al*., 2015; Kurti, Barolli, & Sevrani, 2013). Most of the few studies found attempting to identify factors influencing the achievement of the concept often lamp it up as a single activity instead of breaking it down into its various types, dimensions, levels etc. and identifying factors that influence the achievement of each of these categorizations (Kurti *et al*., 2013; Salim & Abu Seman, 2013).

In terms of research coverage, developing economies seem to have been neglected (Panda & Rath, 2018; Yayla & Hu, 2012). The same can be said about Institutions of Higher Learning. Previous studies have shown that, IT-Business alignment research in the sector lurks behind other sectors such as banking and manufacturing (Alghamdi & Sun, 2017). The sector is also believed to be one of the sectors with high IT investment wastage (Alghamdi & Sun, 2017), despite the crucial role it plays in development (Paul *et al*., 2017). This arguably justifies the need for IT-Business alignment research in the sector.

1.3 Research Purpose

The purpose of this thesis is to examine factors that influence the achievement of IT-Business Alignment in the context of a developing economy, specifically Ghana's public institutions of higher learning. Using Schlosser and Coltman's (2012) IT-Business alignment dimensions model as a lens, the study seeks to identify factors that influence each of the dimensions of IT-Business alignment.

1.4 Research Objectives

1) To explore the nature of IT in Ghanaian public institutions of higher learning.
2) To assess the state of Strategic IT-Business Alignment among Ghanaian public institutions of higher learning
3) To examine factors that influence the achievement of IT-Business alignment among Ghanaian public institutions of higher learning.

1.5 Research Questions

1) What is the nature of IT in Ghanaian public institutions of higher learning?
2) What is the state of Strategic IT-Business Alignment among Ghanaian public institutions of higher learning?
3) What factors influence the achievement of Strategic IT-Business Alignment among Ghanaian public institutions of higher learning?

1.6 Significance of the Study

The study is designed with the intent of providing insight into the factors influencing the achievement of strategic IT-Business Alignment in the specific context of higher education sector of a developing economy by examining factor influencing each of the key dimensions of the concept. Through a critical assessment of factors influencing the concept and with evidence from Ghanaian public institutions of higher learning, the study will serve as a professional guide for managing Strategic IT-Business Alignment, fill part of the gaps that exist in literature and a guide for future studies.

1.7 Chapter Outline

The thesis is structured in seven chapters. The introductory chapter consists of the research background, Problem Statement, Research Purpose, Objectives of the study, Research Questions, Research Significance, and Research Scope and Limitations. The Second Chapter present a review of literature, specifically definitions of the various concepts used in this thesis and a discussion of theories, models and constructs postulated in IT-Business alignment literature.

The Third chapter focuses on the research framework which serves as the lens of the study. An overview of Schlosser and Coltman's (2012) IT-Business alignment dimensions model and the proposed research model are presented in this chapter. Chapter four is the research Methodology. It discusses the research paradigm and the research strategy, thus the research design, population, sample size and sampling procedures, data collection techniques, research instrument and data analysis

Research context is presented in chapter five followed by Findings, Analysis and discussions in chapter six. Chapter seven, which is the concluding chapter summarizes the entire study and presents recommendations and future directions.

CHAPTER TWO

LITERATURE REVIEW

2.1 Chapter Overview

The concept of IT adoption by businesses is quite old and its benefits have long been established both in practice and literature. As already indicated in chapter one above, the focus of this thesis is to explore the nature of IT application in Ghanaian public institutions of higher learning, assess the state of Strategic IT-Business Alignment among these institutions, and to examine the factors influencing the achievement of the concept. This Chapter specifically presents definitions of concepts used in this study, and a review of literature on IT-Business alignment in general.

2.2 Definition of concepts

For a better understanding of the study and what it seeks to achieve, the various concepts used by author have been defined. Table 1 below contains the specific definitions adopted for the major concepts used in the study.

Table 2.1: Definition of Concepts

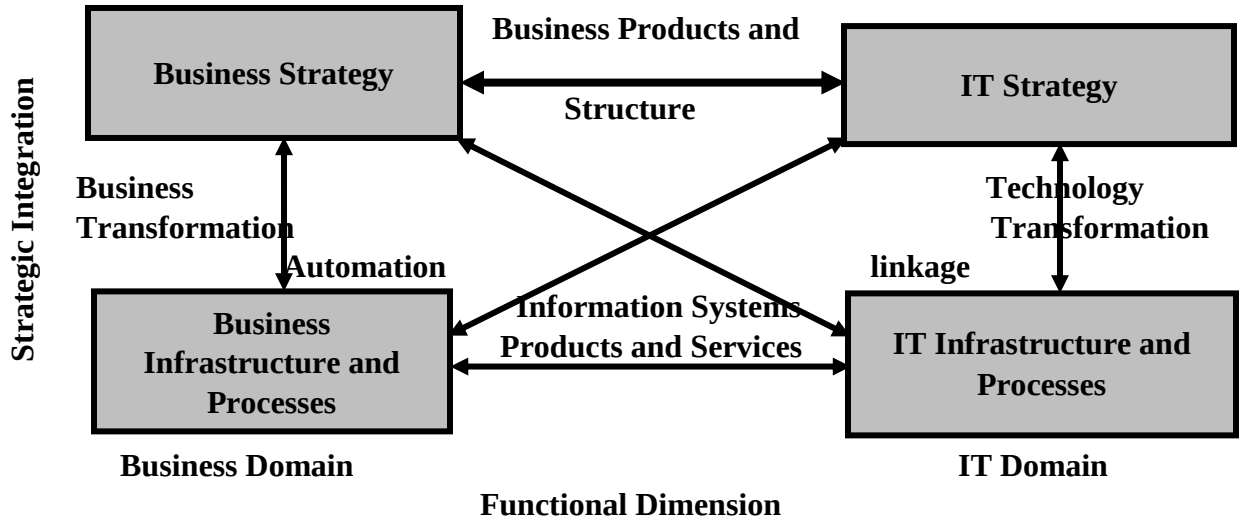
Concept	Definition	Author
Alignment	the level at which IT influences and reinforces a firm's mission and objectives	(Reich & Benbasat, 1996)
IT Strategy	A plan that spells out the tactical potential and directs the use of IT in a business.	(Philip, Gopalakrishnan, & Mawalkar, 1995)
Business Strategy	A plan that spells out how an institution intends to achieve its unique objectives in a competitive market place.	(Porter, 2008)
IT	Computer hardware and software systems of all kinds that an institution invests in, in order to carry out its business more efficiently.	(Broadbent & Weill, 1993)

2.3 IT-Business Alignment

IT-Business alignment as a concept has been studied and conceptualized in several ways: as fit between IT strategy and business strategy by Henderson amd Venkatraman (1993), as the level at which IT influences and reinforces a firms mission and objectives (Reich & Benbasat, 1996) and as harmony between a firms goals and IT systems (McKeen & Smith, 2003). Other conceptualizations include that of Sauer, Yetton and Alexander (1997) who propose IT-Business alignment amounts to paying equal attention to the management of the business as a whole as well as the management of IT resources.

One conceptualization that however dominates the alignment literature is that of Venkatraman, Henderson and Oldach (1993). The Strategic Alignment Model proposed by their study though criticized by many base on relevance and applicability, remains the go-to model in IT-Business alignment research (Gerow *et al*., 2015). The four components which include Business Strategy, Business/organizational Infrastructure and Processes, IT strategy, and IT Infrastructure and Processes proposed by this model and their interrelations offer a holistic and detailed view of the Strategic IT-Business alignment concept and serves as a guide for achieving an organization-wide alignment. **Fig 2** is a schematic view of the Strategic Alignment model proposed by Venkatraman, Henderson *et al*. (1993).

Fig 2.1: Strategic Alignment Model (SAM)



Source: Venkatraman & Henderson (1999)

2.3.1 Components of the Strategic Alignment Model

Table 2.2 below gives insight into the compositions of the four main constructs of the strategic IT-Business Alignment Model.

Table 2.2: Components of the Strategic Alignment Model

Business Strategy
Business scope: Business scope is concerned with geographic location, customer base, products and services, product/service market etc. (Boateng, 2017; Henderson & Venkatraman, 1993).
Distinctive Competence: This includes all factors that give a firm competitive edge or sets it apart from others, also referred to as critical success factors. Example, brand, location, pricing, products and services, employees etc. (Boateng, 2017; Henderson & Venkatraman, 1993).
Business Governance: Business governance concerns with relationship management. More specifically it is the aspect of a business that focuses managing the relationship between stakeholders, board of directors and management. Others include strategic partnerships (Boateng, 2017; Henderson & Venkatraman, 1993).

Organization Infrastructure
Administrative Structure*:** This refers to how an institution chooses to manage its business. Some commonly adopted structures include matrix, centralized, horizontal, vertical, federal and geographic (Boateng, 2017; Henderson & Venkatraman, 1993). ***Processes: refers to workflow. Thus, the activities performed by employees or machines on daily basis. The major concern of many institutions is process improvement and value-added activities (Boateng, 2017; Henderson & Venkatraman, 1993). ***Skills:*** a function of human resource department focuses on which employee to hire, which employee to fire, employee training, motivation and education and organizational culture (Boateng, 2017; Henderson & Venkatraman, 1993).
IT Strategy
Technology Scope: The extent to which IT can be applied. This ensures appropriate application of IT (Boateng, 2017). ***Systemic Competencies***: The key attributes or capabilities of an institution's systems that are unique to that institution only and deliver competitive advantage. Example, ability to access information needed to execute an institution's strategy (Boateng, 2017; Henderson & Venkatraman, 1993). . ***IT Governance:*** concerns with distribution of power/authority, conflict management, risk management, sharing of IT responsibilities across the entire business, relationship management, IT resource distribution etc. (Boateng, 2017; Henderson & Venkatraman, 1993).
IT infrastructure
Architecture: A decision point where choices, priorities and policies regarding software applications, hardware, data management and network design are considered (Boateng, 2017; Henderson & Venkatraman, 1993). ***Processes***: Activities and practices carried out by individuals, groups or machines to manage IT infrastructure and to develop as well as maintain applications (Boateng, 2017; Henderson & Venkatraman, 1993).

2.4 Categorizations of IT-Business alignment

Venkatraman and Henderson (1999) categorized IT-Business Alignment into domains (IT and Business Domain), levels (Strategic, operational and cross-domain level), and Internal vs. External IT-Business Alignment. Several other categorizations such as dimensions of IT-business alignment and types of IT-Business alignment which draw from the Strategic Alignment Model (SAM) exist in IT-Business alignment literature. The following paragraphs

however only discuss Venkatraman and Henderson's (1999) three categorizations as well as the dimensional categorization of IT-Business alignment.

2.4.1 Domains of IT-Business Alignment

As already indicated in the paragraph above, Venkatraman and Henderson's (1999) proposed two domains of IT-Business alignment. The Business domain also known as business alignment refers to finding a fit between an organization's vision, mission and objectives, and its infrastructure and processes. This domain seeks to suggest that organizations seeking a total alignment must also make sure their business infrastructure, processes and activities reflect their business strategy.

The IT domain on the other hand is sometimes referred to IT alignment. It involves the adaptation of an organization's internal IT processes and infrastructure to its externally-focused IT strategies (Gerow *et al*., 2015). The main focus of this type of alignment is to make sure an organization's IT strategy (scope, system competencies and IT governance) translates into its IT architecture and processes.

2.4.2 Levels of Strategic IT-Business alignment

To achieve an organization-wide IT-Business alignment, IT and business components integration at three main levels is required: strategic level also known as intellectual alignment, infrastructure level also referred to as operational alignment, and strategic and infrastructure level also known as cross-domain integration (Venkatraman & Henderson, 1999).

The intellectual level of strategic IT-Business alignment though conceptualized in several ways can be traced to King's 1978 study which viewed IT-Business alignment as a tactical issue and defined it as a link between a firm's ‘‘strategy set’’ and its MIS ‘‘strategy set’’. Gerow *et al.* (2014) however indicated that King's definition of IT-Business alignment was focused on a one-way link where IT only plays a support role opening his study up to criticism. ‘‘strategy set’’ as used in King's study was later modified by consequent studies to include plan, missions, objectives, strategies, plan and orientation with emphasis on a two-way alignment where IT could also influence business strategy (Chen, 2010; Kearns & Lederer, 2003; Pyburn, 1983) whereas, ‘‘Link’’ was modified to mean alignment or harmony (Chen, 2010; Tallon, Kraemer, & Gurbaxani, 2000). In the end the main focus of King's study and other similar studies was to assess how alignment can be attained and maintained at the tactical level. Thus, finding a fit between IT and business strategy.

The operational level on the other hand focuses mainly on management's ability to properly integrate IT and business infrastructure, processes and skills rather than finding a fit between different sets of strategies. According to Gerow *et al*. (2014) IT-Business Alignment research expanded in scope in the 90s necessitating the inclusion of ‘‘corresponding internal domain’’ Lee and Leifer (1992) referred to ‘‘corresponding internal domain’’ as IT infrastructure and processes. Henderson and Venkatraman (1999) further added a third component which is ‘’skills’’ thus alignment between business and IT infrastructures, processes and skills. More specifically Henderson and Venkatraman (1999) propose that IT policies, procedures, personnel, systems, structure and activities must align with the firm's business. This level of alignment focuses mainly on management's ability to properly integrate IT and business infrastructure, processes and skills rather than finding a fit between different sets of strategies.

The Cross-domain alignment is the level of IT-Business alignment that lies between intellectual and operational IT-Business alignment, it takes a more holistic look at the concept by considering the strategy and operational level components simultaneously (Venkatraman & Henderson, 1999). Studies at this level are important because business and IT strategies are bound to change in response to changing business environment (Jordan & Tricker, 1995).

According to Henderson & Venkatraman (1993) strategy and operational components can be grouped into four different cross-domain alignments called strategy execution, technology transformation, service level, and competitive potential. Strategy execution defines the link between business strategy and IT infrastructure, specifically IT infrastructure is impacted by business strategy but influenced by the business infrastructure. Technology transformation is the type of alignment that occurs when IT infrastructure influences the business strategy but is constrained by the IT strategy. Service level refers to an alignment between IT Strategy and business infrastructure such that the IT strategy impacts the business infrastructure but is constrained by the IT infrastructure. Competitive potential ‘‘is where the business infrastructure is influenced by the IT strategy but is constrained by the business strategy.’’ Gerow *et al*. (2014) summarized this as a level of IT-Business alignment research that focuses on the pursuance of alignment of the total organization such that there is a simultaneous fit between business strategy, IT infrastructures, business infrastructures, and IT strategy.

Other levels proposed in alignment research include organizational level, systems level (Campbell, Kay, & Avison, 2005; Wooldridge & Floyd, 1990), the individual/cognitive level (Tan & Gallupe, 2006), and the project level (Jenkin, T. A., & Chan, 2006).

2.4.3 External vs. internal alignment

IT-Business alignment can also be categorized into external and internal alignment (Henderson & Venkatraman, 1993). External alignment focuses on finding a fit between an organizations business and IT strategies and its industry and technology forces whereas internal alignment seeks harmony between organizational and IT processes and infrastructure. Though majority of studies and organization focus mainly on internal alignment, some studies such as that of Sledgianowski and Luftman (2005) echoed the need for organization to also pay attention to external alignment as it enables firms to leverage their IT infrastructure by extending into supply chains of customers and suppliers.

2.4.4 Dimensions of Strategic IT-Business Alignment

Just as levels of IT-Business alignment, IT-Business Alignment dimensions have been conceptualized in several ways, most of which are open to criticism due to their overlapping and lack of precision nature (Schlosser & Coltman, 2012). Three main dimensions of IT-Business alignment are however often seen in alignment literature, these include: The Social Dimension, Intellectual Dimension and Human Dimension.

According to Chan and Reich (2007) Intellectual dimension of IT-Business alignment can be viewed as the cohesion between a firm's business strategy and its IT strategy or plan. This type of Alignment happens at the tactical level of the firm where strategic decisions are made. Schlosser and Coltman (2012) on other hand referred to this dimension of alignment as artifacts produced by the business and/or IT staff; it involves formal and purposeful design and documentation of location of decision-making rights, IT personnel deployment reporting relationships and centralization vs. decentralization of structures. Other authors such as Reich

and Benbasat (2000) define the intellectual dimension in as the state in which a high quality set of cohesive business and IT plans exist (Lahdelma, 2013).

The social dimension refers to the relationships and communication that exist between the various actors in the alignment process; it is about socially organized human behavior which exists "beyond" a single actor (Schlosser & Coltman, 2012). According to Williams and Baxter (1996) culture, respect, informal communication, and mutual trust make up the core components of the social dimension. It can also be viewed as shared commitment and understanding of institutional goals by both IT and business executives.

Finally, the human dimension of alignment is concerned with attributes: skills, knowledge, leadership, and behavior of individual actors in the alignment process, thus, IT infrastructure and process must be met with people with the right skills not only in IT but also in business. In the same manner Non-IT staff must also possess some basic skills in IT (Schlosser & Coltman, 2012).

Other dimensions include the cultural dimension which refers to the alignment between IS planning and cultural elements: Communication culture, Business planning culture etc. (Chan & Reich, 2007), Structural dimension referring to the degree of structural harmony that exists between the business and IT subject to power delegation and laid down procedures for activities such as IT employee deployment (Chan, 2002), and the environmental dimension which is concerned with how IT can be positioned in order to help minimization environmental uncertainty gap which is the difference between the perceived business environmental conditions and realized/actual environmental conditions (Garg, Joubert, & Pellissier, 2012).

2.5 Factors influencing Strategic IT-Business alignment based on dimensions

In order to better manage strategic IT-Business alignment, arguably factors that inhibit and those that enable the achievement of the concept must be identified. Though underexplored, a few studies such as Basir and Norzaidi (2009), Chan, Sabherwal and Thatcher (2006), Albrecht *et al*. (2004), Cragg *et al*. (2002), Luftman, Papp and Brier (1999), Reich and Benbasat (1996), and Sabherwal and Kirs (1994) can be referred to. It was however observed that most of these studies propose factors that are general and lack precision as to which factor influences what type or dimension of IT-Business alignment. The few that take IT-Business alignment dimensions perspective such as Reich and Benbasat (2000) also only focus on one type or dimension of IT-Business alignment. Kurti *et al's.* (2013) CSFs of IT-Business alignment on the other hand is about the only study that attempts to identify factors that influence the achievement of the various dimensions of IT-Business alignment. Consequent paragraphs present a summarised discussion of Kurti *et al's.* (2013) IT-Business alignement CSFs based on dimensions.

2.5.1 Intellectual Dimension

Alignment of IT and Business Strategy

In-depth understanding of business and IT goals and how they complement each other should be the focus of any organization seeking to achieve IT-Business alignment (Kurti *et al*., 2013). Thus, in an ideal situation a firm's IT strategy should match its business strategy in a manner that each IT goal or objective is mapped to one or more business goals with the aim of maximizing returns (Calhoun & Lederer, 2011; King, 1978). Though some authors have argued that having an aligned IT and Business strategy alone is not enough (Nfuka & Rusu, 2010; Venkatraman *et*

al., 1993), it forms the basis of every IT-Business alignment agenda and getting it wrong has severe consequences on the whole process

IT track record/success

First emerging in Reich & Benbasat's (1996) study as a factor that influence strategic IT-Business alignment, IT project success or failure is said to have a great impact on how management and end users perceive IT investment. While the latter is desirable the former seems to be the plague of most businesses since the introduction of computers (Kurti *et al*., 2013). Though the statistics have improved from 50 percent failure rate to 14 percent as at 2016 according to Florentine (2017), IT investment continues to be a sensitive issue due to the devastating effect IT project failures have on firms. Kurti *et al*. (2013) defined failed IT projects as those that fail to meet completion deadlines, project requirements and proposed budget. Though most of the problems with IT project failure are often not technical, the blame is often aportioned to the IT department (Lucas, 1975). This does not only dent the credibility of the department but also influences the level of IT-Business alignment. (Reich & Benbasat, 2000). Thus a failing IT department hinders IT-Business alignment by damping the confident of management in IT investment and creating IT-Business communication gap which further influences joint strategy development, whereas a succeeding one promotes IT-Busness alignment, communication between IT and business, and joint strategy development (Teo & Ang, 1998).

2.5.2 Social Dimension

Business–IT Partnership

Enterprise strategy co-creation has been established and is known in Strategic IT-Business alignment literature be an important ingredient in IT-Business alignment creation. According to Teo and Ang (1999), Business-IT partnership facilitates joint decision making on criteria for IT development and implementation appraisal as against business goals and objectives. Calhoun and Lederer (1990) pointed out that having a strong business plan alone is not enough, it needs to be communicated to IT management in order for them to take viable IT decisions that blend with the business plan and create value.

Shared domain knowledge

Shared understanding between business and IT executives has long been established as a factor that influences IT-Business alignment (Basir & Norzaidi, 2009; Luftman *et al*., 1999; Reich & Benbasat, 1996). According to Teo and Ang (1999), information systems in businesses exist to serve business user's needs, hence their development should be a combined effort of both IT and Business executives. Kurti *et al*. (2013) indicated that making sure the technical requirements of an information system reflects the business of an entity requires that parties involved communicate with each other with no ambiguity as misinterpretaion could lead to inaccuracies in requirement interpretation and conflict (Nelson & Cooprider, 1996). According to Horner Reich and Benbasat, (2000) this understanding can be achieved through frequent and deepened communication between business and IT. This further minimizes the negative effect of IT project failure.

Mutual trust and respect between business and IT executives

Mutual Trust can be defined as shared expectation of commitment between business and IT executives (Gupta & Clarke, 1996). According to Kurti *et al*. (2013) trust is crucial when it comes to building relationships between individuals and organizational groups. In the case of IT-Business Alignment, top management need to have confidence in the IT department which is only possible when there is trust (Teo & Ang, 1998). Absence of trust according Teo and Ang (1999) can lead to resource sharing inbalance and IT strategy development challenges. Mutual respect and trust creates the atmosphere for collaborative decision making and enhances Strategic IT-business alignment process (Reich & Benbasat, 2000). Luftman *et al*. (1999) indicated that all IT-Business alignment influencing factors exist within a space of honest and open communication. None of the factors is relevant without honest and open communication.

2.5.3 Human Dimension

Business skills and knowledge of IT executives

Just as IT skills and knowledge of business executives has been confirmed to have a great impact on Strategic IT-Business alignment achievement, IT managers are also required possess some business skills and knowledge. It has become important for IT managers to be concerned with both the technical and business aspect of IT (Khandelwal, 2001; Luftman *et al*., 1999; Nfuka & Rusu, 2010; Teo & Ang, 1998). Teo and Ang (1999) even rated the need for IT managers to have business skills and knowledge above business manager's need for IT skills and knowledge. According to Enns, Huff and Golden (2001) IT managers who operate in isolation and focus only on technology risk becoming excluded in the strategic decision-making process which can lead to misalignment. IT managers stand a better chance of avoiding failures if they are knowledgeable in the businesses' objectives (Leaderer & Burky, 1989).

IT skills and knowledge of business executives

IT skills and knowledge of business executives refers to business executive's comprehension of IT and its application in businesses for value creation. According to Kurti *et al*. (2013), this has a strong literature backing as most of the studies they reviewed stressed on the need for business executives to be skillful and knowledgeable in IT (Burn & Szeto, 2000; Khandelwal, 2001; Jerry Luftman *et al*., 1999; Nfuka & Rusu, 2010; Teo & Ang, 1998). This is because of broad nature of the responsibilities entrusted in executives as stewards. Of all the responsibilities Weill, Subramani and Broadbent (2002) believes that IT investment which is a key part of the Strategic business IT-Business alignment process is the most difficult and crucial. Their assessing stems from the costly nature of IT investment and the high failure rate involved (The Standish Group, 2009). According to Kurti *et al*. (2013) Lack of the skill and knowledge thereof could result in poor IT decision and investment analysis which can have a devastating effect on the IT-Business alignment agenda and the firms performance.

Top management commitment

The key to IS success is having a senior management team that understands the extent to which IT can add value to their business, hence devote time and resource towards IT initiatives (Kurti *et al*., 2013). Just as the other factors mentioned above, top management commitment has surfaced in several studies as one of the key success factors of IT-Business alignment (Nfuka & Rusu, 2010; Luftman *et al*., 1999; Teo & Ang, 1998). Findings in all these studies propose that top management commitment can create a charged environment necessary for change and inspire positive attitude (Milis & Mercken, 2002). Also, top management commitment will ensure collaboration, total participation and support (Cohen & Toleman, 2006; Enns *et al*., 2001).

Technical skills and knowledge of IT employees

The technical skills and knowledge of IT employees remain a key measure of IT department competency. According to Teo and Ang (1999) the quality of IT personnel is of great concern to many organizations. In today's constantly changing business environment, IT staff are expected not only to be highly skilled in IT but also be sophisticated enough to communicate with top management to earn their support (Poon & Wagner, 2001). Part of the sophistication includes soft skills such as motivation, communication skills, interpersonal skills, problem solving skills, and positive attitude (Schirf & Serapiglia, 2017)

Leadership skills of IT executives

The need for IT executives to possess leadership skills cannot be over emphasized as there is enough literature to support this claim (Nfuka & Rusu, 2010; Preston, Leidner, & Chen, 2008; Luftman *et al.*, 1999; Teo & Ang, 1998). Persons entrusted with the management of an institution's IT resources are expected to conduct themselves in such a way that brings prestige to the IT function and causes IT to impact on the performance of the institution. This requires leadership skills and competencies necessary to bring their organizations up to speed with ICT opportunities available to them (Nfuka & Rusu, 2010).

Table 2.3 presents a summarized dimensional categorization of some IT-Business alignment achievement influencing factors identified in IT-Business alignment literature.

Table 2.3: Factors Influencing IT-Business alignment based on dimensions

Dimension/Factors	Reich and Benbasat (1996)	Luftman *et al*., (1999)	Albrecht *et al*. (2004)	Chan, Sabherwal and Thatcher (2006)	Basir and Norzaidi (2009)	(Kurti *et al*., 2013)
Intellectual Dimension						
Alignment of IT and Business Strategy						✓
IT track record/success	✓			✓		✓
Social Dimension						
Business – IT Partnership		✓				✓
Shared domain knowledge	✓			✓		✓
Mutual trust and respect between business and IT executives						✓
Human Dimension						
Business skills and knowledge of IT Executives		✓				✓
IT skills and knowledge of business executives						✓
Top management commitment		✓				✓
Technical skills and knowledge of IT employees					✓	✓
Leadership skills of IT executives		✓				✓

Source: Author Constructed.

2.6 Chapter Summary

The chapter was introduced with the main objective of reviewing literature surrounding the concept of Strategic IT-business Alignment and factors influencing its achievement. In essence, definition of terms such us IT, Alignment, and Strategy were first presented, followed by a discussion of the nature of the concept of Strategic IT-Business alignment itself and its associated postulations. The chapter further discussed the three categorizations of IT-Business alignment proposed by Henderson and Venkatraman's (1993). The final part of the chapter presented a discussion of the dimensions of IT-Business alignment and factors that influence the achievement of the three key dimensions; intellectual social and the human dimensions.

CHAPTER THREE

RESEARCH FRAMEWORK

3.1 Chapter Overview

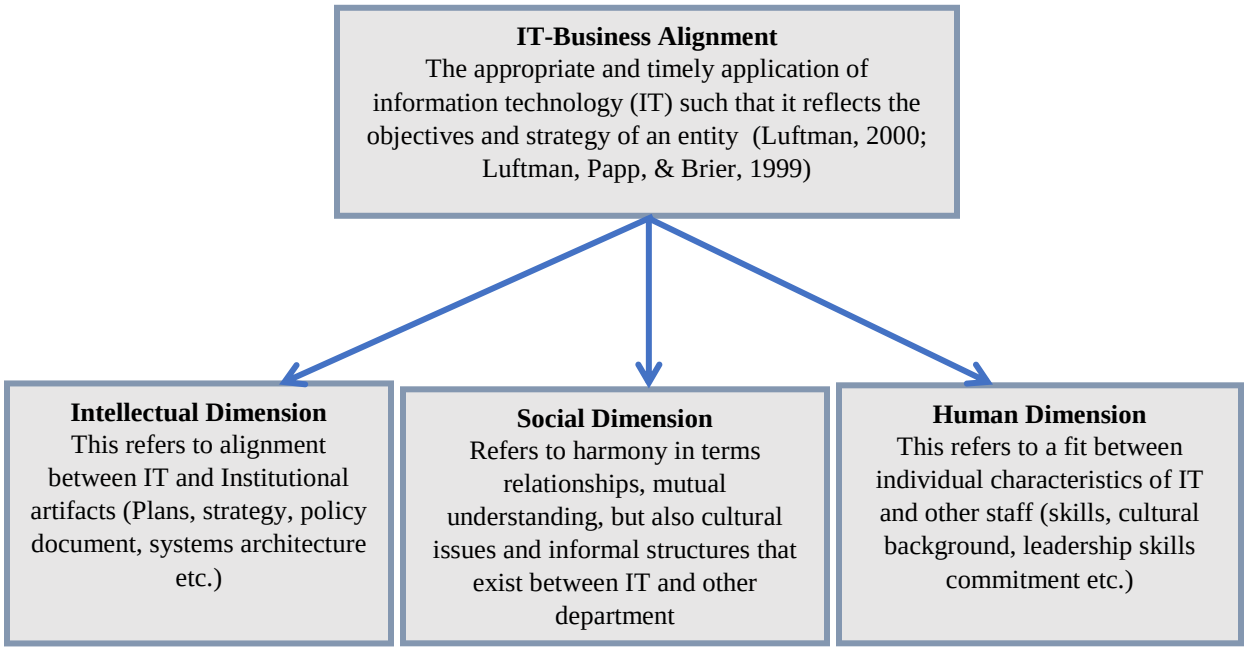
After clearly defining the scope and objectives of this study, and discussing the pertinent issues in strategic IT-Business alignment literature, it has become necessary to discuss the research framework. Research framework refers to an outline of the processes required to study the variables or concepts of a particular phenomenon (Boateng, 2017a). For the purpose of this study, Schlosser & Coltman's (2012) IT-Business Alignment dimensions model was considered best fit, just as in Kurti *et al*.'s (2013) critical success factors of IT-Business alignment. This model is about the only model in IT-Business alignment literature that clearly defines the commonly referred to dimensions of the concept. The paragraphs below present an overview of Schlosser & Coltman's (2012) IT-Business Alignment dimensions model and the conceptual model for the study.

3.2 Overview of Schlosser & Coltman's (2012) IT-Business Alignment Dimensions Model

Schlosser & Coltman's (2012) in an attempt to address the difficulty associated with clearly defining the dimensions of IT-Business alignment, redefined the three commonly referred to dimensions of the concept (Intellectual, Social and Human Dimension). Their redefinition ws based on a review of four models proposed in previous studies; The strategic alignment model (SAM) by Henderson and Venkatraman (1993), Ross *et al*.'s (1996) model, Model of Melville, Kraemer and Gurbaxani (2004) and Hevner, March, Park, and Ram's (2004) model.

They redefined the intellectual dimension to mean finding a fit between artifacts such as strategies Plans, Policies etc. created by both IT and other departments, whereas the social dimension was refined to mean harmony in terms of relationships and cognitive linkages. The human dimension was also redefined to mean alignment between attributes of both business and IT staff.

Fig 3.1: Schlosser and Coltman's (2012) IT-Business alignment dimensions



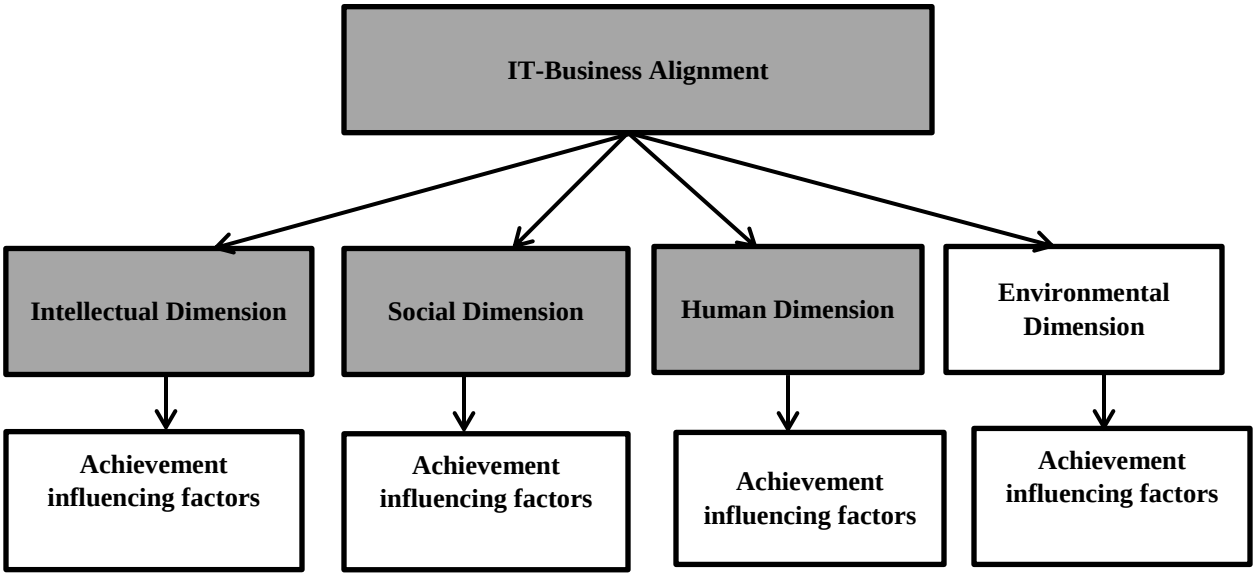
Source: Schlosser and Coltman (2012)

3.3 Research Model

The research model for this study draws mainly from Schlosser & Coltman's (2012) IT-Business alignment dimensions model and builds on Kurti *et al.*'s (2013) critical success factors of business-IT alignment model. Specifically, the model expands Schlosser & Coltman's (2012) dimensions further to include the environmental dimension of IT-Business alignment. Thus, the

model is conceptualized in a way that helps identify the factors that influence the achievement of the intellectual, social, human, and the environmental dimension of IT-Business alignment.

Fig 3.2: Conceptual model of factors influencing the achievement of IT-Business alignment based on dimensions



Source: Author constructed

3.4 Definition of constructs

The constructs in the above conceptual model are defined in the paragraphs below as per the objectives of this study.

3.4.1 IT-Business Alignment

There has been much deliberation on the concept of IT-Business alignment in previous chapters. In the context of this thesis however, IT-Business alignment is conceptualized as fit between operations of institutions of higher learning (Teaching and learning, Library and Research,

General Administration etc.) and IT, along the four proposed dimensions of the concept (Human, Social and Intellectual dimension of IT-Business alignment).

In terms of measurement, a number of approaches have been proposed in literature. Venkatraman (1989) for instance provided six different perspectives from which alignment could be defined and studied. Lahdelma (2013) however indicated that every approach has its own measurement model and what it implies in theory. With the focus of this thesis being to qualitatively assess the state of IT-Business alignment in institutions of higher learning, Achievement Rating Scale proposed by Washington (2009) is preferred to the mathematical models such as the matching and moderation approach proposed in literature (Reich *et al.*, 1999). The achievement rating scale allows respondents to in their opinion indicate whether IT-Alignment with regards their core operations has been achieved or not.

3.4.2 Intellectual Dimension

The intellectual dimension of IT-Business alignment refers to harmony between IT and Business processes that result in the creation of artifacts such as strategy documents, policy guidelines, codes of conduct, process documents, work structure documents, project proposals etc. This dimension of IT-Business alignment often results in the creation of IT artifacts that reflect the institutions vision, mission, goals and objectives, as well as operational artifacts (Strategies, policies, guidelines etc.) that reflect the institution's IT Strategy (Schlosser & Coltman, 2012)

3.4.3 Social Dimension

The social dimension refers to relationships and cognitive linkages, specifically, human behavior, that exists beyond a single actor. It comprises of relationships, mutual understanding as

well as cultural issues, and informal structures such as trust, Shared understanding, respect etc. (Schlosser & Coltman, 2012). Unlike the intellectual dimension, the social dimension is about the social environment architecture of both IT Domain and Business Domain other than artifacts and human actors (Reich & Benbasat, 2000).

3.4.4 Human Dimension

The human dimension is more concerned with the individual human attributes such as skills, knowledge, leadership, and behavior other than structural or organizational attributes. The focus of this dimension of IT-Business alignment is to attract employees with the right skills necessary for solving business problems as well as those with the right skills necessary for solving IT problems. This notwithstanding, Non-IT employees are expected to have some basic IT skills, just as IT employees are also expected to be abreast with the operation of the institutions they work for (Schlosser & Coltman, 2012).

3.4.5 Environmental Dimension

The environmental dimension proposed in this study refers to the external environment, specifically the Task Environment. The Task Environment is believed to be the closest external environment to every organization and it includes actors such as labor unions, competitors, customers, suppliers, government etc. unlike the intellectual, social and human dimensions of IT-Business alignment, the environmental dimension focuses mainly on IT support for assessment and management of environmental uncertainties which could either be threats or opportunities (Garg *et al*., 2012).

3.4.6 Achievement influencing factors

The achievement influencing factors of each of the IT-Business alignment dimensions in this study refer to the conditions, activities, or traits that enable the achievement of each of the dimensions. These factors will be identified by first allowing the survey respondents to brainstorm the factors that influence the achievement of each of the dimension. Responses gathered will then be matched with those in literature. This will inform the design of a second survey where respondents get to confirm their level of agreement to each of the factors proposed.

3.5 Chapter Summary

This chapter began with a chapter overview which highlighted why Schlosser & Coltman's (2012) IT-Business Alignment dimensions model was chosen for the study. This was followed by an overview of Schlosser & Coltman's (2012) alignment dimensions conceptualization together with a schematic view of the model.

The rest of the chapter was focused on the research model for the study. The five constructs presented in **Fig 3.2** above were discussed together with how the author intends to identify factors that influence the achievement of each of the dimensions.

CHAPTER FOUR

RESEARCH DESIGN

4.1 Chapter Overview

Having looked at Schlosser and Coltman's (2012) alignment dimensions model and settled on the conceptual model best suited for this study. This next chapter focuses on the design and execution of the study. Specifically, the chapter discusses shared believes also known as research paradigm, research method, data collection approach, respondent sampling method and data analysis technique.

4.2 Research Paradigm

Research paradigm refers to a set of techniques and believes that guide the conduct of people belonging to a scientific community. It basically informs the sort of problems they address and how they address them (Kuhn & Sternfeld, 2006). Though various research paradigms exist, the most commonly discussed ones in social science research include the positivism, Interpretivism, realism, relativism and, critical realism research paradigm (Boateng, 2017). These paradigms are differentiated by three sets of taxonomies; Ontology, Epistemology, and Methodology (Creswell, 2009). **Table 4.1** presents taxonomies of the five main paradigms in social science research.

Table 4.1: Taxonomies of research paradigms

Paradigm	Ontology**: What is the nature of reality**	Epistemology**: What is the nature of knowledge generated**	Methodology**: How is knowledge created**
Positivism	Single, objective and tangible reality	Value-Free, objective knowledge generation free from bias	Research questions are carefully tested under carefully controlled circumstances

Paradigm	Ontology**: What is the nature of reality**	Epistemology**: What is the nature of knowledge generated**	Methodology**: How is knowledge created**
Interpretivism	Subject to human experiences and interpretation	Context dependent, time-bound and subjective.	Identification, interpretation and construction of reality that exists by establishing patterns
Realism	Reality is imperfect and probabilistic and can only be ascertained through triangulation from many sources	Findings are probably true	Testing of hypothesis to establish patterns of association
Relativism	Truth is relative.	Human interpretation of reality	Influenced by world-wide view and research paradigm of a researcher
Critical Realism	Two schools of thought: Reality is what we observe and learn with our minds (Transitive) and reality is void of human thinking (Intransitive)	Transitive world is value-laden and changes continually whereas intransitive school of thought have structured mechanism that are relatively enduring	Deconstruction and understanding of structures and mechanisms underlying the subjective realities that exist. Triangulation is often required

Source: Author constructed.

This thesis favors the interpretivism paradigm which is often associated with qualitative research methodology. Researchers in this group are of the view that reality is not absolute but rather socially constructed (Fisher, 2010), hence, observation of people's action in a context alone is not enough when determining what reality is. Rather than just observing the actions of participants in a context, interpretivists seek the understanding of the subjective meanings people assign to their actions and the reasons backing those actions (Neuman, 2011).

4.3 Research Design and Methodology

Research Design refers to a study plan with clearly spelt procedures guiding data collection (Leedy & Ormrod, 2010), whereas research methodology refers to the principles and assumptions underlying a particular approach to inquiry (Schwardt, 2007). These together are often referred to as research methodology. Johnson and Onwuegbuzie (2004) postulated two widely accepted broad categorizations of research methodology: quantitative and qualitative research methodology.

Quantitative research is a research method that involves theory testing, fact finding, demonstration of relationships that exist between two or more variables, and outcome prediction (Zulu, 2017). This type of research adopts methods in the natural sciences designed to ensure Reliability, objectivity and generalizability (Weinreich, 2009). Data collection is via standardized questionnaire based on predefined research variables, relationships, and hypothesis. Data analysis is done with statistical methods, using statistical tools (Mafuwane, 2012). Unlike qualitative researchers, quantitative researchers can be detached from the research. Thus regardless who conducted the study; findings should carry no element of personal influence or bias and should be replicable in similar studies. Mingers (2004) associates this category of research with the positivist research paradigm.

Qualitative research on the other hand is a research approach that is aimed at developing theories and understanding (Garbers, 1996). Denzin and Lincoln cited in Zulu (2017) viewed Qualitative Research as an activity targeted at locating the observer in the world. It explores the beliefs, values and attitudes underlying people's behavior with regards to a particular phenomenon. Rather than testing relationships with the sole purpose of agreeing or disagreeing with what has already been studied or postulated, qualitative research focuses on getting a deeper

understanding of a particular phenomenon (Boateng, 2017b). Again, instead of statistical means of qualification, qualitative research applies procedures that produces findings arrived at from a real-world setting where phenomenon of interest unfolds naturally. This according to Weinreich (2009) gives it an edge over quantitative research in terms of richness and detail. Again, qualitative research leaves the participants perspective unaltered, while providing a context for the phenomena being studied. This category of research is linked with the Interpretivism research paradigm.

This thesis is however qualitative in nature due to the type of questions it seeks to answer and the research paradigm guiding how reality is perceived. Qualitative methods have been proven to help researchers uncover the mental processes behind certain behaviors and to elucidate people's view regarding certain social phenomenon. Widely used qualitative methods include unstructured open-ended interviews, direct observation, participant observation, and document analysis (Mafuwane, 2012). Nonetheless, for the type of participants and richness of findings being sought-after in this study, Dalkey's (2011) Delphi Technique is deemed appropriate. This technique involves the collection and organization of judgments from a group of experts over several survey rounds (Austin, Henderson, Power, Jirwe, & Ålander, 2015). It is about the only method that handles seeking expert opinion in an exploratory study quite well (Habibi, Sarafrazi, & Izadyar, 2014). The expression, interpretation and assessment of expert opinions which defines the technique is deeply rooted in the interpretivism research paradigm (Sobaih, Ritchie, & Jones, 2012).

4.4 Overview of the Delphi Technique

Originally developed in the 1950s by Norman Dalkey, Delphi Technique is a research approach that seeks consensus through series of questionnaires and feedback to and from participants who are experts in the specific area of inquiry (Habibi *et al*., 2014). The application of the Delphi Technique spans from the education sector to healthcare, Business, and IS (Gallego & Bueno, 2014; Gupta & Clarke, 1996; Mitchell, 1991). Specifically in the field of IS, Strasser (2017) indicated that Delphi technique is now an established method and its usage keeps increasing by the day (Gray & Hovav, 2008; Skulmoski & Hartman, 2007; von der Gracht, 2012).

4.4.1 Characteristics of the Delphi Technique

Rowe and Wright (1999) identified four key characteristics of the Delphi technique: Statistical summary of group response, Participants Anonymity, Controlled Feedback and Iteration. According to Strasser (2017), only studies that possess all four of the characteristics postulated by Rowe and Wright (1999) qualify to be termed Delphi studies. **Table 4.2** below describes each of the characteristics.

Table 4.2: Characteristics of the Delphi technique

Anonymity of Delphi participants: Response gathered are refined and rotated in a number of rounds such that no single respondent is able to trace a response to another respondent. This encourages participation expression opinions with no undue influence from dominant participants or participants who carry influence because of their status or personality (Sekayi & Kennedy, 2017; Strasser, 2017; Austin *et al.*, 2015; Skinner, Nelson, Chin, & Land, 2015; Kelly & Porock, 2005)
Iteration: The questionnaires are refined in every round to reflect previous responses of the respondents. This affords them the opportunity to revise their opinions based on the submissions of other respondent if need be. (Sekayi & Kennedy, 2017; Strasser, 2017; Austin *et al.*, 2015)

Controlled feedback: Every round of questionnaire carries controlled feedback informing participants about the opinions of other participants. This is done with upmost discretion in order not to breach the anonymity rule, irrelevant details are left out (Sekayi & Kennedy, 2017; Strasser, 2017)
Statistical summation of group response: Responses from all participants in all rounds are summarized and analyzed statistically if need be (Sekayi & Kennedy, 2017; Strasser, 2017).

Source: author constructed.

4.4.2 Delphi Technique Design variants

The Delphi technique is one research method that has been modified by several researchers to suit their research objectives. Its increased use has resulted in the postulation of a multitude of Delphi design variants, more especially in the field of IS (A. Strasser, 2017). A few of the common and widely used designs have been highlight in Table 4.4 below.

Table 4.3: Delphi Technique Design Variants

Design Type	Aim	Target Panelists	Administration	Number of Rounds	Round 1 Design
Classical Design	To gain consensus on opinions	Research objective led panel selection (experts in the field of interest)	Postal service	≥ 3	First round is characterized with open ended questionnaire which allows panelists to brainstorm
Modified Design	Iterative; consensus building, prediction of future events etc.	Research objective led panel selection (experts in the field of interest)	Iterative: online, postal etc.	<3	Panelist are served pre-determined items to make decisions on

Design Type	Aim	Target Panelists	Administration	Number of Rounds	Round 1 Design
Decision	For group decision making	Different hierarchies of experts are selected based on depth of knowledge. This helps in the creation of different views.	Iterative	iterative	Often starts with brainstorming in the form of open ended questions.
Policy	Creation of different opinions on policy and arriving at a conclusion.	Experts possessing different views are selected	Online, postal, group meeting etc.	Varies	Often starts with brainstorming in the form of open-ended questions.
Real time / Consensus Conference	Consensus	Research objective led panel selection (expert in the field of interest).	Technology means available to respondents are adopted	iterative	Often starts with brainstorming in the form of open-ended questions.
e-Delphi	Universal (Dependents on the objective of study)	Dependent on study objectives of	Web based (email or online survey)	Iterative	Often starts with brainstorming in the form of open-ended questions.
Technological	Universal (Dependents on the objective of study)	Dependents on the objectives of the study	hand-held keypads are used for instant recording and feedback	Iterative	Often starts with brainstorming in the form of open-ended questions.
Online	Universal (Dependents on the objective of study)	Dependents on the objectives of study	Forums and online chat rooms	iterative	Often starts with brainstorming in the form of open-ended questions

Design Type	Aim	Target Panelists	Administration	Number of Rounds	Round 1 Design
Argument	To generate opposing views through structured arguments	Selected based on opposing views	Iterative	Iterative	Often starts with brainstorming in the form of open-ended questions
Disaggregative Policy	Generation of future scenarios	Dependents on the objective of the study	Iterative	Iterative	Cluster analysis.

Source: Skinner, Chin, Chin, and Land (2015)

Just as Austin *et al*. (2015), this study adopts the web-based Delphi technique also known as the e-Delphi, which is mostly administer online via emails or web-based surveys.

4.5 Rigor of the Delphi Technique (Trustworthiness)

Trustworthiness has now become an accepted measure for thoroughness in many qualitative studies that adopt the Delphi technique as a method of inquiry (Austin *et al*., 2015). Just like in quantitative studies the criterion for measuring Trustworthiness are categorized into internal validity, external validity, objectivity and reliability. The paragraphs below explain the application of each of the measuring criteria.

4.5.1 Credibility (Internal Validity)

Credibility involves sufficient commitment to a research setting for recurrent considerations or patterns to be identified and verified (Lincoln & Guba, 1985). According to Austin *et al*. (2015) it is important to identify and document recurring patterns, ideas and ethical considerations in order to understand the research situation. They proposed peer debriefing, prolonged

engagement, triangulation, persistent observations, and member checks as key to ensuring credibility.

Prolonged Engagement: This refers to a deeper understanding of the topic under investigation through expansive literature review and regular contacts with participants.

Persistent Observation: This refers to the researcher's ability to spot out characteristics relevant to the research question during prolong engagement through persistent observation.

Triangulation: This refers to the use of different sources, investigators, theories and methods that allow the consistency of findings to be checked through evidence/findings comparison.

Peer Debriefing: Peer debriefing refers to the submission of the research work to scrutiny by research colleagues. It involves the examination of the researcher's entire work including methodology and findings by a group of colleagues who then express their unbiased opinions.

Member Check: this involves submitting the final analysis to scrutiny by the expert participants in the Delphi study. According to Austin *et al.* (2015) the essence of this exercise is to ascertain how far the researcher's interpretation of data corresponds with that of the members (participants) involved in the research

4.5.2 Transferability (external validity)

Transferability refers to the degree of uniformity among similar studies. In qualitative research, the interpretation of data for a given context is believed to be exclusive and important to that context only. It is for this reason purposive sampling is considered appropriate for Delphi studies. Purposive sampling method focuses mainly on participants relevant to the study and does not seek a representation of a general population (Guba, 1981). Lincoln and Guba (1985a,

p17) on the other hand suggests Transferability can be achieved through "thick description"; Thus, rich description of the phenomenon or participants in a study.

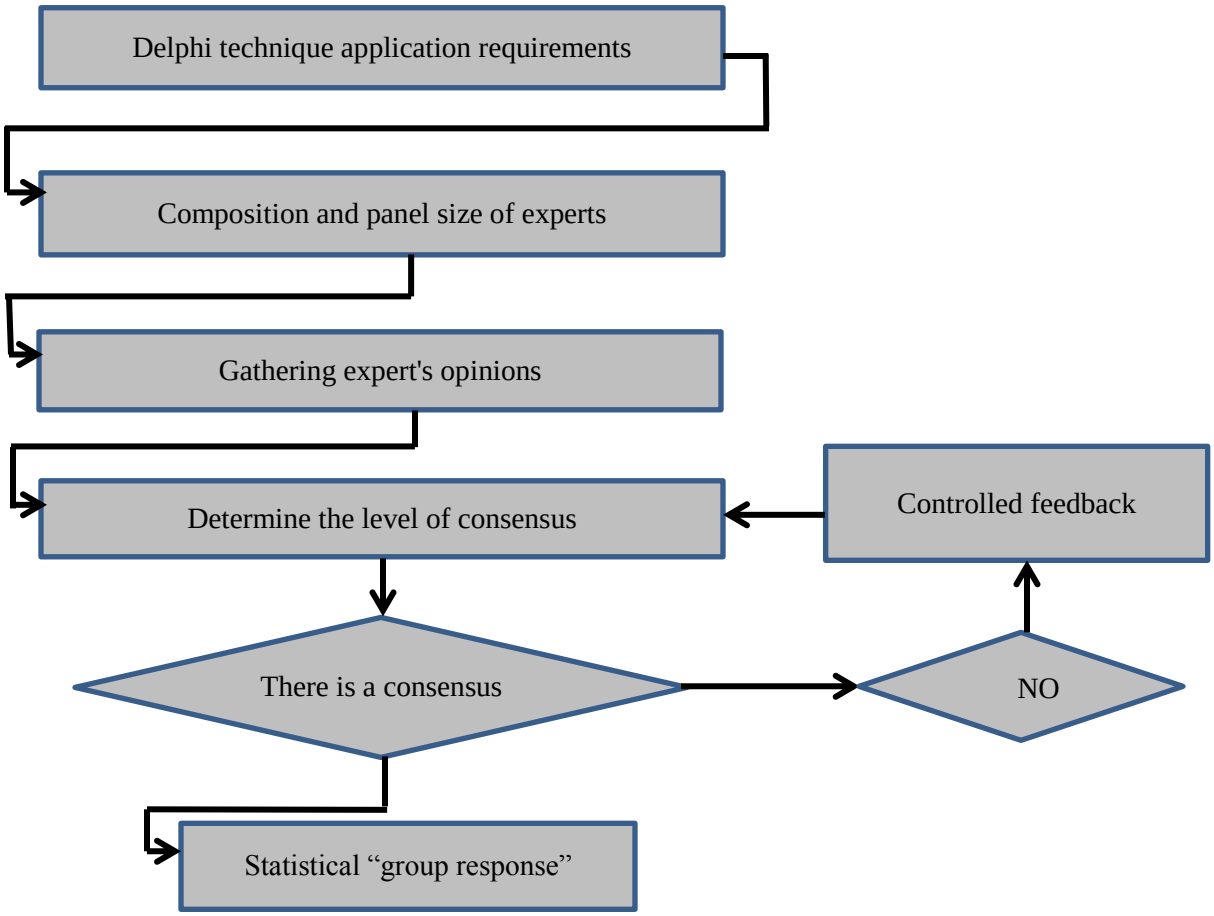
4.5.3 Conformability and Dependability (objectivity and reliability)

Here, an audit trail that includes notes on the methods used, raw data, analysis techniques and pilot forms should allow an auditor to determine if conclusions, interpretations and recommendations are supported by the inquiry (Egger *et al*., 1997; Guba, 1981). Alternatively, dependability relies on the same detailed description of the research process that allows the reader (or external auditor) to track, and if necessary, replicate the research process concerning data collection and analysis.

4.6 Conducting the Delphi Study

As already discussed, Delphi technique is iterative and lacks a generally accepted theoretical framework. More specifically, the end of Delphi stages, application requirements, Panel selection, and panel size have always been the key areas of ambiguity in (Habibi *et al*., 2014). This study however adapts Habibi *et al*'s. (2014) proposed framework for applying Delphi technique in a qualitative study, while observing the key measurement criteria discussed above in order to ensure the rigor of this approach is acceptable. **Fig 4.2** is Habibi *et al*'s. (2014) proposed framework.

Fig 4.1: Theoretical framework for Delphi technique in qualitative research



Source: Habibi *et al*. (2014)

4.6.1 Delphi Technique's Application Requirements

The need for group decision making; expert opinion on a subject matter; data collection anonymity; solution to complex multidimensional and interdisciplinary problems; consensus building; and expert convergence at the lowest cost possible are some of basis for the application of the Delphi technique (Cowan, Brunero, Lamont, & Joyce, 2015; Fan & Cheng, 2006; Landeta J., 2006; Meijering, Kampen, & Tobi, 2013; Walker & Selfe, 2014). For qualitative research however, two main conditions mandate the use of the technique: when the study is based on

expert opinion and when the study is exploratory in nature with the aim of identifying the nature and fundamental elements of a phenomenon (Habibi *et al*., 2014). These two conditions fit into the main objective of this thesis, which is to seek expert opinion on factors influencing the achievement of the various dimensions of IT-Business alignment.

4.6.2 Composition and Panel Size

Delphi panel selection is done based on the experience and the depth of knowledge an individual has on a subject matter (Habibi *et al*., 2014). Experience and depth of knowledge is often used to test the validity of results. For this reason, participants for this study were purposively selected. The target population was IT heads of Ghanaian Traditional Universities and Polytechnics (Technical Universities). Out of a total of ten (10) Traditional Universities and eight (8) Polytechnics (Technical Universities), five (5) traditional universities and three (3) Polytechnics (Technical universities) were purposively selected. The traditional universities selected were, University of Ghana, Kwame Nkrumah University of Science and Technology, University of Cape Coast, University of Professional Studies, and University for Development Studies. The Polytechnics (Technical Universities) on the other hand constituted Accra Technical University, Takoradi Technical University, and Cape Coast Technical University. Heads of IT in all these institutions were contacted, making up eight respondents. Another 17 were contacted based on recommendation by the first eight (8) respondents. In all, twenty-five (25) individuals were contacted.

According to Habibi *et al*. (2014), there is no standard sample size in Delphi studies. While some studies considered fewer than 10 (Malone *et al*., 2005; Strasser, London, & Kortenbout, 2005) others included more than 100 participants (Kelly & Porock, 2005; Meadows, Maine, Keyes,

Pearson, & Finstuen, 2005), the choice of size is dependent on the topic, the nature of different viewpoints included, time and money available (van Zolingen & Klaassen, 2003).

4.6.3 Gathering Expert Opinions

After a test study comprising two (2) respondents, all experts who had been contacted together with my two supervisors were consulted to determine the medium of Delphi inquiry that best suits all participants. Web-Based Delphi Survey was approved by all and considered appropriate for this study. Expert opinions were gathered through a two-round Web-Based Delphi Survey, mostly comprising of open-ended questions in the first round and close ended questions in the second round.

The questionnaire was developed and refined a number of times based on feedback from both my lead supervisor and co-supervisor, just as Churchill (1979) proposed. The first round of the survey explored the background of the respondents, IT climate in their institutions, state of IT-Business alignment, and factors influencing the dimensions of IT-Business alignment. The second round was focused on determining factors that influence the achievement of IT-Business Alignment. The various factors proposed by the respondents in the first round together with some proposed IT-Business Alignment achievement factors in literature, were used to design the second round of questionnaire.

4.6.4 Determining the Level of Consensus

The number of Delphi rounds varies with one's research purpose. While some studies suggest reaching a consensus with the use of some mathematical calculations such as Kendall's coefficient of concordance (Kendall's W) should be the basis for ending Delphi rounds (Habibi

et al., 2014), others suggest two or three iteration Delphi rounds should be enough for most study objectives (Delbecq, Van de Ven, & Gustafson, 1975). According to Skulmoski and Hartman (2007), three and above rounds are required if group consensus is one's focus. On the other hand, in order to understand nuance which is often a goal in qualitative studies, two rounds or less may be required to reach a consensus as well as elucidate a phenomenon or reach a theoretical saturation. Consensus for this study was however reached in round two just as in Duncan (1995), using Kelly, Moher, and Clifford's (2016), 70 percent expert agreement rating in a condition of stable free-text comments approach.

4.7 Data Analytical Approach

A thematic analysis approach was adopted in the first round of the survey. Specifically, the data gathered was analyzed by identifying and carefully examining same response put differently by respondents. These responses were grouped under umbrella phrases called themes. For clarity and completeness, this process was divided into six phases; Time was taken to examine and understand the data collected in the first phase, the second phase involved rearranging responses gathered based on sections of the survey. The third phase was dedicated to identifying themes and grouping the data gathered according to these themes. The fourth phase was for refining the themes identified and presenting them in easily understandable phrases and sentences. The second round of the Web-Based Delphi survey was designed in the final phase.

The second round of the survey was made up of mostly closed ended questions which seek confirmation of the responses gathered in the first round. Both electronic (Microsoft Excel) and manual analysis technics were employed in the analysis of the responses gathered.

Findings in both the first and second round were presented in detailed paragraphs supported with diagrams and tables for easy understanding and further analysis in the analysis and discussion stage.

4.8 Chapter Summary

The research methodology has been discussed in this chapter. Precisely, the chapter began with an introduction, followed by a discussion of research paradigms, where the interpretivism paradigm was justified to be best suited for this of this study. The chapter further discussed the two main types of research methodologies: qualitative and quantitative research methodology and justifies the reason this study sides with qualitative ideologies. The Delphi Technique, its characteristics, variants and trustworthiness were also discussed in this chapter. The final part of the chapter was dedicated to elucidating how the Delphi study was conducted as well as how data was analyzed.

CHAPTER FIVE

RESEARCH CONTEXT

5.1 Chapter Overview

This chapter discusses IT-Business alignment in developing economies, specifically institutions of higher. A general view of the concept in developing economies and institution of higher learning make up the first two topics, followed by an overview of the Ghanaian economy and a brief history of Ghana's higher education sector. The chapter also presents a brief overview of the nature of IT application in Ghanaian institutions of higher learning and the state of IT-Business alignment in the sector.

5.2 IT-Business alignment in developing economies

> *''Although strategic alignment has been well conceptualized and operationalized in previous literature, most of these studies are conducted in developed countries (such as USA, UK and Canada), which creates avenues for further research in the context of developing countries''(Panda & Rath, 2018).*

The scarcity of IT-Business alignment studies in the context of developing economies makes it difficult to comparatively study the concept in both context It is for this reason generalizability of previous studies still remain questionable (Panda & Rath, 2018; Yayla & Hu, 2012). Unlike developed economies, most developing economies still battle with skills gap, rigid business environment, IT infrastructure and other resource deficiency, political environment volatility, lack of funding, and sub-standard national IT policies, just to mention a few (Panda & Rath,

2018; UNCTAD, 2017; Yayla & Hu, 2012). These conditions are likely to produce different IT-Business alignment constructs, hence, the need for studies that take the developing economy perspective. This notwithstanding, recent studies in the developing economy context suggest that, the benefits of IT-Business alignment is universal, regardless the type of economy or sector you choose to do business in (Yayla & Hu, 2012).

5.3 IT-Business alignment in Institutions of Higher Learning

The use of IT for teaching and learning as well as administrative purposes in institutions of higher learning is quite old. It has been the topic for discussion in educational journals, summits and forums for several decades. With the steaming competition among institutions of higher learning globally in recent times (Musselin, 2018), most institutions have resorted to investing heavily in IT in order to lead the competition . These investments however remain questionable as the sector remains one of the sectors with high IT investment wastage (Alghamdi & Sun, 2017); evidence of IT-Business Misalignment. Studies have shown that, majority of the information technologies adopted by most institutions of higher learning do not deliver expected results and are often underutilized leading to eventual obsolesce. Perhaps one of key factor most researcher and heads of IT of institutions of higher learning are missing is the extremely complex nature of the sector compared with other sectors such as the banking sector (Bytheway, Whyte, & Venter, 2015).

Institutions of higher learning are made up of two wings; the structural wing which is made up of professional administrators who oversee the general administration of the institution and the philosophical wing comprising of academics who are tasked with the management of classroom activities, curriculum design, peer reviews and other instructional activities (Albrecht *et al*.,

2004). These two wings operate under two opposite principles (Albrecht *et al*., 2004). The structural wing for instance operates on a principle that breeds strong bureaucracy, slower rate of adaptability, decreased efficiency in times of uncertainty and diminished innovation, the philosophical wing on the other hand fosters innovation through collaborative decision making with little or no bureaucracy. Hence, dealing with the issue of IT-Business alignment in institutions of higher learning with the view that they are structured just like institutions in other sectors such as banking and manufacturing which is often the case, can be misleading (Chan *et al*., 2006).

The IT-Business Alignment research deficient nature of the sector also makes it difficult to understand the true nature of IT in the sector and how to achieve alignment between IT and key operations such as general administration, teaching and learning, research etc.

5.4 Overview of Ghana's economy

Ghana is a West African country with a population of about 29.6 million as at 2018. Over the past two decades, the country has made major strides toward democracy under a multi-party system. Often referred to as the beacon of democracy in Africa, Ghana has consistently been ranked among the top three countries in Africa with freedom of speech, press freedom, and strong broadcast media.

Economically, the country has maintained a steady growth over the years, leading to it attaining a middle-income status in November 2010. Driven by its mining and oil sector with support from cocoa production, the country was rank second behind Ethiopia in 2017 as one of the fastest growing economies in Africa with a growth rate of 8%. Growth continued in 2018, though at a slower pace than the rate in 2017. The year ended with a growth rate 5.6%. As at April 2019, the

country was ranked as the fastest growing economy in Africa by IMF with a growth rate of 8.8%, 1.4 % above the expected growth rate for 2019.

5.5 IT-Business alignment in Ghana's public higher education sector

Ghana's higher education sector dates back to 1948 where through the recommendations of two commissions on education appointed by the British Government (Asquith and Elliot Commissions), the University College of the Gold Coast now University of Ghana was established. This was followed by the Kwame Nkrumah University of Science and technology in 1952. Degrees were awarded by British universities such as the University of London (Effah & Senadza, 2008) until 1961 where through an Act of parliament, Ghanaian public universities received full autonomy and power to award their own internationally recognized academic credentials (Teferra & Knight, 2008). The expansion continued with the establishment of more institutions of higher learning including Agriculture, Teaching and Nursing training colleges, polytechnics and other professional institutions.

The sector has undergone several reforms with the recent ones being the extension of accreditation to private universities to run various degree and diploma programs in 2006 (Goode, 2017) and the conversion of some public polytechnics into technical universities in 2016. Both public and private institutions of higher learning operate under the mandate of Ghana Education Service of the Ministry of Education and are regulated by regulatory bodies such as the NCTE and NAB. **Table 5.0** shows the various categories and the current number of accredited public institutions of higher learning as against private institutions.

Table 5.0: Accredited public institutions of higher learning in Ghana as against private institutions

CATEGORY	PUBLIC	PRIVATE
Universities	10	81
Technical Universities	8	-
Polytechnics	2	1
Nursing Training Colleges	16	13
Colleges of Education	39	7
Chartered Tertiary Institutions	-	5
Professional Institutions	7	-
Distance Learning Institutions	2	-
Registered Foreign Institutions		5
TOTAL	**84**	**112**

Source: Author Constructed

In 2004, the government of Ghana passed into law Ghana's ICT for Accelerated Development (ICT4AD) policy. This policy aims at using ICT as a tool for development and is targeted at 14 key sectors of the economy of which the education sector is part. The policy however became fully operational in the education sector in 2007 with the higher education sub-sector taking the lead way. Institutions under the higher education sector especially major public universities were allowed to have their own ICT policy. This move was to help accelerate the use of ICT in these institutions. One may say this move has yielded the expected results. IT application in Ghanaian institutions of higher learning especially public universities has increased astronomically since 2007 and has become a necessary tool for bridging the higher education access gap which results from inadequate infrastructure. Investment in IT infrastructure and applications such as ERPs and learning management systems is no more luxury but a necessity, especially during this time of intense competition among institutions of higher learning globally. Huge sums constituting Ghana government funding, internally generated funds and funds from donor agencies are invested in IT yearly by Ghanaian public institutions of higher learning. One

thing that seems to have eluded many is whether or not these investments deliver value and are in tune with the goals and objectives of these institutions. The issue of IT-Business alignment seems to have not yet surfaced in this sector though they huge sums are invested into IT just like other sectors such banking and manufacturing. Very little to nothing is known about the appropriate and timely application of IT in support of institutional goals and objectives in this sector.

5.5 Chapter Summary

The under-researched nature of IT-Business alignment in developing economies as well as the challenges surrounding the concept in the context of institutions of higher learning have been discussed in this chapter. From a general perspective, the discussion was narrowed to the Ghanaian context by giving an overview of Ghana's fast-growing economy and further highlighting Ghana's higher education sector by presenting a brief history of the sector, progress made in IT integration and the current state of IT-Business alignment.

CHAPTER SIX

ANALYSIS AND DISCUSSION OF FINDINGS

6.1 Chapter Overview

This chapter presents the research findings, analysis and discussions structured, in three main sections. The first section presents findings in both rounds of the online Delphi survey precisely background of respondents, nature of IT in affiliate institutions, state of IT-Business alignment in affiliate institutions and factors influencing the four main dimensions of IT-Business alignment in institutions of higher learning. The second section is the analysis and discussions section which deliberates on the evidence presented by findings vis-à-vis the research framework (see chapter 3), and final section summarizes the entire chapter.

6.2 Research Findings

This section presents the response gathered from both rounds of the online survey, summarized and organized in manner that allows easy analysis and discussion.

6.3 Delphi Round One

This round served as the brainstorming round where more general open-ended questions were asked to elicit genuine individual opinions. The paragraphs below present findings from the first Delphi round. The focus areas include response rate, description of demographic characteristics of the respondents, nature of IT in affiliate institutions, state of IT-Business alignment in affiliate institutions and factors influencing the dimension IT-Business alignment in institutions of higher learning.

6.3.1 Response Rate

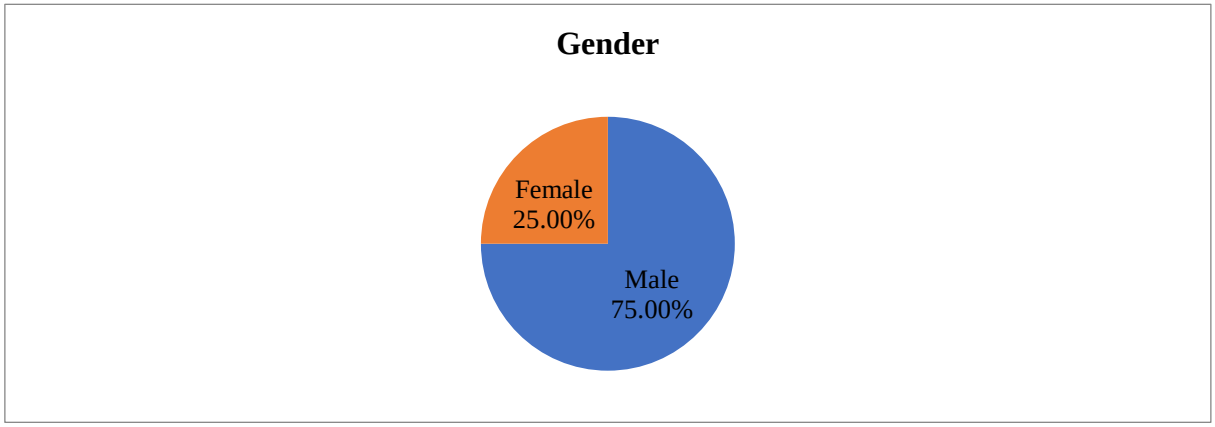
Responses were sorted from experts comprising of persons in IT leader position in Ghanaian public institutions of higher learning. Though twenty (20) experts consented to participating in the survey, only 8 actually participated representing 40 percent.

6.3.2 Respondents Demographics

Respondent demographics refer to the age, gender, educational qualification, employment position, and work experience and institution affiliation of respondents. The consequent paragraphs present responses gathered.

Gender: As represented in Fig 6.1 below, out of the total number of experts who participated in the survey, two were female representing 25 percent and 6 male respondent representing 75 percent making up the total valid respondent of 8. Gender participation was measured in order to understand how skewed the responses are and whether or not certain traits can be deduced from the findings.

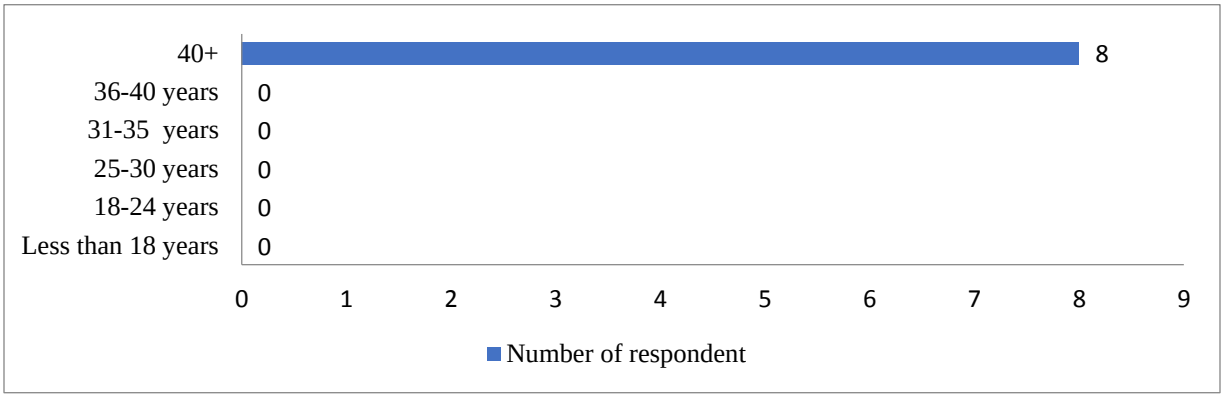
Fig 6.1: Gender



Source: Excel analysis output

Age Distribution: Age distribution of respondent was measured in order to understand whether or not age difference has an effect on the outcome of the study. Results show all respondent are 40 years and above. This is represented in **Fig 6.2** below.

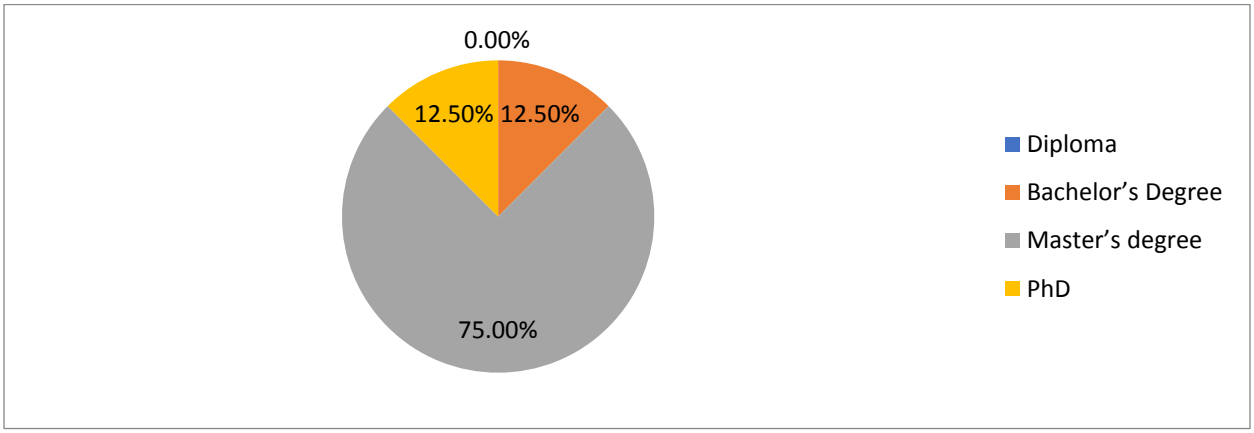
Fig 6.2: Age Distribution



Source: Excel analysis output.

Level of education: Educational level of respondents as presented in **Fig 6.3** below vary between bachelor's degree, Master's degree and PhD. Out of the total, one (1) respondent has a bachelor's degree, six (6) hold Master's degrees and one (1) holds a PhD.

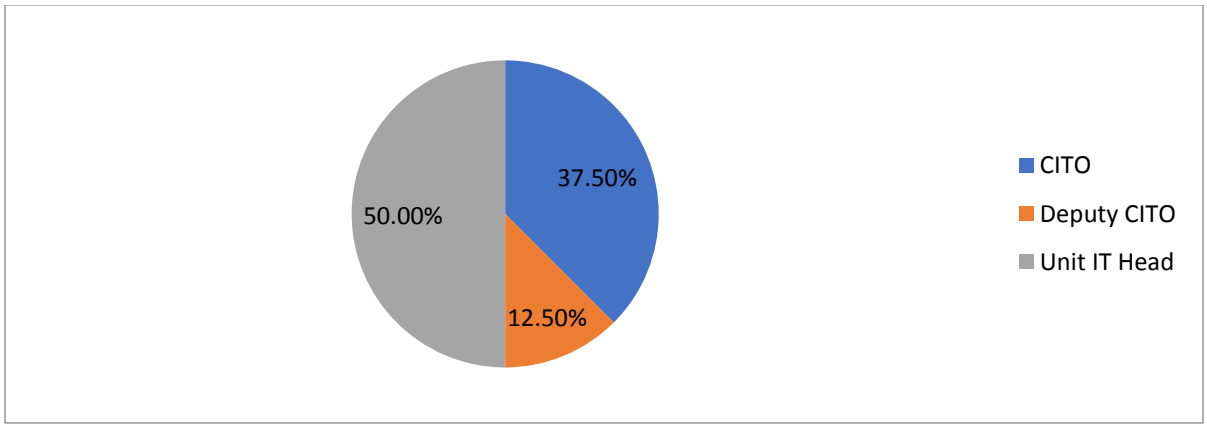
Fig 6.3: Level of Education



Source: Excel analysis output

Current Employment position: **Fig 6.4** below shows current position of the respondents in their various institutions. Three (3) out of the eight (8) respondents are Chief IT Officers representing 37.50 percent, one (1) Deputy Chief IT Officer representing 12.50 percent and Four (4) IT units heads representing 50 percent.

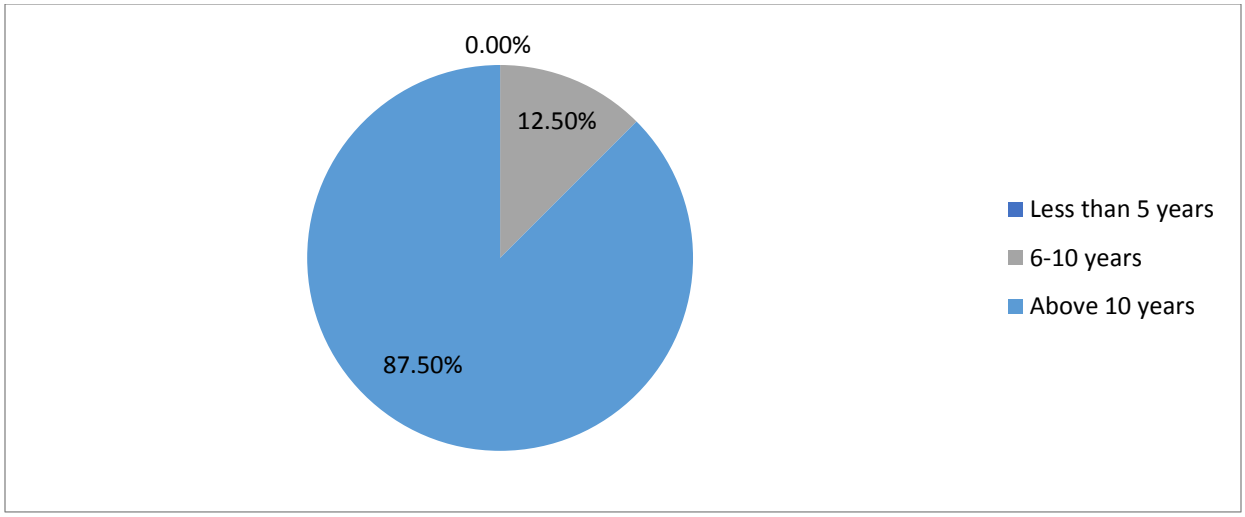
Fig 6.4: Employment position



Source: Excel analysis output

Years of experience**:** With respect to experience, one (1) out of the eight (8) respondents representing 12.5 percent has been working in the field of IT for between 6 to 10 years whereas the remaining 8 representing 87.50 have been in the field for over 10 years. **Fig 6.5** gives a graphical view of the responses gathered with regards to work years of experience.

Fig 6.5: Experience

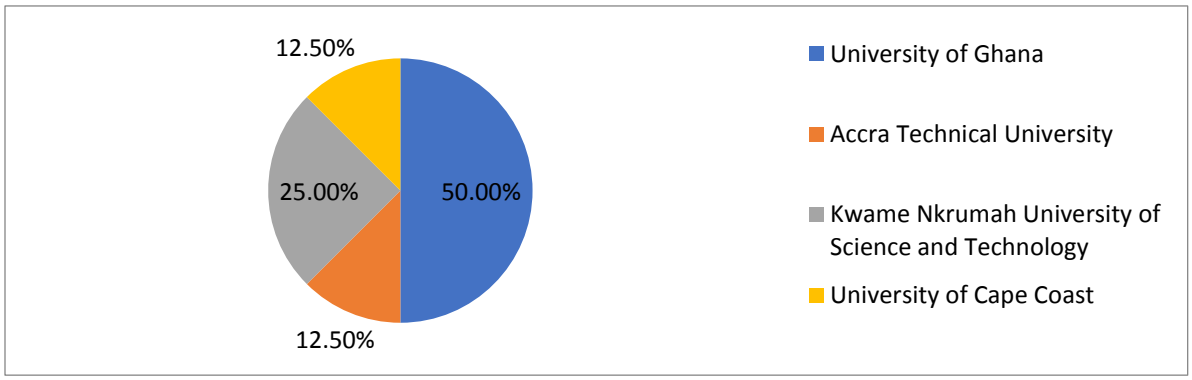


Source: Excel analysis output

Affiliate institution

With reference to **Fig 6.6** below, 50 percent representing four (4) respondents are affiliated to University of Ghana, 12.5 percent, representing one (1) respondent affiliated to Accra Technical University, 25 percent represent two (2) respondents affiliated to Kwame Nkrumah University of Science and Technology and the last 12.5 percent representing one (1) respondent affiliated to University of Cape Coast.

Fig 6.6: Institution affiliation of respondents



Source: Excel analysis output

Table 6.1: Respondent Demographics: Lessons Drawn

Construct	Findings
Gender	Seven (7) out of the eight (8) respondents are male
Age	All the respondents are above the age of forty (40)
Educational background	Six (6) out of the eight respondents hold masters degrees whereas two hold an Bachelor's degree and a PhD respectively
Current employment position	Three (3) out of the eight (8) respondents are Chief IT Officers, one (1) Deputy Chief IT Officer and the remaining four (4) are IT unit heads.
Years of experience	All respondents have over 10 years IT work experience with the exception one who has less than 10 years IT work experience.
Institution affiliations	50 percent representing four (4) of the respondents are affiliated to University of Ghana, 12.5 percent, representing one (1) respondent affiliated to Accra Technical University, 25 percent represent two (2) respondents affiliated to Kwame Nkrumah University of Science and Technology and the last 12.5 percent representing one (1) respondent affiliated to University of Cape Coast.

Source: Author constructed

6.3.3 Nature of IT in Ghanaian institutions of higher learning

In order to understand the position of IT with regards to teaching, learning and management of institutions of higher learning, respondents were asked questions that help understand the nature of IT in the institutions they are affiliated to. Responses gather show these institutions have well-structured IT functions with various levels of complexity. When the question ''How is your university's IT function structured?'' was asked, some of the responses gathered include:

''Our IT Function is Headed by a Chief IT Officer who reports to the ProVC for Research Innovation and Development. The Directorate has 3 Divisions which constitute the shared services expert group - Infrastructure, Services Division, and Security Planning & Compliance Division. These Divisions comprise of technical Units. The Directorate also has service delivery teams embedded in the Colleges, Schools and Departments. A central service Desk provides Level one Support online and face to face for walk-in clients. The Units are as follows Infrastructure - Networks & Telecommunications, Systems & Hosting, Hardware Preventive Maintenance. Services - Administrative Computing, Academic Computing, Engineering Services, Assistive Technology Services, Training Security Planning & Compliance - Planning, Security Planning, Projects and Portfolio Management'' ***Respondent 1***

''We have IT Infrastructure unit that builds and support the IT Infrastructure, we have IT services that seeks to make use of the Infrastructure to support Administrative Computing and Academic computing needs of faculty, students and staff for the business of the University. All these units have heads and they report to the director of IT and IT services'' ***Respondent 2***

It was also revealed that, IT units of Ghanaian Public institutions of higher learning run on an average yearly budget of GHS13.3 million with funding from the Government of Ghana, Donor Agencies and Internally Generated Funds (IGF). This amount is often spent on the acquisition, implementation and maintenance of ICTs that support the core operations of the institutions. T**able 6.1** presents a list of some of the IT products/applications these institutions invest in.

Table 6.2: Areas of IT investments

CORE OPERATION	IT INVESTMENT (PRODUCTS/APPLICATIONS/SERVICES)
Teaching and learning	➢ Enterprise Resource Planning (ERP) application - Supports student records lifecycle management including admissions, Course registration, examinations management and upload of scores, timetabling ➢ Learning Management System (LMS) creation and management if online course content (multimedia), supporting interaction between lecturers and students, collaboration among students and lecturers. ➢ High Performance Computing infrastructure for computational simulations ➢ Internet access for access to online educational and research resources ➢ Assistive technology resources to support students with special needs - visually impaired, hearing impaired etc. Some of the specific technologies inside use of Jaws Software, Magnifiers and brain to text translators. ➢ Deployed Turnitin anti plagiarism software to promote originality of work.
Research and library	➢ Online library access ➢ Library Management systems
Student Administration	➢ ERP description above includes student administration modules such as Integrated Tertiary System (ITS) for student administration ➢ emails system, and reliable storage and retrieval systems are all necessary
General University Administration - internal operations	➢ The ERP system supports most of the business processes - Students records management from admissions to graduation, Human resources management. payroll, Finance and Accounting including fixed assets management, procurement, and logistics management, Residential accommodation allocation. ➢ Use of Office 365 for messaging and collaboration, ➢ IP telephony infrastructure
Financial Administration	➢ ERP-Financial module ➢ Microsoft Office 360
Supporting infrastructure	➢ Computer laboratories ➢ Internet access ➢ HP Matrix Cloud server

Source: Author constructed

It is important to note that majority of the products/applications listed in **table 6.1** above are paid-for licenses. According to most of the respondents, outsourcing is a standard practice, especially because of skills gap and the availability of efficient and cost-effective alternatives. A few of the respondents however indicated that, they only outsource auxiliary services such as air conditioning, Cooling and power setups, leaving the core IT activities to their staff. Procurement of these services including the products listed in **table 6.1** above are done in accordance with the Public Procurement Act of Ghana, Act 663: *''search, proof of concept, evaluation, select and procure.''* ***Respondent***

Table 6.3: Nature of IT in institutions of higher learning: Lessons Drawn

Theme	Lessons Drawn
IT function structuring	Affiliate institutions have well-structured IT function headed by a Chief IT Officer.
IT Investment areas	The main investment areas include the acquisition, implementation and management of IT infrastructure (Computer laboratories, internet etc.), ERPs, Learning Management System and supplementary computer application.
Procurement procedure	Procurement and disposal of IT assets is done based on the public procurement Act, Act 663
IT budget	Yearly IT function budget is purged around an average of 2.5 million USD

Source: Author constructed.

6.3.4 State of IT-Business Alignment among affiliate institutions

In order to gain understanding into the current state of IT-Business alignment, which in the context of this study refers to the timely and appropriate application of IT to core institutional operations, respondents were asked to indicate their level of achievement of IT-Business

alignment with respect to their core operations; Teaching and Learning, Research and Library, student administration, General University Administration - internal operations, and support services. **Table 6.2** presents the responses gathered.

Table 6.4: State of IT-Business Alignment among affiliate institutions

Key Operations	Fully achieved, very few or no shortcomings (Number of Respondents)	Largely achieved, despite a few shortcomings (Number of Respondents)	Only partially achieved, strides and shortcomings finely balanced (Number of Respondents)	Very limited achievement, extensive shortcomings (Number of Respondents)	Not achieved (Number of Respondents)
Teaching and Learning	0	8	0	0	0
Research and Library	0	8	0	0	0
Student Administration	1	7	0	0	0
General University Administration	1	7	0	0	0
Financial Administration	2	6	0	0	0
Support services	0	8	0	0	0

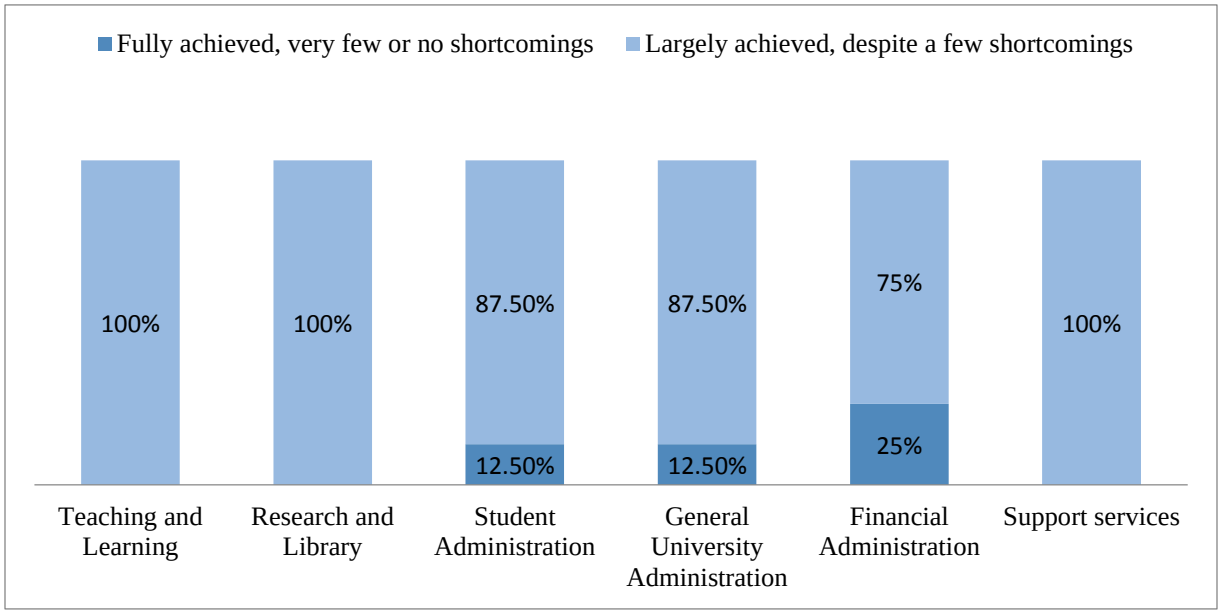
Source: Author Constructed

With regards to Teaching and Learning, Research and Library, and Support Services, all eight (8) of the respondents representing 100% indicated that alignment between IT and these core operations has largely been achieved, despite a few shortcomings. Also, with regards to Student Administration, one (1) respondent (12.5%) indicated that alignment

has been fully achieved with very few or no shortcomings. The remaining seven (7) (87.5%) indicated alignment has largely been achieved, despite a few shortcomings.

With regards to General University Administration, one (1) respondent (12.5%) indicated alignment has fully achieved with very few or no shortcomings whereas the remaining seven (7) (87.5%) indicated alignment has largely been achieved, despite a few shortcomings. Alignment between IT and Financial Administration has been fully achieved with very few or no shortcomings according to two (2) (25%) of the respondent. Whereas the remaining 6 respondents (75%) are of the view that alignment has largely been achieved, despite a few shortcomings. Below is a graphical view of the responses gathered.

Fig 6.7: State of IT-Business Alignment among affiliate institutions



Source: Excel analysis output

Table 6.4: State of IT-Business Alignment in institutions of higher learning: Lessons Drawn

Operation	Lessons Drawn
Teaching and Learning	All eight (8) of the respondents indicated IT-Business alignment with regards to teaching and learning is largely achieved, despite a few shortcomings.
Research and Library	All eight (8) of the respondents indicated IT-Business alignment with regards to Research and Library is largely achieved, despite a few shortcomings.
Student Administration	One (1) respondent indicated that IT-Business alignment with regards to Student administration is Fully achieved, very few or no shortcomings whereas the remaining seven are of the view that IT-Business alignment is largely achieved, despite a few shortcomings.
General University Administration	Just as in student administration, one respondent indicated that IT-Business alignment with regards to General University Administration is Fully achieved, very few or no shortcomings whereas the remaining seven are of the view that IT-Business alignment is largely achieved, despite a few shortcomings
Financial Administration	Two (2) out of the eight (8) of respondent indicated that IT-Business alignment with regards to Financial Administration is Fully achieved, very few or no shortcomings whereas the remaining six (6) are of the view that IT-Business alignment is largely achieved, despite a few shortcomings
Support services	All eight (8) of respondents indicated IT-Business alignment with regards to Support services is largely achieved, despite a few shortcomings.

Source: Author Constructed.

6.3.5 Factors influencing the achievement of IT-business alignment in institutions of higher learning

With the identification of factors influencing the achievement of IT-Business in institutions of higher learning being the key objective of this thesis, the survey instrument was designed to seek expert opinion on factors influencing the achievement of IT-Business alignment in institutions of

higher learning. Without examples or predefined factors, the first round of the Delphi Study was designed in a manner that allows respondents to brainstorm factor that influence the achievement of the four main dimensions of IT-Business alignment proposed in this thesis, thus the Intellectual Dimension, Social Dimension, Human Dimension and the environmental dimension. The paragraphs below thematically summarized responses gathered.

6.3.5.1 Intellectual dimension

Decentralization of IT function: In order to achieve the intellectual dimension of IT-Business alignment, institutions of higher learning must make sure alignment between IT and Business strategies at the tactical level, reflect in the IT and operational plans, policies and objectives of all functional areas (colleges, units and departments). This can be achieved by having a more elaborate IT Service Delivery wing with IT service delivery officers manning IT units in all functional areas of both wings (College and Administrative wing) of the institution. The officers are expected to develop a clear and deep understanding of the operations of the functional areas, colleges, departments or units they serve under, in order to bridge the gap between the IT function and the rest of the institution. Their contributions during planning processes will help achieve uniformity in IT artifacts and artifacts created by other functions, departments and units.

6.3.5.2 Social dimension

Understanding and appreciation of institutional goals and objectives: It is critical for both the business executives and IT officers to have a common appreciation of where the Institution should be heading. This will help create the enabling environment for collaborative effort towards achieving the institution's goals.

Shared understanding of business and IT staff: It is important for both business and IT executives to learn about each other's function. Thus, IT executive must be knowledgeable in the business of their institution and on the other hand, business executives must possess some IT skills/knowledge. This will help them understand each other's language and eliminate conflicts that result from misinterpretation of IT and business viewpoints.

6.3.5.3 Human Dimension

***Technical skills and knowledge of IT employees*:** It is important for IT staff to be well placed in order to provide the relevant IT solutions and services to help achieve the aspirations of all.

IT skills and knowledge of business executives: In order to achieve the human dimension of IT-Business alignment, IT skills and knowledge of business executives is key.

Business skills and knowledge of IT executives: Institution must ensure their IT executives possess some business skills and knowledge if they wish to achieve the human dimension of IT-business alignment.

6.3.5.4 Environmental Dimension

Future proofed IT investment*:* IT unit should be ready to adapt to changes as and when they come. Any investment made in IT should be future proofed to ensure that major changes in the institution's future environment are taken care of. Ensuring this requires detailed environmental scanning leading to more accurate predictions.

6.4 Delphi Round Two

The round-two survey was mainly about factors influencing the achievement of the various dimensions of IT-Business alignment. Eight of the respondents who fully completed the first-round questionnaire were served with the second-round questionnaire which was designed by thematically collating all the response gathered regarding factors influencing the achievement of IT-Business alignment in the first round and some aged factors in IT-Business alignment literature. Respondents were asked to indicate their level of agreement (Totally Agree, Neutral, and Disagree) to each of the factors believed to influence the achievement the various dimensions of IT-Business alignment and to leave a comment if any.

6.4.1 Sate of IT-Business alignment in affiliate institutions

All respondents in the survey indicated that there may be few challenges but in general IT-Business alignment has largely been achieved. When asked how IT-Business alignment achievement is measured, again all respondents indicated they map their goals with results.

6.4.2 Factor agreement ratings

Almost all the factors presented in the round two of the survey received a 100 percent agreement rate with the exception of two of the factors under the environmental dimension of IT-Business alignment. These factors received a 100% agreement rate **Table 6.4** presents a detailed view of the responses gathered.

Table 6.5: Factor Agreement Rate

1 = Totally agree

2 = Fairly agree

3 = Disagree

Factor	Respondent A	Respondent B	Respondent C	Respondent D	Respondent E	Respondent F	Respondent G	Total Agreement Rate
INTELLECTUAL DIMENSION								
IT and Business artifact mapping.	1	1	1	1	1	1	1	**100%**
IT Success	1	1	1	1	1	1	1	**100%**
Decentralization of IT function	1	1	1	1	1	1	1	**100%**
SOCIAL DIMENSION								
IT-Business Partnership	1	1	1	1	1	1	1	**100%**
Closing IT-Business communication gap through cross functional skill/knowledge acquisition.	1	1	1	1	1	1	1	**100%**
Mutual trust and respect.	1	1	1	1	1	1	1	**100%**
Common understanding and appreciation of institutional goals	1	1	1	1	1	1	1	**100%**

Factor	Respondent A	Respondent B	Respondent C	Respondent D	Respondent E	Respondent F	Respondent G	Total Agreement Rate
HUMAN DIMESNION								
Technical skills and knowledge of IT staff	1	1	1	1	1	1	1	**100%**
Cross-functional knowledge and skills of both IT and non-IT staff	1	1	1	1	1	1	1	**100%**
Top management commitment	1	1	1	1	1	1	1	**100%**
Leadership skills of IT executives	1	1	1	1	1	1	1	**100%**
ENVIRONMENTAL DIMENSION								
Future Proof IT investment	1	1	1	1	1	1	No Response	**87.5%**
Investment in desired future environment	1	1	1	1	1	1	No Response	**87.5%**

Source: Excel analysis output

Table 6.6: Factors influencing the IT-Business alignment based on dimensions: Lessons Drawn

IT-Business alignment dimension	Achievement factors
The Intellectual dimension of IT-Business alignment	➢ IT and Business artifact mapping. ➢ IT Success ➢ Decentralization of IT function
Social Dimension of IT-Business alignment	➢ IT-Business Partnership ➢ Closing IT-Business communication gap through cross functional skill/knowledge acquisition. ➢ Mutual trust and respect. ➢ Common understanding and appreciation of institutional goals
Human Dimension	➢ Technical skills and knowledge of IT staff ➢ Cross-functional knowledge and skills of both IT and non-IT staff ➢ Top management commitment ➢ Leadership skills of IT executives
Environmental Dimension	➢ Future Proof IT investment ➢ Investment in desired future environment

Source: Author Constructed

6.5 Analysis and Discussions

This section presents an analysis and discussion of research findings as against the research framework and available literature.

6.6 Strategic IT-Business alignment

In order to understand strategic IT-Business alignment in the context in which the study was conducted and to identify factors that influence its achievement, understanding into the nature of IT and the state of IT-Business alignment was sorted.

6.7 Nature of IT in respondent affiliate institutions

Though advancement in IT varies between developed and developing economies (Asongu & Boateng, 2018; Manda & Dhaou, 2019), there seems to be no gap between the understanding of the importance and prospects of IT among business and IT executives globally. Responses gathered indicate just as in developed economies and other sectors, IT heads of Ghanaian institutions of higher learning are poised towards exploiting IT for both service delivery and efficient management of their institutions. This is evident in the well-structured nature of their IT functions and the IT investments being made in the various aspects of their operations. As Alghamdi and Sun (2017) indicated, institutions of higher learning invest just as much as other sectors such as manufacturing and banking invest in IT. Averagely 2.5million USD is spent on IT by the affiliate institutions yearly. This amount goes IT infrastructure development, implementation and acquisition of software such as ERPs, learning management systems, library management system etc.

The value of these investments reflects in the ease with which student operations such as fee payment, course registration, access to library services, student requests, student assignments etc. are done. With a click of a button, students are able to complete course registration, access and submit assignments, print transcripts, access library services, study materials and even take courses online. Free access to the internet and ICT laboratories has also bridged the gap between the rich and the poor and has improved information dissemination among students. Lecturers have also been equipped to take advantage of the ICT revolution to deliver excellent service. The internet access and access to applications such as learning management systems, coupled with lecture halls equipped with sophisticated ICT tools such as computers, projectors etc. enable lecturers to discharge their duties in an easier and more efficient manner. This is a great

improvement from ten years ago where investment in IT was for institutions that could afford a little more ‘‘luxury’’. Everything was done manually with no IT investment required. Majority of student operations such as course registration, hall registration, fees payment verification etc. took days to complete. Students join long queues to complete registrations at the beginning of every semester and access to internet and computers were for the rich. Lecturers on the other hand also did not have access to the ultra-modern facilities we have today; lectures were delivered on face-to-face basis only.

The ICT revolution is not only happening at the academic wing but also the administrative wing. From a manual system characterized with volumes of paper work stored in files and folders, the administrative wing has seen a steady improvement in terms of IT over the years. Certain operations such as recruitment, financial administration, performance evaluation, internal audit, records management etc. have been computerized.

6.8: State of IT-Business alignment in affiliate institutions

It has been established both in practice and literature that IT-Business alignment is the sure way of realizing the true value of IT investment. The concept has been discussed expansively in the previous chapters. Despite the difficulty in defining what the concept really is and what it entails, IT heads of Ghanaian public institutions of higher learning seem to be on top of issues. Response gathered on the state of IT-Business alignment in affiliate institutions indicate IT-Business alignment has either been fully achieved with very few or no shortcomings or largely achieved, despite a few shortcomings. Specifically, one out of eight respondents indicated they have fully achieved IT-Business alignment with regards to student administration and general university administration respectively; Two out of eight also indicated they have fully achieved IT-Business

alignment with regards to financial administration; All eight (8) of the respondents, however indicated IT-Business alignment has largely been achieved with regards to Teaching and Learning, Research and Library and support services despite few shortcomings. These findings seem to contradicted Luftman & Kempaiah (2007) assertion that the education sector lurk at bottom in terms of IT-Business alignment maturity when compared with other sectors such as the manufacturing, health, banking sector. On the other hand, it may be an indication of progress made in the sector over the years.

6.9 Dimensions of IT-Business Alignment

The composition and definitions of IT-Business Alignment dimensions is still an ongoing discussion and has a lot of propositions. This study however sides with Schlosser & Coltman's (2012) postulation due to its comprehensiveness. They proposed three key dimensions based on four previously postulated IT-Business Alignment models; Strategic Alignment Model (SAM) by Venkatraman *et al*. (1993), Ross *et al's*. (1996) IT Assets model, Melville *et al*'s. (2004) IT resource categorization, and Hevner *et al*'s (2004) environmental categorization. Extending Schlosser & Coltman's (2012) postulation further, this study highlights the need to narrow the gap that often exists between perceived environmental uncertainty and eventual environmental conditions in IT and business domains (Garg et al., 2012). The study proposes a fourth dimension which is the Environmental Dimension of IT-Business alignment. These four dimensions have been discussed in the previous chapters. Kindly refer to Chapters 2 and 4.

6.10 Factor influencing IT-Business alignment

Factors Influencing the Achievement of IT-Business Alignment as already discussed is underexplored though it remains a key aspect of the concept. The focus of this study is to present a more comprehensive empirical evidence of these factors, while confirming the validity of previously postulated factors in today's rapidly changing technology and business environment. The four dimensions of IT-business alignment previously discussed were used as guide. In all, thirteen key factors were identified: three (3) believed to influence the achievement of the intellectual dimension; Four (4), the social dimension; Another four (4), the human dimension and; Two (2) influencing the achievement of the environmental dimension of IT-business alignment. The following paragraphs present a detailed analysis and discussion of these factors.

6.11 The Intellectual dimension of IT-Business alignment

The intellectual dimension as previously discussed refers to alignment between IT and business artifacts (Documents, physical hardware configurations and codes). Factors influencing the achievement of this dimension of IT-Business alignment are discussed in the paragraphs below.

6.11.1 IT and Business artifact mapping

Linking IT with business by clearly defining IT plans, objectives, strategies, codes, policies etc. and directly mapping them with same or similar artifacts in the business domain has long been established as a factor that influence the achievement of IT-Business alignment (Calhoun & Lederer, 2011; King, 1978). Per Schlosser and Coltman's (2012) IT-Business alignment dimensions postulation, this factor falls under the intellectual dimension of IT-Business alignment. Though IT and Business artifact mapping was not mentioned in the

first/brainstorming round of the survey, it received a 100 percent total agreement rating in the second survey. Respondents indicated that the factor should be a practice in the entire institution and not only at the tactical level as often observed. The problem however is, most institutions lack clearly defined and widely accepted objectives, strategies, policies etc. to start with (Benson & Bugnitz, 2004; De Haes & Van Grembergen, 2005).

6.11.2 Consistent IT Success

‘‘IT Success,’’ an aged factor believed to influence the achievement of IT-Business alignment received total endorsement from respondents in this study. According to Kurti *et al.* (2013), the quality of IT-End user working relationship is dependent on the nature of IT service delivery. The high failure rate which has however been the plague of IT projects makes it difficult for business executives to actively engage and assign resources to IT departments during strategy formulation. Both end-users and business executives become increasingly upset that IT projects especially big projects do not succeed. IT project success is often determined by the rate at which it meets the follow key measurement criteria; business requirement, completion time and budget. Responses gathered suggest that a good IT track reward which leads to confidence in IT function and co-creation of policies plans and codes is a recipe for the achievement of the intellectual dimension of IT-Business alignment.

6.11.3 Decentralization of IT function

Decentralization of IT function is one of the factors that surfaced during the brainstorming stage of the survey. Responses gathered suggest that, decentralizing IT function ensures that IT is deeply rooted in all aspects of the institution and creates the enabling environment for IT-

Business co-creation of strategies, policies, guidelines etc. even at the lowest level of the institution. This finding buttresses Henderson and Venkatraman (1993) and Nfuka and Rusu (2010) argument that cascading IT-Business alignment down an organization does not only lead to improved IT-Business alignment but also leads to a more widespread use of IT.

6.12 Social Dimension of IT-Business alignment

The social dimension as already discussed refers to human relationships and cognitive linkages that ensure that both IT and business staff work together in harmony. The following are factors believed to influence the achievement of this dimension of IT-business alignment.

6.12.1 IT-Business Partnership

IT-Business partnership previously surfaced in Broadbent and Weill's (1993) study and has been endorsed by several other authors as a key factor in ensuring a good working relationship (Earl, 2000; Feeny, Earl, & Edwards, 1994). Respondents in this study could not agree any less as they all selected ‘‘totally agree’’ with regards to IT-Business partnership being a factor that fosters good working relationship. Luftman *et al*. (1999) confirmed that the factor is not only supported by IT executives but also non-IT executives. According to Luftman and Kempaiah (2007) IT-Business partnership is a measure of the level of relationship that exist between IT and business staff. Thus, a higher level of IT-Business partnership is an indication of a good working relationship, vice versa.

6.12.2 Closing IT-Business communication gap through cross functional skill/knowledge acquisition.

According to one of the survey respondents;

> *It is important for business executives/staff to have some knowledge/skills in IT and for IT executives/staff to also have some knowledge/skills in business. This helps eliminate communication gap and conflict that often arises as result of misinterpretation of business/IT viewpoint……**Respondent***

Past studies have shown that cross functional skills/knowledge acquisition helps breach the understanding/communication gap that often exists between IT and business (Reich & Benbasat, 2000; Teo & Ang, 1998; Nelson & Cooprider, 1996). According to Reich and Benbasat (2000), it is important for Business executives to be able to understand, participate and make meaningful contribution to key IT processes. In the same manner, IT executives should also be able to understand, participate and make meaningful contribution to key business processes.

6.12.3 Mutual trust and respect

Defined by Dasgupta (1988) as the shared expectation of commitment between business and IT executives. ‘‘Mutual trust and respect’’ was endorsed by all respondents in this study as a critical for achieving the social dimension of IT-Business alignment. Top management must be able to trust their IT department enough in order to commit to the strategic use of IT and to allocate resources (funds, personnel etc.) for the execution of their duties. On other hand, IT executives must believe in top management support in order to commit their time and energy into devising ways to use IT to champion the institutions’ course.

*Good relationship between top management and the IT function is exhibited in the level of trust and respect Top management have for IT executives vice versa……**Respondent***

According to Luftman, *et al*., (1999), aside all the factors that influence the achievement of IT-Business alignment, ‘‘an atmosphere of open and honest communications’’ is key.

6.12.4 Common understanding and appreciation of institutional goals

*It is critical for both business executives and IT executives to have a common appreciation and understanding of where the Institution is heading. This way, there will be mutual commitment beyond personal objectives or interest……**Respondent.***

Common understanding and appreciation of an institution’s goals by its staff and other stakeholders drives commitment. Specifically, commitment of IT and business staff originating from a common understanding and appreciation of business/institutional goals fosters good relationship and mutual respect.

6.13 Human Dimension

Below are factors that influence the achievement of the human dimension of strategic IT-Business alignment;

6.13.1 Technical skills and knowledge of IT staff

The perception top management often develops about an institution’s IT function greatly depends on the technical skills and knowledge of that institution’s IT staff. Previous studies have justified the need for IT staff be sophisticated enough and abreast with recent developments in

the sector in order win management support (Nfuka & Rusu, 2010; Luftman *et al.*, 1999; Teo & Ang, 1998) According to one of the respondents;

> *Stakes are high; IT investment cost is sky rocketing as the days go by and high project failure rate still plagues the sector. Hence, institutions must sort for the best IT staff and continually train them to be abreast with developments in the sector in order to realize the value of their IT investments.*

IT has moved from the support role it used to play to a more strategic and transformative role where decisions by IT executives or investments made in IT either through the development of an application or hiring of an expert is crucial to the institution's long-term survival.

6.13.2 Cross-functional knowledge and skills of both IT and non-IT staff

IT and Non-IT executives acquiring knowledge and skills in each other's domain to complement their respective technical skills and knowledge has long been established both in research and practice as critical to the attainment of IT-Business alignment (Nfuka & Rusu, 2010; Khandelwal, 2001; Burn & Szeto., 2000; Luftman *et al*., 1999; Teo & Ang, 1998) Responses gathered from CIOs in a 2018 survey conducted by CISCO on IT training and hiring suggests that, it is no longer enough for IT executives to only be concerned about IT, they are expected to be business minded in order to deliver applications or IT solutions that solve real world business problems. Non-IT staffs on the other hand are expected to have some IT knowledge and skills in order not to miss the balance. According to Kurti *et al*. (2013) most business executives are unable to evaluate the viability of IT investment mainly because they lack the adequate knowledge and culture required for this type of evaluation. Respondents in this study confirmed this with a 100% total agreement rate.

6.13.3 Top management commitment

> *Commitment of top management expressed through genuine support and participation in IT initiatives and development of information systems does not only ensure fair distribution of resources but also arouses commitment in other staff towards the achievement of the institution's goals……**Respondent***

Top management commitment is a very popular phrase in IT-Business alignment and has received a broad consensus as one of the key factors necessary for the achievement of IT-Business alignment (Nfuka & Rusu, 2010; Luftman *et al*., 1999; Teo & Ang, 1998). Having a committed management teams means proactive cooperation (Morgan & Hunt, 1994), adequate resource allocation, and support for organizational change that is often brought about by the implementation of new systems.

6.13.4 Leadership skills of IT Executives

The business value an institution hopes to derive from IT largely depends on the leadership skills of its IT executives. The constantly changing technology landscape requires a leader who is not only creative but also innovative, and is able to demonstrate the value of IT to the institution. Luftman *et al's*. (1999) noticed an increasing IT innovation rate across all industries two decades ago. The rate is even more radical today, though some organizations are still unaware of ICT opportunities available to them. Nfuka and Rusu (2010) argue that the ability of an institution to bring these opportunities to bear and act on them depends on the skills and competencies of its IT executives.

6.14 Environmental Dimension of IT-Business alignment

Below are factors believed to influence the achievement of the environmental dimension of IT-Business Alignment.

6.14.1 Future-Proof IT investment

IT units should be ready to adapt to the changes as and when they come. According to one of the respondents, any investment made in IT should be future-proof to ensure that major future changes are taken care of. Systems must be designed in such a way that they give room for modification when the need arises, there must be administrative techniques in place to take care of tradeoffs in times of environmental changes and to conduct comprehensive environmental scanning from time to time in order to anticipate possible changes (Lederer & Mendelow, 1990).

6.14.2 Investment in desired future environment

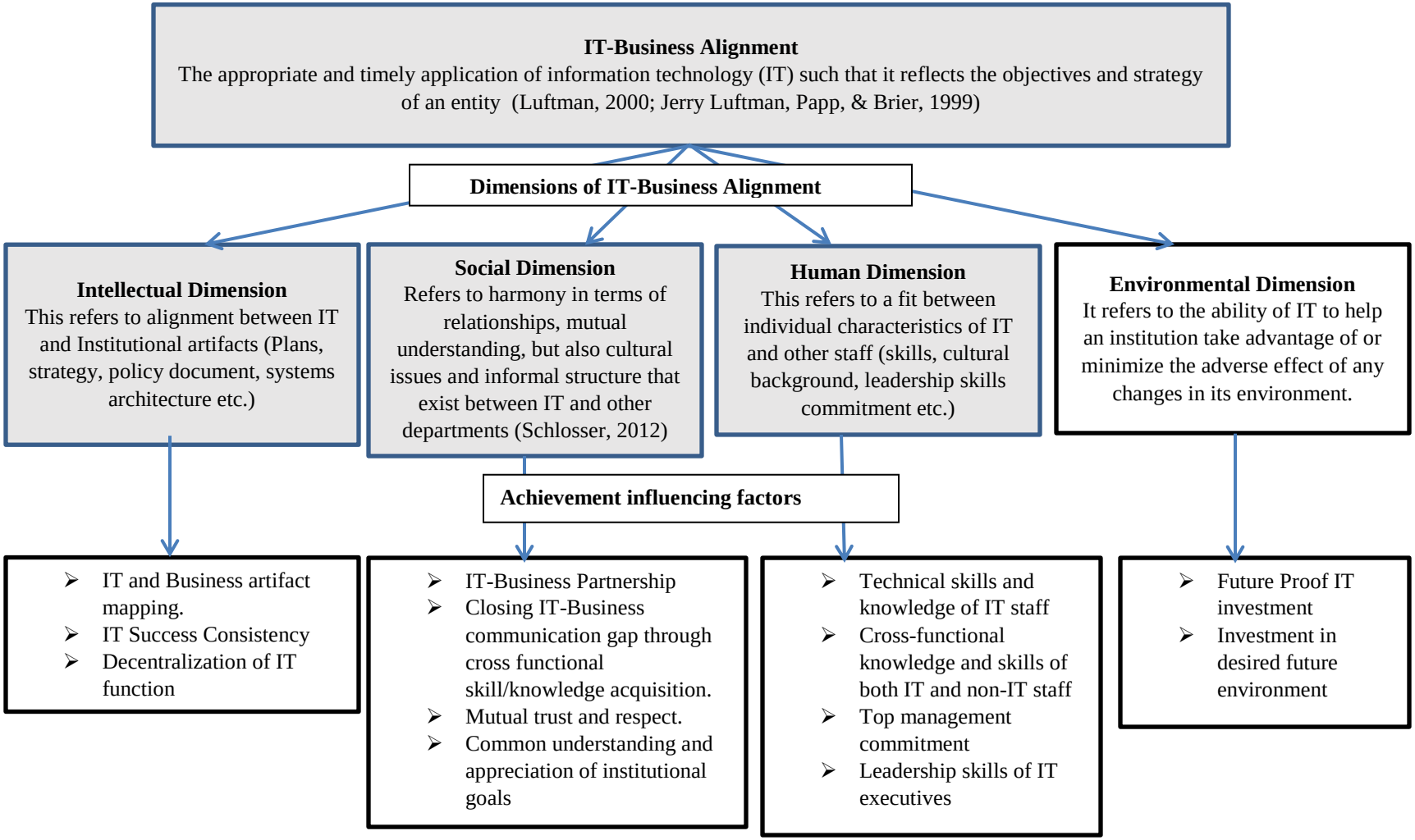
Investment in IT initiatives that aims at creating a desired future environment reduces the environmental uncertainty gap. Investment in this sense does not only mean money but also time. For example, recent best practice in software engineering allows for vending companies to release BETA versions of their software to their target users in order for them to try them and make their recommendations before the final software is released.

> *IT executives must avail themselves to take part in software testing sessions or try BETA versions of software and make recommendations as this is only way they can influence the final product…..***Respondent.**

Another way of influencing future environmental outcomes is through political actions to influence government regulations as well as industry and vendor association decisions (Lederer

& Mendelow, 1990). It is however important to note that the dynamics vary from industry to industry. IT executives are therefore expected to constantly scan their environment in order to identify trends and to set clear goals.

Fig 6.8: Model for factors influencing the achievement of IT-Business alignment based on dimensions



Source: Author Constructed.

6.15 Chapter summary

Responses gathered from both the first and second round of the Online Delphi Survey composing of background of the respondents, nature of IT in Ghana's public institutions of higher learning, State of IT-Business alignment in these institutions, and factors influencing the achievement of the various dimensions of IT-Business alignment, have been thematically summarized and presented in such a way that the facts still remain. Summary and analysis of the findings made up the first section of the Chapter.

The second part of the chapter matched the research objectives against the responses gathered, and presented an in-depth analysis and discussion of findings with regards to the nature of nature of IT in institutions of higher learning, the state of IT-Business alignment in institutions of higher learning, and factors that influence the four key dimensions of IT-Business alignment proposed in this study.

The final part of the chapter presented the modified conceptual model of factors influencing the achievement IT-Business based on dimensions.

CHAPTER SEVEN

SUMMARY, CONCLUSION AND RECOMMENDATION

7.1 Chapter Overview

The previous chapters: Introduction, Literature Review, Research Framework, Research Methodology, Research Context, and Findings, Analysis and Discussions together present an in-depth view of factors influencing the achievement of four key dimensions of IT-Business alignment in the specific context of the higher education sector of a developing economy. This final chapter presents a review of the research objectives in chapter one Vis-à-vis the findings. Contributions of the study to research, practice, and policy are also discussed together with limitations of the study and recommendations for future research.

7.2 Summary of the Research Process

This study was designed around three key objectives:

1) To explore the nature of IT in Ghanaian public institutions of higher learning
2) To assess the state of Strategic IT-Business Strategy Alignment among Ghanaian public institutions of higher learning
3) To examine factors that influence the achievement of IT-Business alignment among Ghanaian public institutions of higher learning

To achieve the above objectives, opinions were gathered from IT experts, specifically persons in IT leadership position in institutions of higher learning using a two round Delphi Survey. This approach was chosen because it has a strong literature backing and because it is about the best known technique for obtaining expert opinions (Austin *et al*., 2015).

The Delphi Technique was guided by a proposed five construct model which breaks IT-Business alignment down into dimensions; Intellectual, social and human dimension. This was to help achieve a high level of richness by empirically studying factors that influence the achievement of each of the dimensions. The model is based on Schlosser and Coltman's (2012) IT-Business alignment dimensions model just as applied in Kurti *et al*. (2013) literature review of critical success factors IT-Business alignment, however, this study extended it further to include a fourth dimension which is the environmental dimension of IT-Business alignment.

7.3 Summary of the Research Findings

Findings of this study have been categorized into three according to the research objectives. The first part presents the nature of IT in Ghanaian public institutions of higher learning, the second presents the state of IT-Business alignment in these institutions and the last and final part presents factors influencing the achievement of IT business alignment in Ghanaian institutions of higher learning. **Table 7.2** presents the thesis matrix

Table 7.2: Thesis matrix

Research Objective	Research Findings	Extant Literature	Contributions, Implications and Recommendations
1. To assess the nature of IT in Ghanaian public institutions of higher learning.	The ICT revolution in Ghana's public higher education sector started in 2007 where through the government's ICT for accelerated development agenda, public institutions of higher learning were mandated by law to have their own ICT policies. With funding from the Government of Ghana, donor agencies and the institutions themselves, IT application in public institutions of higher learning has increased astronautically. Findings show that these institutions currently spend an average of 2.5 million USD on IT every year. This amount goes into IT infrastructure acquisition, implementation and management as well as acquisition of software applications such as ERPs, LMSs etc. This revolution is happening in both the administrative wing and the academic wing.	According to Lubega (2017), The rapid increase in the demand for higher education in Africa over the last ten years has forced many institutions to find innovative ways to increase access through the use of ICT. Research has proven that IT has been and continues to be a major driver of the transformation we see in high education today (Alaraji, 2015; Cui, Jonathan, Hai, & Li, 2015; Beard & Humphrey, 2014). It is for this reason just as other sectors such as the banking and manufacturing sector, institutions of higher learning are investing heavily in IT (Alghamdi & Sun, 2017).	This study gives insight into the nature of IT in institutions of higher learning in developing economies and serves as guide for similar studies in the future. More research, specifically on how to sustain the innovative use of IT in institutions of higher learning is required.
2. To assess the state of IT-Business in institutions of higher learning.	Findings show that IT-Business is either fully achieved with very few or no shortcomings or largely achieved, despite a few shortcomings in all six core operational areas examined: Teaching and Learning, Research and Library, Student Administration, General University Administration, Financial Administration, and Support services. Measurement of IT-Business alignment is done by mapping	IT-Business alignment research in the context of institutions of higher learning is generally scarce (Alghamdi & Sun, 2017). Perhaps it is the reason Luftman and Kempaiah (2007) indicated that the higher education sector is the least matured sector in terms of IT-	This study presents fresh knowledge on the state of IT-Business alignment in institutions of higher learning in the context of developing economy and adds to higher education IT-Business alignment literature. There is a need for more research specifically in the area of IT-

Research Objective	Research Findings	Extant Literature	Contributions, Implications and Recommendations
	objects to results.	Business alignment. Their study was however conducted over a decade ago and a lot may have changed as this study presents an opposing view.	Business alignment measurement in order to arrive at a generally accepted measurement standard.
3a. To identify factors that influence the achievement of the Intellectual dimension of IT-Business alignment.	Factors identified include; ➢ IT and Business artifact mapping. ➢ IT Success ➢ Decentralization of IT function	The factors identified in this study were previously discussed in IT-Business alignment literature (Burn & Szeto., 2000; Khandelwal, 2001; J Luftman et al., 1999; Nfuka & Rusu, 2010; Teo & Ang, 1998)	This study presents empirical evidence on factors influencing the achievement of IT-Business alignment in institutions of higher learning in the context of a developing economy. With this as guide, future studies should consider using a different methodology.
3b. To identify factors that influence the achievement of the Social Dimension of IT-Business alignment	➢ IT-Business Partnership ➢ Closing IT-Business communication gap through cross functional skill/knowledge acquisition. ➢ Mutual trust and respect. ➢ Common understanding and appreciation of institutional goals	The factors identified in this study were previously discussed in IT-Business alignment literature (Burn & Szeto., 2000; Khandelwal, 2001; J Luftman et al., 1999; Nfuka & Rusu, 2010; Teo & Ang, 1998)	Same as contributions, implication and recommendation in **3a.**
3c. To identify factors influencing the achievement of the Human Dimension of IT business alignment	Factors identified include: ➢ Technical skills and knowledge of IT staff ➢ Cross-functional knowledge and skills of both IT and non-IT staff ➢ Top management commitment ➢ Leadership skills of IT executives	The factors identified in this study were previously discussed in IT-Business alignment literature (Burn & Szeto., 2000; Khandelwal, 2001; Luftman et al., 1999; Nfuka & Rusu, 2010; Teo & Ang, 1998)	Same as contributions, implication and recommendation in **3a.**

Research Objective	Research Findings	Extant Literature	Contributions, Implications and Recommendations
3d. To identify factors influencing the achievement of the social dimension of the Environmental Dimension of IT-Business alignment**.**	Factors identified include: ➢ Future Proof IT investment ➢ Investment in desired future environment	The environmental Dimension of IT-Business alignment was previous discussed by (Coltman et al., 2015; Garg et al., 2012)	Same as contributions, implication and recommendation in **3a.**

Source: Author Constructed

7.3.1 Nature of IT in Ghanaian public institutions of higher learning

Analysis of the responses gathered and available literature show that, IT has gained roots in every aspect of Ghana's higher education sector and remains the key driver of transformation in the sector. As a major cost center, most public institutions of higher learning, invest huge sums in IT on yearly bases with funding from the Government of Ghana, donor agencies and the institutions themselves through Internally Generated Funds (IGF). These investments are often in the form of computer laboratories, IT hardware, internet infrastructure, ERPs, LMS and other computer applications etc. Just as other public institutions, the acquisition, usage and disposal of IT assets by public institutions of higher learning is the regulated by the Government of Ghana.

7.3.2 State of IT-Business alignment in alignment in public institutions of higher learning

IT heads of Ghana's public institutions of higher learning strongly believe that IT-Business alignment with respect to their key operations; Teaching and Learning, Research and Library student administration, general university administration, financial administration and support services has either been fully achieved with very few or no shortcomings or largely achieved, despite a few shortcomings. They arrived at this conclusion by comparing their short and long-term goals with their achievements.

7.3.3 Factors influencing the achievement of IT-Business in Public institutions of higher learning

Thirteen factors were identified in all, each influencing the achievement of a particular dimension of IT-Business alignment. Refer to **Table 7.1**

Table 7.1: IT-Business alignment achievement factors

IT-Business alignment Dimension	Achievement Factors
The Intellectual dimension of IT-Business alignment	➢ IT and Business artifact mapping. ➢ IT Success ➢ Decentralization of IT function
Social Dimension of IT-Business alignment	➢ IT-Business Partnership ➢ Closing IT-Business communication gap through cross functional skill/knowledge acquisition. ➢ Mutual trust and respect. ➢ Common understanding and appreciation of institutional goals
Human Dimension	➢ Technical skills and knowledge of IT staff ➢ Cross-functional knowledge and skills of both IT and non-IT staff ➢ Top management commitment ➢ Leadership skills of IT executives
Environmental Dimension	➢ Future Proof IT investment ➢ Investment in desired future environment

Source: Author constructed

7.4 Implications of the Study

This section discusses the contributions this study has made to both theory and practice.

7.4.1 Implication for Research

This study has made three major contributions to literature. First, the study has extended Schlosser and Coltman's (2012) IT-Business alignment dimensions model further to include an environmental dimension thereby broadening the understanding of factors that influence the achievement of IT-Business alignment.

Secondly, the study presents fresh empirical knowledge on factors that influence the achievement of four key dimensions of IT-Business alignment in the context of institutions of higher learning in developing economies.

Finally, the study has shown that IT heads of institutions of higher learning in developing economies are very much aware of the positive transformation IT can bring to teaching and learning as well as management of their institutions, hence, have put in measures to ensure that IT investments do not go waste. This is evident in the well-structured nature of their IT functions and the current state of IT-Business alignment in their institutions. This finding contradicts what is being carried in IT-Business alignment literature about the higher education sector being the least matured in terms of IT-Business alignment and having the highest IT investment wastage rate (Alghamdi & Sun, 2017; Jerry Luftman & Kempaiah, 2007). This qualifies as new knowledge.

7.4.2 Implication for Practice

Findings show that IT-Business Alignment has been greatly achieved by Ghanaian public institutions of higher learning. Some key factors known to fuel this achievement are; IT and Business artifact mapping, IT Success, Decentralization of IT function, IT-Business Partnership, Closing IT-Business communication gap through cross functional skill/knowledge acquisition, Mutual trust and respect, Common understanding and appreciation of institutional goals, Technical skills and knowledge of IT staff, Cross-functional knowledge and skills of both IT and non-IT staff, Top management commitment, Leadership skills of IT executives, Future Proof IT investment, and Investment in desired future environment. These findings will help persons in IT leadership positions make informed IT investment decisions.

7.4.3 Implication for Policy

Institutions of higher learning are mandated by law to have an ICT policy as part of the Government of Ghana's ICT for accelerated development agenda. This study brings to bear the progress made in IT usage by public institutions of higher learning, the current state of IT-Business alignment in these institutions, and factors that influence the achievement of the four key dimensions of IT-Business alignment discussed in this study. These findings in essence will guide future policies both in the higher education sector and other sectors.

7.5 Limitations and Future Research Directions

Just as every research, this study had its own share of limitations, but in spite of the limitations, efforts were taken to present a valid, in-depth study.

One of the major constraints of this study was time; this is a two round Delphi study which involves experts often on tight schedules and difficult to reach. Though many were contacted and consented to taking part in the study, only a few were able to make time to complete the surveys within the stipulated time even upon several extensions. This delayed the completion of the study.

Also, the study was focused on Ghanaian public institutions of higher learning excluding the private institutions of higher learning. Future studies should consider widening the net to include Ghanaian private institutions of higher learning.

In terms of methodology, a different methodology may perhaps produce different results.

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APPENDICES

Appendix A- Introduction Letter for Respondents

UNIVERSITY OF GHANA
BUSINESS SCHOOL
DEPARTMENT OF OPERATIONS AND MANAGEMENT INFORMATION SYSTEMS

UGBS
University of Ghana Business School

Ref. No.: INTRO/OMIS/1118/029

TO WHOM IT MAY CONCERN

9th November, 2018

Dear Sir/Madam,

LETTER OF INTRODUCTION: DICKSON OFOSU (10636776)

I write to introduce to you **Dickson Ofosu** who is a student at the University of Ghana Business School. He is pursuing MPhil in Management Information Systems.

He is conducting a thesis on "**Factors Influencing IT – Business alignment in Developing Economies: Evidence from Ghanaian's Public Institutions of higher learning.**"

Hence, I would appreciate any assistance you can give to him to collect the relevant information.

This long essay is under the supervision of Prof. Richard Boateng of the Department of Operations and Management Information Systems.

Thank you.

Yours faithfully,

Prof. Richard Boateng
(Head of Department)
INTRO/OMIS/1118/028

COLLEGE OF HUMANITIES

P. O. Box LG 78, Legon, Accra, Ghana.
• Telephone: +233 (0) 302 501 594 • Email: omis@ug.edu.gh • Website: www.ug.edu.gh

Appendix B- Research Questionnaire

Delphi Round One Online Survey Questionnaire

FACTORS INFLUENCING THE ACHIEVEMENT OF IT-BUSINESS ALIGNMENT

INTRODUCTION

This survey is targeted at individuals in IT leadership position in institutions of higher learning.

Your participation will help me understand the state of IT-Business alignment in Ghanaian public institutions of higher learning and to identify factors that influence the achievement of IT-Business alignment.

I consider your contribution very vital to the success of my study and I assure you every information to be gathered from you is purely intended for academic purposes and will be treated with utmost confidentiality.

You are however not under any obligation to answer questions you are uncomfortable with.

Please feel free to contact me via email: akcdickson@gmail.com or on mobile: 0208254284 should you require any assistance.

Thank you in advance.

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PART ONE: BACKGROUND OF RESPONDENT

Please tick (√) where appropriate.

1. Gender:
☐ Male ☐ Female

2. Age:
☐ Less than 18 years ☐ 18-24 years ☐ 25-30 years ☐ 31-35 years ☐ 36-40 years

3. Level of education:
Other

4. Current position:
Other

5. Years of experience:
☐ Less than 5 years ☐ 6-10 years ☐ Above 10 years

6. Which of these institutions are you affiliated to?
☐ University of Ghana ☐ University of Professional Studies ☐ Accra Technical University
☐ Kwame Nkrumah University of Science and Technology ☐ University of Cape Coast ☐ University of Education
☐ Cape Coast Technical University ☐ Takoradi Technical University ☐ University for Development Studies

PART TWO: IT CLIMATE

Kindly ignore if you are not in the position to provide answers to any of the following.

1. How is your university's IT function structured?

2. Kindly identify and briefly describe the different types of information technologies in your university that are critical to your operations.

a) Teaching and learning :

b) Research and library:

c) Student Administration:

d) General University Administration - internal operations:

e) Financial Administration:

f) Supporting infrastructure - eg Internet, general computer labs, security, etc.:

3. How are the information technologies in question (2) above procured ?

4. Do you engage in outsourcing:

☐ YES

☐ NO

5. Please give reasons for your answer to question 4 above:

6. If your answer to question 4 above is yes, how are such contracts arranged?

7. How much is spent on ICT annually? Kindly provide an estimate:

8. Any other information concerning how IT is procured, developed, managed, maintained or disposed of:

PART THREE: STATE OF IT-BUSINESS ALIGNMENT

Kindly ignore if you are not in the position to provide answers to any of the following.

IT-Business alignment refers to the application of information technology (IT) in an appropriate and timely manner, in harmony with business operations, strategies, goals and needs

The matix below will help me gain understanding into the current state of IT-Business alignment in your institution. For each of the operations listed on the first column of the matrix, kindly indicate the state of IT-Business alignment applicable to your institution by ticking one of the boxes, using the achievement levels listed on the first row as reference.

	Fully achieved, very few or no shortcomings	Largely achieved, despite a few shortcomings	Only partially achieved, strides and shortcomings finely balanced	Very limited achievement, extensive shortcomings	Not achieved	Can't say
Teaching and Learning	☐	☐	☐	☐	☐	☐
Research and Library	☐	☐	☐	☐	☐	☐
Student Administration	☐	☐	☐	☐	☐	☐
General University Administration	☐	☐	☐	☐	☐	☐
Financial Administration	☐	☐	☐	☐	☐	☐
Support services	☐	☐	☐	☐	☐	☐

PART FOUR: FACTORS INFLUENCING THE ACHIEVEMENT OF THE VARIOUS DIMENSIONS OF STRATEGIC IT-BUSINESS ALIGNMENT

1. Intellectual Dimension:

In your opinion, what are the factors that can help ensure artifacts (physical hardware configurations, documents, and codes comprising of IT plans and strategy, location of decision-making rights, reporting relationships, centralization vs. decentralization of IT, and IT personnel deployment) created by your IT function are in line with those of other functions? Kindly state and briefly explain.

2. Social Dimension of Alignment:

How can an institution like yours ensure that IT and Business executives work together towards the achievement of both your business and IT mission, objectives, and plans? Kindly state and briefly explain.

3. Human Dimension of Alignment:

How do you ensure that the skillset, knowledge, leadership ability, and behavior of your IT staff are in harmony with those of other staff? Kindly state and briefly explain.

4. Environmental Dimension Alignment:

In ensuring that your IT strategy supports your institutions quest to take advantage of or minimize the effect of environmental uncertainties such as government regulations and competitive pressure, what factors need to be considered? Kindly state and briefly explain.

Closure

1. Additional Contributions/questions:

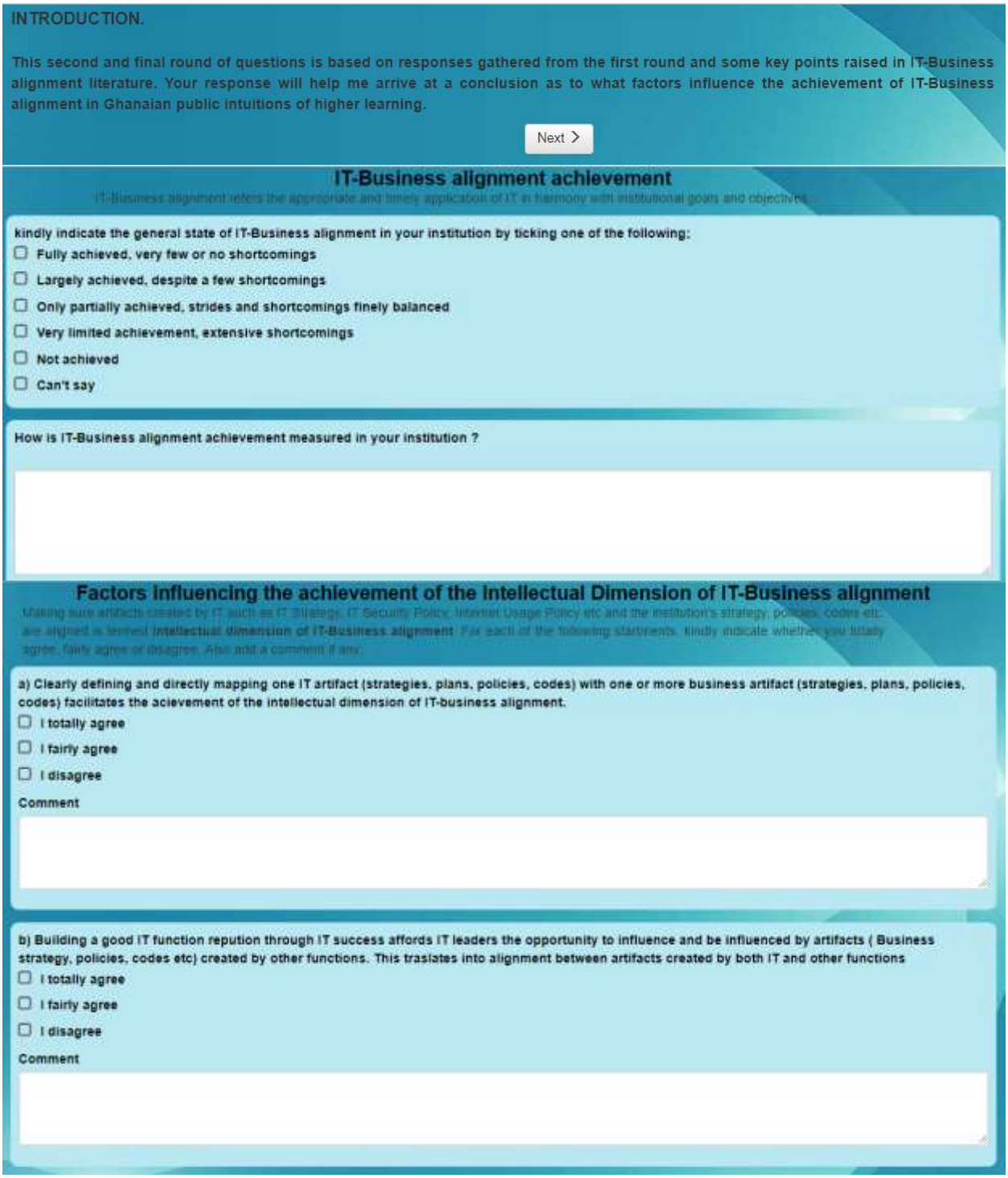
2. Kindly assist with contact details of any another informant you recommend:

3. Are there other documents (manuals, brochures, flyers) that can provide me with further information?
- ☐ YES
- ☐ NO

4. If your answer to question (3) above is Yes, kindly assist me with how these documents can be acquired:

Thanks for your time and participation.

Delphi Round Two Online Survey Questionnaire



INTRODUCTION.

This second and final round of questions is based on responses gathered from the first round and some key points raised in IT-Business alignment literature. Your response will help me arrive at a conclusion as to what factors influence the achievement of IT-Business alignment in Ghanaian public intuitions of higher learning.

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IT-Business alignment achievement

IT-Business alignment refers the appropriate and timely application of IT in harmony with institutional goals and objectives

kindly indicate the general state of IT-Business alignment in your institution by ticking one of the following:

- ☐ Fully achieved, very few or no shortcomings
- ☐ Largely achieved, despite a few shortcomings
- ☐ Only partially achieved, strides and shortcomings finely balanced
- ☐ Very limited achievement, extensive shortcomings
- ☐ Not achieved
- ☐ Can't say

How is IT-Business alignment achievement measured in your institution ?

Factors influencing the achievement of the Intellectual Dimension of IT-Business alignment

Making sure artifacts created by IT such as IT Strategy, IT Security Policy, Internet Usage Policy etc and the institution's strategy, policies, codes etc are aligned is termed **intellectual dimension of IT-Business alignment**. For each of the following statements, kindly indicate whether you totally agree, fairly agree or disagree. Also add a comment if any.

a) Clearly defining and directly mapping one IT artifact (strategies, plans, policies, codes) with one or more business artifact (strategies, plans, policies, codes) facilitates the acievement of the intellectual dimension of IT-business alignment.

- ☐ I totally agree
- ☐ I fairly agree
- ☐ I disagree

Comment

b) Building a good IT function repution through IT success affords IT leaders the opportunity to influence and be influenced by artifacts (Business strategy, policies, codes etc) created by other functions. This trasiates into alignment between artifacts created by both IT and other functions

- ☐ I totally agree
- ☐ I fairly agree
- ☐ I disagree

Comment

c) Decenntralization of IT function ensures that strategies, policies, and codes created by both IT and other functions are alingned both at the strategic and operational/unit levels

- ☐ I totally agree
- ☐ I fairly agree
- ☐ I disagree

Comment

d) Other comments/Factors influencing the achievement of the intellectual dimension of IT-Business alignment

Factors influencing the achievement of the Social Dimension of IT-Business alignment

The social dimension of IT-Business alignment refers to socially organized human behavior which exists 'beyond' a single actor. It encapsulates all aspects that play a role in the work relationship between business and IT staff. For each of the following statements, kindly indicate whether you totally agree, partially agree or disagree. Also add a comment if any.

a) IT and Business partnership through cross functional activities foster good working relationship

- ☐ I totally agree
- ☐ I fairly agree
- ☐ I disagree

Comment

b) It is important for business executives/staff to have some knowledge or skills in IT and for IT executives/staff to have some knowledge or skills in business. This will help eliminate communication gap and conflicts that arise from misinterpretation of IT and business viewpoints.

- ☐ I totally agree
- ☐ I fairly agree
- ☐ I disagree

Comment

c) Mutual trust and respect creates the enabling environment for building good working relationship

- ☐ I totally agree
- ☐ I fairly agree
- ☐ I disagree

Comment

d) Other comments/Factors influencing the achievement of the social dimension of IT-Business alignment

Factors influencing the achievement of the Human Dimension of IT-Business alignment

The human dimension of IT-Business alignment is concerned with distinct attributes of individual persons. Example skills, knowledge, leadership and behavior. Having IT staff with the attributes necessary for finding IT solutions to business/institutional problems and business staff who understand the importance of IT and have the attributes necessary to use IT to perform their duty is termed the **human dimension of IT-Business alignment.** For each of the following statements, kindly indicate whether you totally agree, fairly agree or disagree. Also add a comment if any.

a) Not only should IT staff be skillful and knowledgeable in IT, they must be able find IT solutions to business problems.

- ☐ I totally agree
- ☐ I fairly agree
- ☐ I disagree

Comment

b) Nursing diversity skills breeds flexibility and understanding of different viewpoints. Specifically IT staff must have some business acumen and understand the business of the institutions they work for. In the same vein, non-IT staff must acquire at least some basic IT skills.

- ☐ I totally agree
- ☐ I fairly agree
- ☐ I disagree

Comment

c) Commitment of top management expressed through genuine support and participation in IT initiatives and development of information system does not only ensure fair distribution of resources but also arouses commitment in other staff towards the achievement of the institution's goals.

- ☐ I totally agree
- ☐ I fairly agree
- ☐ I disagree

Comment

d) The business value an institution hopes to derive from IT largely depends on the leadership skills of its IT executives. The constantly changing technology landscape requires a leader who is not only creative but also innovative and able to demonstrate the value of IT to stakeholders.

- ☐ I totally agree
- ☐ I fairly agree
- ☐ I disagree

Comment

e) Other comments/Factors influencing the achievement of the Human dimension of IT-Business alignment

Factors influencing the achievement of the Environmental dimension of IT-Business alignment

Positioning IT in a manner that helps an institution/business to take advantage of or minimize the effect of environmental uncertainties such as government regulations and competitive pressure is termed the environmental dimension of IT-Business alignment. For each of the following statements, kindly indicate whether you totally agree, fairly agree or disagree. Also add a comment if any.

a) IT strategies, plans, policies etc. that make enough room for anticipated environmental/future changes can easily be altered to respond to these changes should they occur.

- ☐ I totally agree
- ☐ I fairly agree
- ☐ I disagree

Comment

b) Investment in IT initiatives that aim at creating a desired future environment reduces and helps manage the environmental uncertainty gap.

- ☐ I totally agree
- ☐ I fairly agree
- ☐ I disagree

Comment