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Examining the Factors Influencing the Achievement of IT-Business Alignment in a Developing Economy: Evidence from Ghanaian Public Universities

Research Paper

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ABSTRACT

The purpose of this study was to qualitatively assess the state of information technology (IT) business alignment among Ghanaian universities and to identify factors that influence the achievement of four key dimensions of the concept. Studies show that factors influencing the achievement of the concept remain underexplored and research coverage for both developing economies and the higher education sector trails behind other sectors and developed economies. A two-round online Delphi technique was employed to elicit responses from personnel in IT leadership positions using Schlosser et al. (2012) alignment dimensions model as a lens. Findings suggest that IT investment is often aligned with institutional goals and that IT-business artifact mapping, IT-business partnerships, closing the IT-business communication gap, and technical skills and knowledge of IT staff are among key factors that influence the achievement of the intellectual, social, human, and environmental dimensions of IT-business alignment, respectively. Implications are also discussed.

Keywords

IT-business alignment, alignment dimensions, achievement influencing factors, Ghana.

INTRODUCTION

IT-business alignment is a concept known 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). Luftman (2000) defined IT-business alignment as the appropriate and timely application of IT in line with business objectives. This concept has become important in the

educational sector due to the key role IT plays in teaching, learning, research, and school administration (Khouja et al., 2018). Just as in other sectors such as the banking, manufacturing, and the service sector, institutions in the educational sector, specifically the higher education sector invest as much in IT, if not more (Alghamdi & Sun, 2017). Studies have however shown that the educational sector is one of the sectors with high IT investment wastage. The majority of IT investments in this sector do not deliver the needed value (Alghamdi & Sun, 2017). Specifically, in the Ghanaian context, the educational sector continues to receive IT investments from the government, the institutions themselves, and donor agencies, but unfortunately, most of these investments fail to yield the needed results (Adarkwah, 2020). Evidently, IT-business alignment research in the sector cannot be overlooked.

Though IT-business alignment literature has several postulations on factors that can influence the achievement of alignment between an institution's IT investment and its objectives, lessons drawn from the educational sector and developing economies such as Ghana are hard to find (Panda & Rath, 2018; Alghamdi & Sun, 2017; Yayla & Hu, 2012). The concept itself remains in a constant state of flux and factors that influence its achievement are yet to be adequately explored (Alaceva & Rusu, 2015; Coltman et al., 2015; Kurti et al., 2013). Most studies found on the topic are not only quite old considering how fast the concept keeps changing due to the unstable business and technology landscape, they often present the concept as a single activity without breaking it down into its various types, dimensions, and levels (Kurti et al., 2013).

The purpose of this study is to share fresh knowledge of IT-business alignment and to help bridge the context and research approach gaps identified. Precisely, the study seeks to assess the state of IT-business alignment among Ghanaian public universities and ultimately identify factors that influence the achievement of four key dimensions of the concept. This will be accomplished by extending Schlosser et al. (2012) intellectual, social, and human dimensions further to include an environmental dimension and assessing factors that influence each of the dimensions. Specific questions the study seeks to answer include:

- 1) What is the state of strategic IT-business alignment among Ghanaian public universities?
- 2) What factors influence the achievement of strategic IT-business alignment among Ghanaian public universities?

The rest of the paper is organized as follows: a literature review comprising the concept of IT-business alignment, followed by the theoretical framework and its associated research model, the research methodology, analysis, findings, and discussions. The study concludes with implications for theory, policy, and practice, and suggestions for future studies.

LITERATURE REVIEW

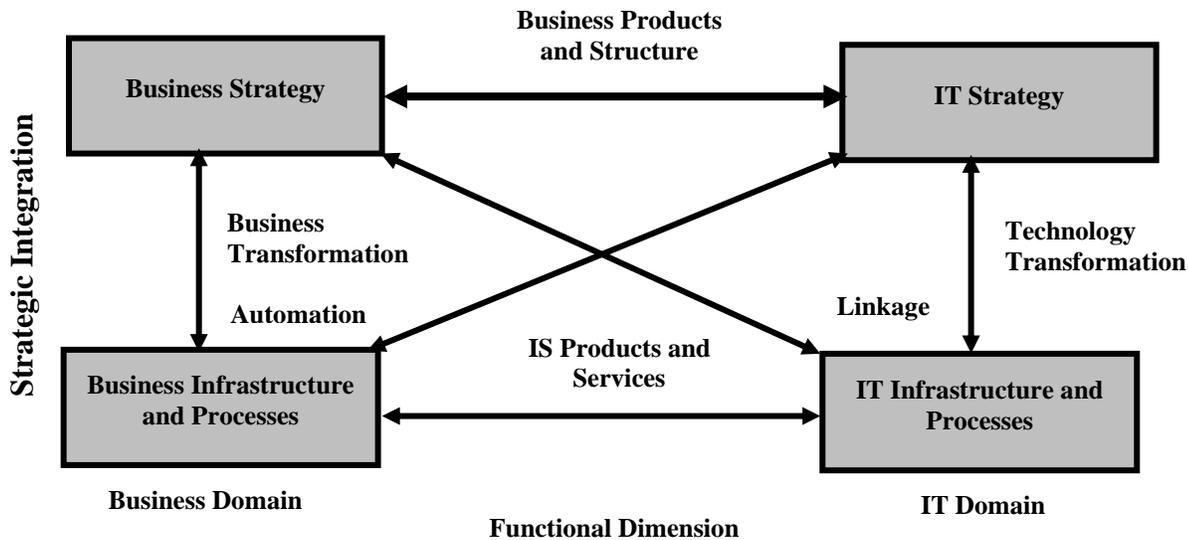
IT-Business Alignment

IT-business alignment as a notion has been studied and conceptualized in several ways; as the fit between IT strategy and business strategy by Henderson and Venkatraman (1993), as the level at which IT influences and reinforces a firm's mission and objectives (Reich & Benbasat, 1996) and as harmony between a firm's goals and IT systems (McKeen & Smith, 2003). Other conceptualizations include that of Sauer and Yetton (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 et al. (1993). The strategic alignment model (SAM) was purported by their study, though criticized by many based on relevance and applicability, yet remains the go-to model in IT-business alignment research

(Gerow et al., 2015). The four components which include business strategy, business 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. Figure 1 below is a schematic view of the strategic alignment model proposed by Venkatraman et al. (1993).

Figure 1
Strategic Alignment Model (SAM)



Note. Adapted from Venkatraman and Henderson (1999).

IT-Business Alignment Dimensions

IT-business alignment dimensions is one of the categorizations of IT-business alignment that remains an ongoing discussion. The available literature is characterized by several conceptualizations most of which according to Schlosser et al.'s (2012) lack precision and often overlap. Three key categorizations that however stand out in IT-business alignment literature include the intellectual dimension, social dimension, and the human dimension. These three dimensions have several postulations.

According to Reich and Benbasat (2000) the intellectual dimension can be viewed “as the state in which a high-quality set of cohesive business and IT plans do exist” (p. 82). Chan and Reich (2007) also defined it as the cohesion between a firm’s business strategy and its IT strategy or plan and indicated that this type of alignment happens at the tactical level of the firm where strategic decisions are made. Schlosser et al. (2012) on the other hand indicated that the intellectual dimension of IT-business alignment does not only happen at the tactical level as Chan and Reich (2007). It refers to artifacts produced by the business and/or IT staff at all levels and involves formal and purposeful design and documentation of the location of decision-making rights, IT personnel deployment reporting relationships, and centralization versus decentralization of structures. It is for these reasons that the IT-business alignment dimensions remain an ongoing discussion.

There has been some consistency however in the postulations of the social dimension. According to Williams and Baxter (1996), culture, respect, informal communication, and mutual trust make up the core components of the social dimension. Schlosser et al. (2012) conceptualized the social dimension as shared commitment and understanding of institutional goals that exists between IT and business executives. More specifically it refers to “relationships and cognitive linkages” (Schlosser et al., 2012, p. 5056).

The human dimension has also enjoyed some consistency over the years. It is concerned with attributes: skills, leadership, knowledge, and behavior of individual actors in the alignment process. Thus, IT infrastructure and processes 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 et al., 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 of the environmental uncertainty gap which is the difference between the perceived business environmental conditions and realized/actual environmental conditions (Garg et al., 2003).

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, p. 425).

The scarcity of IT-business alignment studies in the context of developing economies makes it difficult to have comparative studies between developing and developed economies. It is for this reason that the generalizability of previous studies remains questionable (Panda & Rath, 2018; Yayla & Hu, 2012). Unlike developed economies, most developing economies still battle with the skills gap, rigid business environment, IT infrastructure and other resource deficiencies, political environment volatility, lack of funding, and sub-standard national IT policies, just to mention a few (Panda & Rath, 2018; United Nations Conference on Trade and Development, 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. Notwithstanding these challenges, recent studies in the developing economy context suggest that the benefits of IT-business alignment are universal, regardless of the type of economy or sector you choose to do business in (Yayla & Hu, 2012).

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 of discussion in educational journals, summits, and forums for several decades. With the fierce 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 persists as one with high IT investment wastage (Alghamdi & Sun, 2017), suggestive of IT-business misalignment. Studies have shown that the majority of the information technologies adopted by most institutions of higher learning

do not deliver expected results and are often underutilized leading to eventual obsolescence. Perhaps one of the key factors most researchers and heads of IT institutions of higher learning are missing is an understanding of the extremely complex nature of the sector compared with other sectors such as the banking sector (Bytheway et al., 2015).

Institutions of higher learning are made up of two wings: the structural wing which includes professional administrators who oversee the general administration of the institution and the philosophical wing, comprised of academics who are tasked with the management of classroom activities, curriculum design, peer reviews and other instructional activities (Albrecht et al., 2012). These two wings operate under two opposite principles (Albrecht et al., 2012). The structural wing, for instance, operates on a principle that breeds strong bureaucracy, a 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 like institutions in other sectors such as banking and manufacturing, which is often the case, can be misleading (Chan et al., 2006).

The deficiency of IT-business alignment research pertaining to institutions of higher learning 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, learning, and research, etc.

IT-Business Alignment in Ghana's Public Higher Education Sector

Ghana's higher education sector dates back to 1948 when, following 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 (Teferra & Knight, 2008) until 1961 when 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 the Ghana Education Service (GES) of the Ministry of Education (MoE) and are regulated by regulatory bodies such as the National Commission of Tertiary Education (NCTE) and National Accreditation Board (NAB). Table 1 shows the various categories and the current number of accredited public institutions of higher learning as against private institutions.

Table 1

Accredited Public Institutions of Higher Learning in Ghana as Against Private Institutions

| CATEGORY | PUBLIC | PRIVATE |
|------------------------|---------------|----------------|
| Universities | 10 | 81 |
| Technical Universities | 8 | - |

| CATEGORY | PUBLIC | PRIVATE |
|---------------------------------|-----------|------------|
| 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 |

Note. “-” represents does not exist.

In 2004, the government of Ghana passed into law Ghana’s Information Communication Technology for Accelerated Development (ICT4AD) policy. This policy aims at using information communication technology (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 became fully operational in the education sector in 2007 with the higher education sub-sector taking the lead. 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 significantly 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 Enterprise Resource Planning Systems (ERPs) and Learning Management Systems (LMSs) are no longer considered a luxury but rather a necessity, especially during this time of intense competition among institutions of higher learning globally (Owusu et al., 2017).

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 although huge sums are invested in IT, like sectors such as banking and manufacturing. Very little is known about the appropriate and timely application of IT in support of institutional goals and objectives in this sector.

THEORETICAL FRAMEWORK

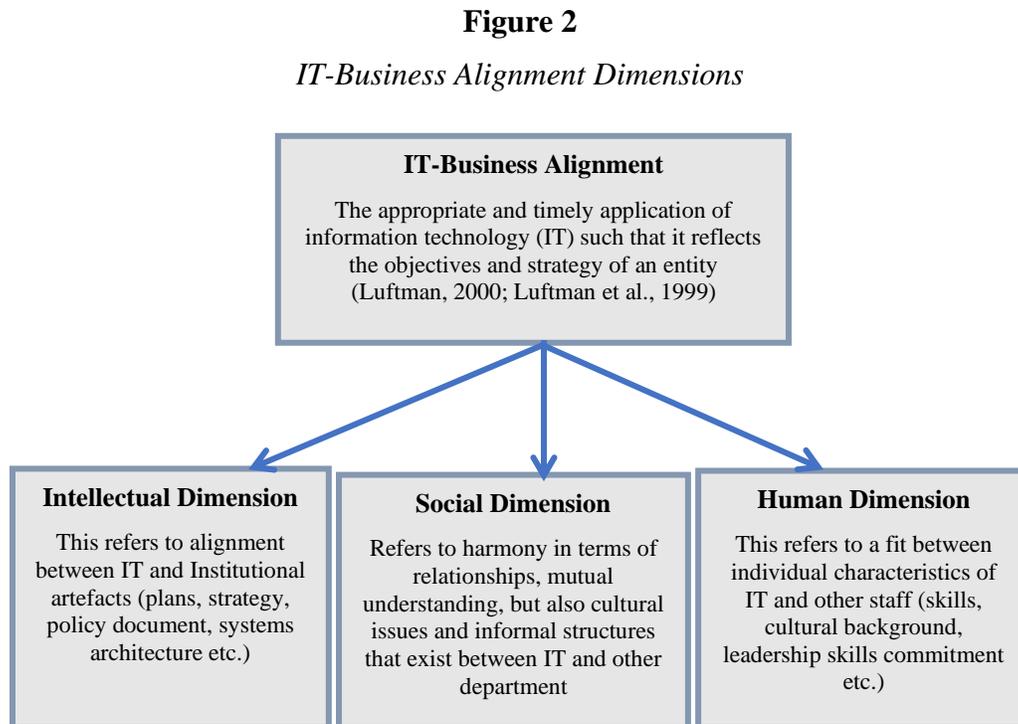
Overview of Schlosser et al.'s (2012) IT-Business Alignment Dimensions Model

After visibly defining the scope and aims of this study and discussing the relevant issues in strategic IT-business alignment literature, we now discuss the research framework. For the purpose of this study, Schlosser et al.'s (2012) IT-business alignment dimensions model was considered the 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 dimensions of the concept, despite their common use.

In an attempt to address the difficulty associated with clearly defining the dimensions of IT-business alignment, Schlosser et al.'s (2012) redefined the three commonly referred to dimensions of the concept

(intellectual, social, and human dimension). Their redefinition was 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 et al. (2004) and Hevner et al. (2004) model.

Schlosser et al. (2012) redefined the intellectual dimension to mean finding a fit between artifacts such as strategies, plans, policies, etc. created by both IT and other departments. 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 as shown in Figure 2.



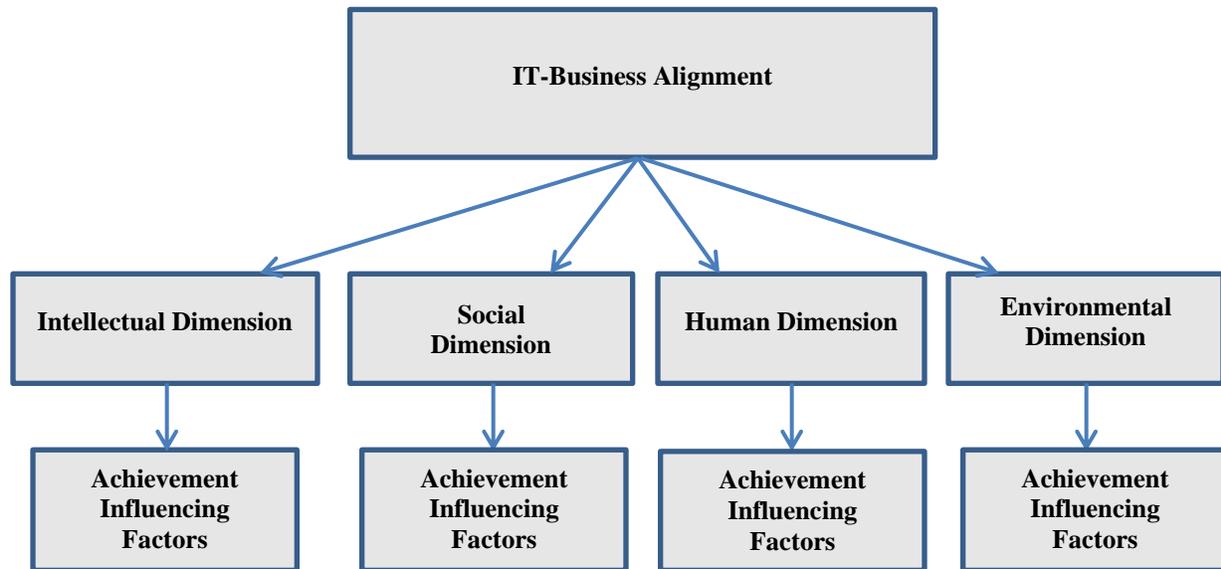
Note. Adapted from Schlosser and Coltman (2012).

Research Model

The research model for this study draws mainly from Schlosser et al.'s (2012) IT-business alignment dimensions model and builds on Kurti et al.'s (2013) critical success factors of the business-IT alignment model. Specifically, the model (Figure 3) expands Schlosser et al.'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 environmental dimensions of IT-business alignment.

Figure 3

Conceptual Model of Factors Influencing the Achievement of IT-Business Alignment Based on Dimensions



Definition of Constructs

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

IT-Business Alignment

There has been much deliberation on the concept of IT-business alignment in previous chapters. In the context of this study, however, IT-business alignment is conceptualized as a 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 the 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. As the focus of this study is to qualitatively assess the state of IT-business alignment in institutions of higher learning, ‘achievement rating scale’ proposed by Washington (2009, p. 39) is preferred to the mathematical models such as the matching and moderation approach proposed in the literature (Reich et al., 1999). The achievement rating scale allows respondents to indicate whether IT-alignment concerning their core operations has been achieved or not, in their opinion.

Intellectual Dimension

The intellectual dimension of IT-business alignment refers to harmony between IT and business processes that results 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 et al., 2012).

Social Dimension

The social dimension refers to relationships and cognitive linkages, specifically, human behavior, that exists beyond a single actor. It comprises relationships, mutual understanding as well as cultural issues, and informal structures such as trust, shared understanding, respect, etc. (Schlosser et al., 2012). Unlike the intellectual dimension, the social dimension is about the social environment architecture of both the IT domain and business domain other than artifacts and human actors (Reich & Benbasat, 2000).

Human Dimension

The human dimension is more concerned with 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 et al., 2012).

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., 2003).

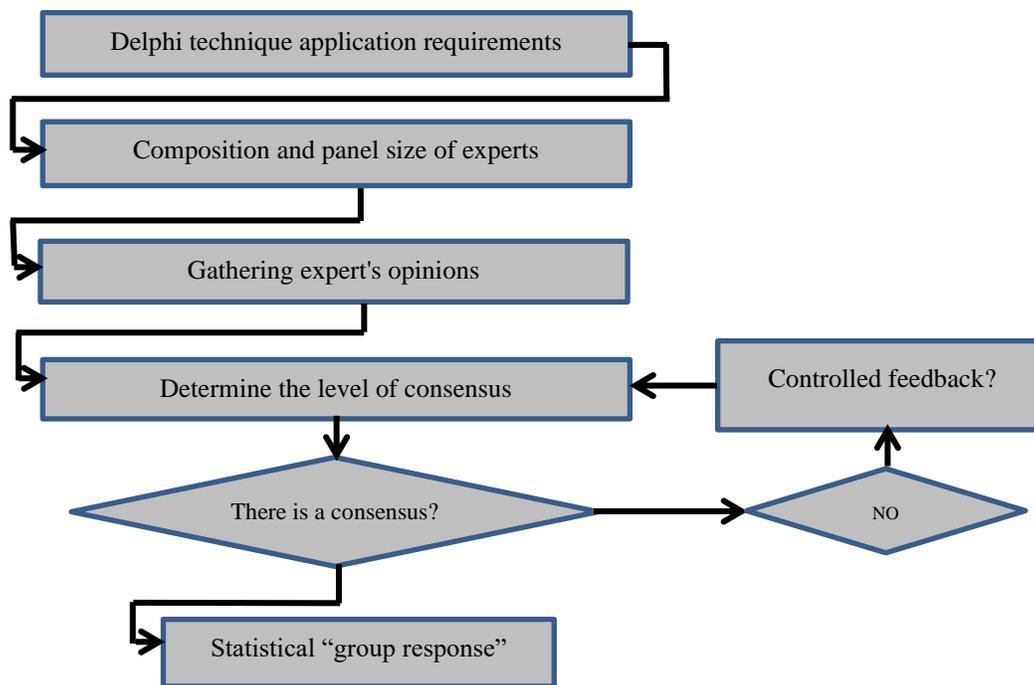
Achievement Influencing Factors

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 dimensions. Responses gathered will then be matched with those in the literature. This will inform the design of a second survey where respondents get to confirm their level of agreement with each of the factors proposed.

RESEARCH METHODOLOGY

Overview of Research Methodology

A qualitative research approach was adopted for this study because of the type of questions it seeks to answer. This approach has proven to help researchers uncover the mental processes behind certain behaviors and to elucidate people's views regarding certain social phenomena (Mohajan, 2018). Widely used qualitative methods include unstructured open-ended interviews, direct observation, participant observation, and document analysis (Jamshed, 2014). However, for the expert opinion being sought-after and the exploratory nature of this study, Dalkey's (1973) Delphi technique was deemed appropriate. This technique involves the collection and organization of judgments from a group of experts over several survey rounds (Austin et al., 2015). It is about the only method that handles seeking expert opinion in an exploratory study quite well (Habibi et al. 2014). Following Habibi et al. (2014) theoretical framework for the Delphi technique in qualitative research, a two-round online Delphi study consisting of six steps was conducted as indicated in Figure 4.

Figure 4*Delphi Technique Framework for the Study*

Note. Adapted from Habibi et al. (2014).

Conducting the Study

Delphi Technique's Application Requirements

The need for group decision making, expert opinions on a subject, data collection anonymity, requiring solutions to complex multidimensional and interdisciplinary problems, consensus building and the ability to engage experts at the lowest possible cost are some of the basis for the application of the Delphi technique (Cowan et al., 2015; Fan & Cheng, 2006; Landeta, 2006; Meijering et al., 2013; Walker & Selfe, 1996). 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 to identify the nature and fundamental elements of a phenomenon (Habibi et al., 2014). These two conditions fit into the main objective of this study, which is to seek expert opinion on factors influencing the achievement of the various dimensions of IT-business alignment.

Composition and Panel Size

Delphi panel selection is done based on the experience and the depth of knowledge an individual has on a subject (Habibi et al., 2014). Experience and depth of knowledge are 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 public universities and polytechnics (now technical universities) who happen to be the direct custodians of IT investments. These universities were selected because the government of Ghana prioritizes them over all other educational institutions in terms of IT investment. They are also expected to have a well-structured IT directorate guided by an IT policy approved by the government.

Out of a total of ten traditional universities and eight polytechnics (technical universities), five traditional universities, and three polytechnics were purposively selected based on age and prestige. The public universities selected were the University of Ghana (UG), Kwame Nkrumah University of Science and Technology (KNUST), University of Cape Coast (UCC), University of Professional Studies (UPSA), and University for Development Studies (UDS). The polytechnics on the other hand comprised Accra Technical University (ATU), Takoradi Technical University (TTU) and Cape Coast Technical University (CCTU). Heads of IT in all these institutions were contacted, making up eight respondents. Another 17 were contacted based on recommendations from the first eight respondents. In all, 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 ten (Malone et al., 2005; Strasser et al., 2005) others included more than 100 participants (Kelly & Porock, 2005; Meadows et al., 2005). The choice of size is dependent on the topic, the nature of different viewpoints included, and the available time and money (van Zolingen & Klaassen, 2003).

Gathering Expert Opinions

After a test study comprising two respondents, all the experts were consulted to determine the most suitable medium of Delphi inquiry. A 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 open-ended questions in the first round and close-ended questions in the second round.

The questionnaire was developed and refined many times based on feedback from our co-researchers, 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 the questionnaire.

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) as the basis for ending Delphi rounds (Habibi et al., 2014), others suggest two or three Delphi rounds should be enough for most study objectives (Delbecq et al., 1975). According to Skulmoski et al. (2007), three or more rounds are required if group consensus is one's focus. On the other hand, 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 to elucidate a phenomenon or reach theoretical saturation. Consensus for this study was however reached in round two just as in Duncan (1995), using Kelly et al. (2016), where a 70% expert agreement rating was achieved in a condition of stable free-text comments approach.

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 the 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 fifth phase was dedicated to defining and naming the themes. Finally, the sixth phase was dedicated to the production of the report. The second round of the web-based Delphi survey was designed in the final phase.

FINDINGS

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, state of IT-business alignment in their institutions, and factors influencing the four key dimensions of IT-business alignment.

Response Rate

Responses were sorted from experts in IT leadership positions in Ghanaian public institutions of higher learning. Though 20 experts consented to participate in the survey, only eight actually participated in the study. Despite the low response rate, the top three traditional universities and one technical university (UG, ATU, KNUST, and UCC) responded, hence findings can be generalized.

Respondents Demographics

Respondent demographics refer to the age, gender, educational qualification, employment position, work experience and institutional affiliation of respondents. Table 2 presents the demographics of the respondents.

Table 2

Respondent Demographics

| Construct | Findings |
|------------------------------------|---|
| Gender | Seven out of the eight respondents are male |
| Age | All the respondents are above the age of 40 |
| Educational background | One respondent holds a PhD, six out of the eight respondents hold Master's degrees, and one holds a Bachelor's degree |
| Current employment position | Three out of the eight respondents are chief IT officers, one is a deputy chief IT officer and the remaining four are IT unit heads. |
| Years of experience | All respondents have over 10 years of IT work experience except one who has less than 10 years of IT work experience. |
| Institution affiliations | Four of the respondents are affiliated to UG, one respondent is affiliated to ATU, two respondents are affiliated to KNUST and one respondent is affiliated to UCC. |

State of IT-Business Alignment Among Ghanaian Public Universities

To gain understanding into the current state of IT-business alignment (research question one), which in the context of this study refers to the timely and appropriate application of IT to core institutional operations, respondents were asked to give an overview of IT function and indicate their level of achievement of IT-business alignment concerning their core operations; teaching and learning, research and library, student administration, general university administration (internal operations and support services).

Overview of IT in Ghanaian Public Universities

Respondents were asked questions that help understand the nature of IT in the institutions they are affiliated to. Responses gathered 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, responses gathered from Respondent 1 and Respondent 2 include:

Our IT Function is headed by a chief IT officer (CITO) who reports to the pro-VC for Research, Innovation, and Development. The directorate has three divisions which constitute the shared services expert group – Infrastructure Division, Services Division, and Security Planning & Compliance Division. These divisions comprise 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 and Compliance - Planning, Security Planning, Projects, and Portfolio Management.

We have IT Infrastructure unit that builds and support the IT infrastructure, we have IT services that seek 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.

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 (GoG), 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. Table 3 presents a list of some of the IT products/applications these institutions invest in.

Table 3

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, etc. LMS creation and management of online course content (multimedia), supporting interaction between lecturers and students, collaboration among students and lecturers. The high-performance computing infrastructure for computational simulations Internet provision for access to online educational and research resources |

| CORE OPERATION | IT INVESTMENT (PRODUCTS/APPLICATIONS/SERVICES) |
|--|---|
| | Assistive technology resources to support students with special needs - visually impaired, hearing impaired, etc. Some of the specific technologies include the 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 E-mail system, and reliable storage and retrieval systems are all necessary |
| General University Administration - Internal Operations | The ERP system supports most of the business processes — student 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 365 |
| Supporting Infrastructure | Computer laboratories Internet access HP Matrix Cloud server |

It is important to note that the majority of the products/applications listed in Table 3 above are paid-for licenses. According to most of the respondents, outsourcing is standard practice, especially because of the 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 3 is done following the Public Procurement Act of Ghana, Act 663.

State of IT-Business Alignment in Institutions of Higher Learning

Respondents were asked to indicate their level of achievement of IT-business alignment concerning their core operations, teaching and learning, research and library, student administration, general university administration - internal operations, and support services. The following were the options provided in addition to a comment box:

1. Fully achieved, very few or no shortcomings
2. Largely achieved, despite a few shortcomings
3. Only partially achieved, strides and shortcomings finely balanced
4. Very limited achievement, extensive shortcomings
5. Not achieved

Table 4 presents the responses gathered.

Table 4*State of IT-Business Alignment in Institutions of Higher Learning*

| Operation | Findings |
|--|---|
| Teaching and Learning | All eight 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 of the respondents indicated IT-business alignment with regards to research and library is largely achieved, despite a few shortcomings. |
| Student Administration | One respondent indicated that IT-business alignment with regards to student administration is fully achieved with 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, with 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 out of the eight respondents indicated that IT-business alignment with regards to financial administration is fully achieved, with very few or no shortcomings whereas the remaining six are of the view that IT-business alignment is largely achieved, despite a few shortcomings |
| Support Services | All eight respondents indicated IT-business alignment with regards to support services is largely achieved, despite a few shortcomings. |

Factors Influencing the Achievement of IT-Business Alignment

With the identification of factors influencing the achievement of IT-business in institutions of higher learning (research question two) being the key objective of this study, 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 of predefined factors, the first round of the Delphi study was designed in a manner that allows respondents to brainstorm factors that influences the achievement of the four main dimensions of IT-business alignment proposed in this study, thus the intellectual dimension, social dimension, human dimension, and the environmental dimension. The paragraphs below and Table 5 thematically summarized the responses gathered.

Table 5*IT-Business Achievement Factors*

| IT-Business alignment dimension | Achievement factors |
|---|--|
| Intellectual dimension of IT-business alignment | IT success Decentralization of IT function |
| Social dimension of IT-business alignment | IT-business partnership Closing the IT-business communication gap through cross-functional skill/knowledge acquisition. Mutual trust and respect |

| IT-Business alignment dimension | Achievement factors |
|--|---|
| Human dimension of IT-business alignment | 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 |
| Environmental dimension of IT-business alignment | Leadership skills of IT executives |
| | Future proof IT investment |
| | Investment in the desired future environment |

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 responses gathered regarding factors influencing the achievement of IT-business alignment in the first round. Respondents were asked to indicate their level of agreement (Totally Agree, Neutral, and Disagree) to each of the factors believed to influence the achievement of the various dimensions of IT-business alignment and to leave a comment if any.

Factor Agreement Ratings

Almost all the factors presented in round two of the survey received a 100% agreement rate except two of the factors under the environmental dimension of IT-business alignment (future proof IT investment and investment in the desired future environment) which received 87.5% agreement.

ANALYSIS AND DISCUSSION

State of IT-Business Alignment in Ghanaian Public Universities

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 and despite its numerous challenges, IT heads of Ghanaian public universities seem to be on top of issues. Well-structured IT functions and high IT investment are notable characteristics of the institutions involved in the study. Response gathered on the state of IT-business alignment indicates IT-business is either 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 respondents, however, indicated IT-business alignment has largely been achieved with regards to teaching and learning, research and library, and support services despite a few shortcomings. These findings seem to contradict Luftman and Kempaiah's (2007) assertion that the education sector lurks at the bottom in terms of IT-business alignment maturity when compared with other sectors such as manufacturing, health, banking sector. On the other hand, it may be an indication of the progress made in the sector over the years. Respondent 1 stated that "Because we do not operate in silos, our IT investments are always aligned with the goals. We know this because of a constant flow of feedback between IT and other directorates." Respondent 4 reiterated by stating "I will say IT-business alignment has greatly been achieved with the exception of a few lapses."

Factors Influencing IT-Business Alignment Based on the Dimensions

Factors influencing the achievement of IT-business alignment as already discussed are underexplored though it remains a key aspect of the concept. The focus of this study is to present 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 a guide and in all, 13 key factors were identified; three believed to affect the achievement of the intellectual dimension, four the social dimension, another four the human dimension and two affecting the achievement of the environmental dimension of IT-business alignment. The following paragraphs present a detailed discussion/analysis of these factors.

Factors Influencing the Achievement of the Intellectual Dimension of IT-Business Alignment

The intellectual dimension as previously discussed refers to the 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.

Consistent IT Success. IT success factor has long been established as a factor that influences the achievement of IT-business alignment (Calhoun & Lederer, 1990; King, 1978). This factor received a 100% endorsement from respondents in this study. According to Kurti et al. (2013), the quality of the 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 following key measurement criteria; business requirement, completion time, and budget. Responses gathered suggest that a good IT track record which leads to confidence in IT function and co-creation of policy plans and codes is a recipe for the achievement of the intellectual dimension of IT-business alignment. Respondent 3 stated that "I believe first IT heads need to concentrate on earning a good reputation for the division through consistent wins in terms of IT projects and initiatives before there can even be the platform for co-creation of policy documents."

Decentralization of the IT Function. Decentralization of the IT function is one of the factors that surfaced during the brainstorming stage of the survey. Responses gathered suggest that decentralizing the 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's (1993) and Nfuka and Rusu's (2011) argument that cascading IT-business alignment down an organization does not only lead to improved IT-business alignment but also leads to the more widespread use of IT. Respondent 8 stated that:

I also believe that one thing that can facilitate alignment between policies and strategies created by IT and those created by other divisions is the decentralization of the IT function. In our case, for instance, we have IT units in every department both the academic and non-academic wings. This is to ensure that policies, strategies, operation guidelines, etc. created even at the lowest level reflect the objectives of the IT directorate, and vice versa.

Factors Influencing the Achievement of the 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.

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 et al., 1994). Respondents in this study all selected 'totally agree' with regards to IT-business partnership being a factor that fosters good working relationships. Luftman et al. (1999) confirmed that the factor is not only supported by IT executives but also by non-IT executives. According to Luftman and Kempaiah (2007), the IT-business partnership is a measure of the level of relationship that exists between IT and business staff. Thus, a higher level of IT-business partnership is an indication of a good working relationship, and vice versa. Respondent 2 stated that:

Bonding between IT and non-IT staff cannot be overemphasized; this remains a big challenge in most institutions. Bonding through job rotation, joint seminars, joint social programs and even office allocation seating arrangements can go a long way to foster a good working relationship.

Closing the IT-Business Communication Gap Through Cross-Functional Skill / Knowledge Acquisition. 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, 1999; Nelson & Coopriider, 1996). According to Reich and Benbasat (2000), business executives need to be able to understand, participate, and make a meaningful contribution to key IT processes. In the same manner, IT executives should also be able to understand, participate, and make a meaningful contribution to key business processes. Respondent 6 stated that:

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

Mutual Trust and Respect. Defined by Dasgupta (1988) as the shared expectation of commitment between business and IT executives. Mutual trust and respect were mentioned by all respondents in this study as critical to the achievement of the social dimension of IT-business alignment. Top management must be able to trust their IT department enough to commit to the strategic use of IT and to allocate resources (funds, personnel, etc.) for the execution of their duties. On the other hand, IT executives must believe in top management support to commit their time and energy to devise ways to use IT to champion the institutions' course. Respondent 5 said "A good relationship between top management and the IT function is exhibited in the level of trust and respect top management has for IT executives and vice versa." According to Luftman et al. (1999), aside from all the factors that influence the achievement of IT-business alignment, "an atmosphere of open and honest communications" (p. 17) is key.

Common Understanding and Appreciation of Institutional Goals. Common understanding and appreciation of an institution's goals by its staff and other stakeholders drive commitment. Specifically, the commitment of IT and business staff originating from a common understanding and appreciation of business/institutional goals fosters good relationships and mutual respect. Respondent 2 stated that "It is critical for both business executives and IT executives to have a

common appreciation and understanding of where the institution is headed. This way, there will be mutual commitment beyond personal objectives or interest.”

Factors Influencing the Achievement of the Human Dimension of IT-Business Alignment

Below are factors that influence the achievement of the human dimension of strategic IT-business alignment:

Technical Skills and Knowledge of IT Staff. The perception of top management that often develops about an institution’s IT function greatly depends on the technical skills and knowledge of the institution’s IT staff. Previous studies have justified the need for IT staff to be sophisticated enough and abreast of recent developments in the sector in order to win management support (Owusu & Broni Jr, 2020; Nfuka & Rusu, 2011; Luftman et al., 1999; Teo & Ang, 1999). Respondent 7 said:

Stakes are high; IT investment cost is skyrocketing 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 realized the value of their IT investment.

IT has moved from the support role it used to play to a more strategic and transformational 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.

Cross-Functional Knowledge and Skills of both IT and non-IT Staff. IT and non-IT executives acquiring knowledge and skills related to each other’s functions to complement their respective technical skills and knowledge has long been established in research and practice as critical to the attainment of IT-business alignment (Owusu & Broni Jr, 2020; Nfuka & Rusu, 2011; Khandelwal, 2001; Luftman et al., 1999; Teo & Ang, 1999). Responses gathered from chief information officers (CIOs) in a 2018 survey conducted by CISCO on IT training and hiring suggest 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 staff, on the other hand, are expected to have some IT knowledge and skills as well. 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.

Top Management Commitment. Top management commitment is a very popular phrase in IT-business alignment and has received broad consensus as one of the key factors necessary for the achievement of IT-business alignment (Owusu & Broni Jr, 2020; Nfuka & Rusu, 2011; Luftman et al., 1999; Teo & Ang, 1999). Having 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. Respondent 6 said:

The 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.

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 can demonstrate the value of IT to the organization/institution. Luftman et al's. (1999) noticed an increasing IT innovation rate across

all industries two decades ago. However, some organizations are still unaware of ICT opportunities available to them. Nfuka and Rusu (2011) 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. Respondent 1 stated that “IT executives need to demonstrate a high level of leadership skills and must be abreast with changes in the technology as well as the business landscape in order to perform and remain relevant.”

Factors Influencing the Achievement of the Environmental Dimension of IT-Business Alignment

The paragraphs below discuss factors influencing the achievement of the environmental dimension of IT-business alignment.

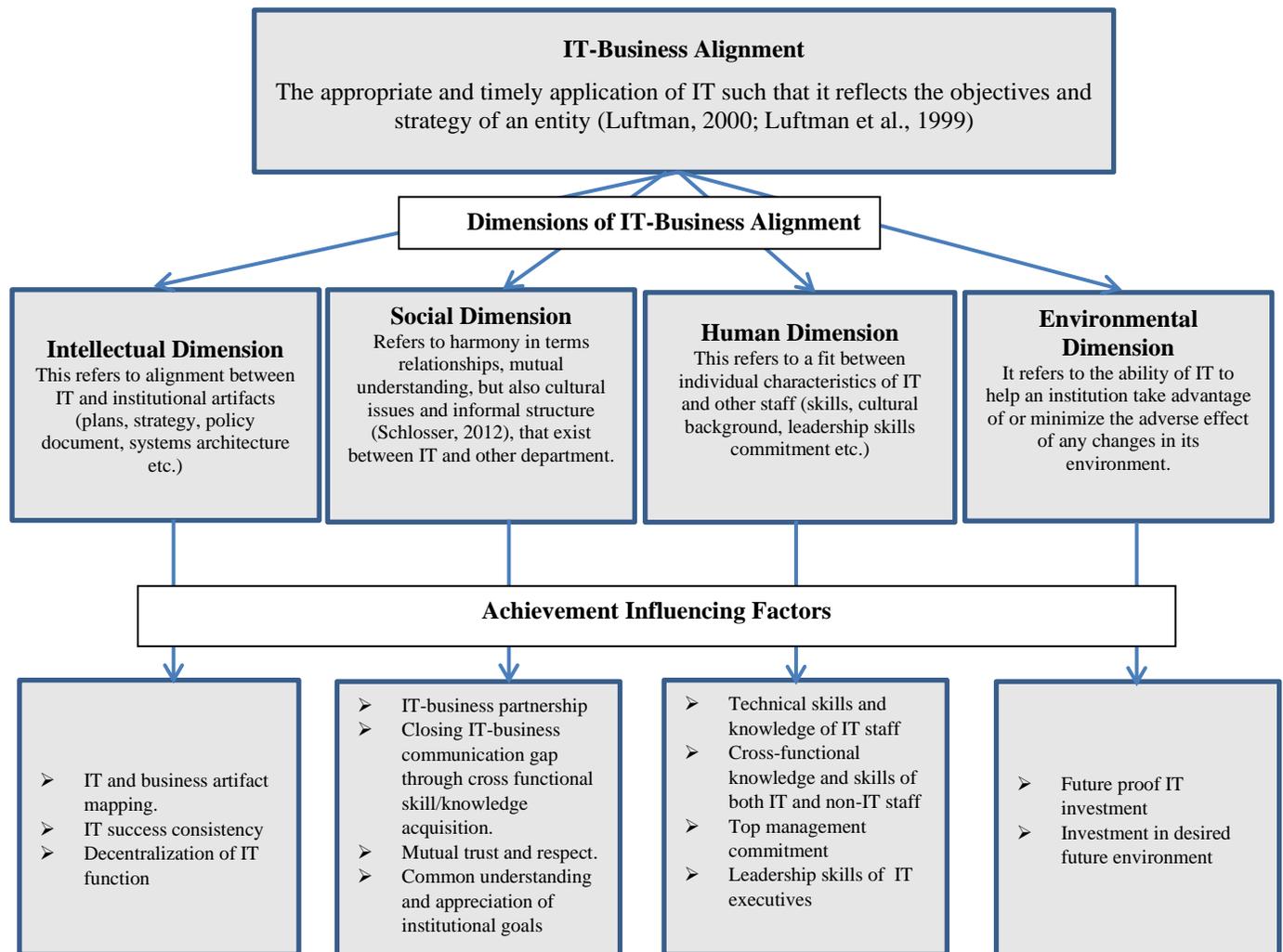
Future Proof IT Investment. IT units should be ready to adapt to the changes as and when they come. Systems must be designed in such a way that they allow room for modification when the need arises. There must also be administrative techniques in place to take care of trade-offs in times of environmental change and to conduct comprehensive environmental scanning from time to time to anticipate possible changes. This buttresses Lederer and Mendelow's (1990) proposition. Respondent 3 stated that “IT investment must be tested to ensure that they can stand the test of time. The underlying factor here is proper environmental scanning.”

Investment in the Desired Future Environment. Investment in IT initiatives that aim to create 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 pre-release versions of their software to their target users for them to try and make recommendations before the final software is released. Respondent 1 said “IT executives must avail themselves to take part in software testing sessions or try beta versions of software and make recommendations, as this is the only way they can influence the final product.” 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.

Factors influencing the achievement of IT-business alignment based on the dimensions have been summarized in Figure 5 below.

Figure 5

Model for Factors Influencing the Achievement of IT-Business Alignment Based on the Dimensions



CONCLUSION

Summary of the Research Findings

The responses gathered from both the first and second survey have satisfied the key objectives of this study which include: the state of IT-business alignment among Ghana’s public universities. Additionally, the study identifies factors that influence the achievement of four key dimensions of the concept by extending Schlosser et al.’s (2012) IT-business alignment dimensions (intellectual, social, human model) to include an environmental dimension.

Findings suggest that IT-business alignment concerning key operations, teaching and learning, research and library, student administration, general university administration, financial administration and support services have either fully been achieved with very few or no shortcomings or largely achieved,

despite a few shortcomings. The respondents arrived at this by comparing their short- and long-term goals with their achievements.

Finally, 13 factors were identified with regards to the achievement of the four key dimensions of IT-business alignment proposed in this study. Findings suggest that IT and business artifacts mapping, IT success, and decentralization of IT function are the factors that influence the intellection dimension. The social dimension is influenced by IT-business partnership, closing the IT-business communication gap through cross-functional skill/knowledge acquisition, mutual trust and respect, and common understanding and appreciation of institutional goals. Factors influencing the achievement of the human dimension include 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 whereas future proof IT investment and investment in the desired future environment influence the achievement of the environmental dimension.

Contribution to Research

This study has made two major contributions to literature. First, the study presents fresh empirical knowledge on factors that influence the achievement of four key dimensions of IT-business alignment in two contexts (fit between operations of institutions of higher learning and IT) that have not received much attention in terms of IT-business alignment research.

Secondly, 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 and have over the years been able to match their IT investment to institutional goals. This finding contradicts what is being communicated in IT-business alignment literature about the higher education sector having the highest IT investment wastage rate, hence qualifies as new knowledge.

Implications and Limitations

Implications 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 artifacts 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 the desired future environment. These findings will help persons in IT leadership positions make informed IT investment decisions.

Implications for Policy

Public 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.

Limitations and Future Research Directions

Just as every research, this study had its share of limitations. Despite 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 that involves experts often on tight schedules and difficult to reach. Though many consented to take part in the study, only a few were able to complete the surveys within the stipulated time, even with several extensions. This delayed the completion of the study.

Also, the study was focused on Ghanaian public universities excluding the private institutions of higher learning. Future studies should consider widening the net to include Ghanaian private institutions of higher learning. And in terms of methodology, a different methodology may perhaps produce different results.

Finally, the study takes a single stakeholder (IT) viewpoint; future studies may consider business viewpoints as well as students' viewpoints.

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