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UNIVERSITY OF GHANA
COLLEGE OF HUMANITIES

**TOWARDS THE DEVELOPMENT OF CONTEXTUALLY RELEVANT AND
INDUSTRY-RESPONSIVE GRADUATE INFORMATION SYSTEMS
CURRICULA FOR SUB-SAHARAN AFRICA**



**DEPARTMENT OF OPERATIONS AND MANAGEMENT INFORMATION
SYSTEMS**

FEBRUARY 2023

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INDUSTRY-RESPONSIVE GRADUATE INFORMATION SYSTEMS CURRICULA
FOR SUB-SAHARAN AFRICA**

BY

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**A THESIS SUBMITTED TO THE SCHOOL OF GRADUATE STUDIES IN
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ABSTRACT

The relevance of academic programmes, including information systems (IS), to meeting stakeholder expectations, continues to be a concern for both researchers and practitioners. For example, on one hand, industries expect IS graduates to acquire the relevant competencies needed for organisational performance. This expectation is congruent with governments' expectation of graduates acquiring the necessary knowledge and skills that make them employable and also solving national socio-economic challenges. On the other hand, IS academics focus on independent autonomous research and further knowledge that is not necessarily focused on vocation. This, for example, conflicts with government, industry and students' expectations of graduates being employed after obtaining degrees. Furthermore, new societal challenges emerging as a result of the impact of the COVID-19 pandemic, call for disruption-responsive IS curricula. These multiple, and sometimes conflicting expectations, from different actors, constitute an institutional complexity which currently confronts IS curriculum innovation in SSA. IS departments in SSA are expected to navigate this institutional complexity in their efforts to develop or revise contextually relevant and responsive IS curricula. However, empirical evidence and theoretical explanations of how relevant academic programmes in IS respond to the SSA context have not been adequately explored.

A review of the information systems curriculum and the institutional complexity literature delineates, among others, four interlinked research gaps, which have also been echoed in practice and somewhat by the global IS body, the Association of Information Systems (AIS). First, *there is the need to explore the IS competencies required of mid-level management IS professionals relevant to organisations in SSA*. Mid-level IS managers occupy positions between entry-level and the Chief Information Officer (CIO) position. Second, *there is the*

need to explain how institutional logics and agent actions influence IS curriculum innovation in SSA. Third, there is the need to explain the consequences of the influences of institutional logics and agent actions on the responsiveness of IS curricula in SSA. Lastly, there is the need to explore the nature of graduate IS programme offerings in SSA. Consequently, the overarching purpose of this doctoral study is to develop a framework for the development of contextually relevant and industry-responsive graduate information systems curricula for Sub-Saharan Africa. To explore the nature of graduate IS programme offerings and mid-level management IS competencies, the study adopted the MSIS 2016 global IS competency model to guide the collection and analysis of data. Again, the study also adopted the institutional theory, and specifically the institutional logics perspective, to explain the influences of institutional logics and agents' actions on the development of IS curricula. The curriculum responsiveness perspective was used to examine the responsiveness of graduate IS curricula in SSA. This study, based on the critical realism paradigm, adopted a mixed-method research approach (Delphi study with 56 experts, a case study and a survey of 200 university websites) because the different research questions required different methods.

For the first research objective, this study found that, in SSA, mid-level management IS professionals, play a hybrid of technical and non-technical roles and require individual foundation competencies (IFC), IS-specific competencies and competencies in a domain of practice. In addition, organisations emphasise IFCs more than IS-specific skills for mid-level IS management positions in SSA. IFCs, though difficult to develop through education and training are essential to look out for during hiring. For example, in this study, a trait like “ability to be flexible and adapt to change” which is a lower competency, was identified to be important for mid-level IS managers. Hitherto silent in literature, this study is the first to focus on mid-level management IS competencies, particularly from an SSA and a socio-

technical perspective. For the second research objective, this study captured the influence of new institutional logics, such as the development and the de-colonialism logics, at the societal level on graduate IS curriculum innovation in SSA. Previous studies had only identified the state, the market, the corporation, the religion, the community, the family, and the professionalism as enduring institutional logics of western societies that influence social behaviour. The church logic and the decolonisation logic, though existing at the societal and organisational levels respectively, do not influence graduate IS curriculum innovation. In addition, this study captured the academic logic at the field level, the interdisciplinary logic at the organisational level, and the Computer Science and IS logics at the individual level, to influence graduate IS curriculum innovation in SSA. Furthermore, these societal, field, university and individual level institutional logics contradicted each other presenting an institutional complexity to graduate IS curriculum innovation in SSA. However, the IS department resolved conflicting logics through mechanisms such as decoupling practices, faithful appropriation of congruent logics, hybridisation of logics *and pursuit of dominant logics*.

For the third research objective, this study found that: First, graduate IS curricula in SSA are economically responsive by responding to the *university's economic needs, and students' economic needs*. Second, graduate IS curricula in SSA are *disciplinary responsive* by responding to the *local and global IS disciplinary identity*. Third, graduate IS curricula in SSA are *pedagogically responsive* by accommodating *IS entry experiences and IS learning resources*. Fourth, graduate IS curricula in SSA are *culturally responsive* by accommodating the *internal organisational culture and the culture of dependent organisations*. Fifth, the technological and disruptive responsiveness are new dimensions uncovered in this study. Graduate IS curricula in SSA are *technologically responsive*, by accommodating *ICT trends*

and the *institutional ICTs* and also disruptively responsive by being resilient to emergencies such as global pandemics and disasters and planned changes. For the fourth research objective, the following findings were discovered. First, graduate IS programmes in SSA are hybrid and are focused on providing generalist, domain-driven specialist or technology-driven specialist competencies and are more dominant in public universities than private universities. In addition, graduate IS course offerings provide IS-specific, individual foundational and domain of practice competencies such as business, computing, health, education, public policy, development, geography, government and mining reflecting the immediate local contextual needs in SSA.

Prior to this research, there had been the general belief that academic programmes in IS, just like IS developed in the west, carry the values, aspirations, and interests of western societies. There have, therefore, been calls for IS curriculum researchers and practitioners in SSA to focus on “decolonising” IS, and in particular “Africanise” IS curricula, in SSA universities. In response, the study contributes theoretically and empirically to the understanding of graduate IS curriculum innovation in SSA in a number of ways. First, the study, arguably the first, extends the institutional logic perspective to IS curriculum innovation in SSA and uncovered beyond the existing seven institutional orders of western societies, the role of the logics of *development* and possibly *de-colonialism* in shaping IS curriculum decisions in SSA. These findings open the need to explore how the development and de-colonialism logics, specific to the SSA region and other developing countries, influence the development, implementation, adoption and use and consequences of information systems. Second, the study also explains how other institutional logics at different levels influence IS curriculum innovation. Such a socio-technical multi-level analysis of IS curriculum innovation is

uncommon in extant literature. These contributions, among others, have been published in two book chapters and a conference proceeding.



DEDICATION

I dedicate this PhD to the Honourable Dr Edward Kofi Omane Boamah (MD), a former Minister of Communications of the Republic of Ghana who taught me, in all practical ways, that the most enduring competency characteristic, which is the motive to serve others, is causally effective for a successful career.



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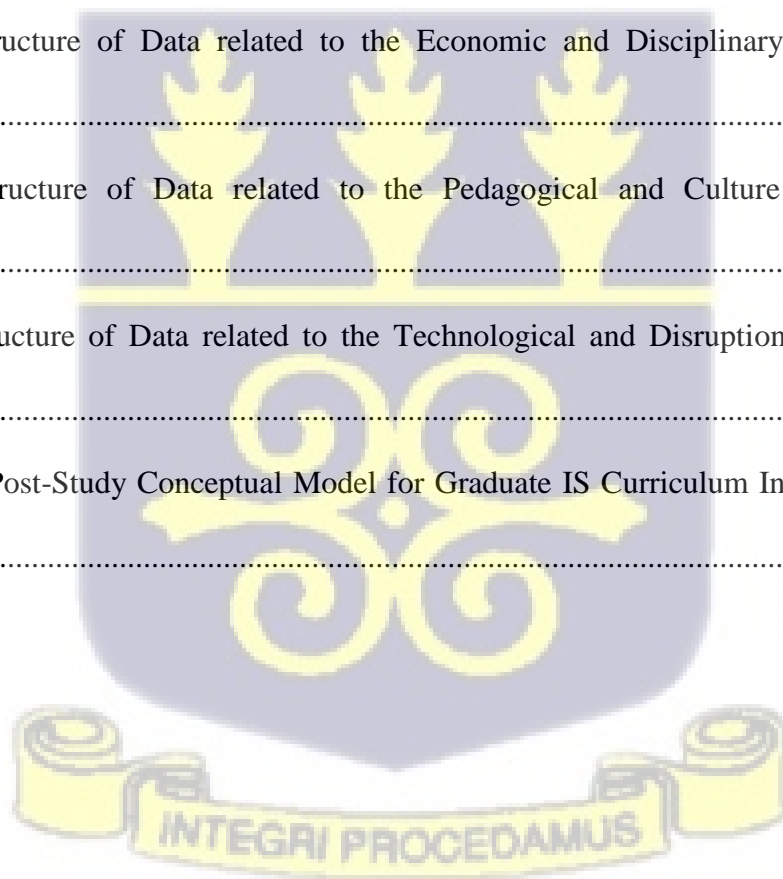
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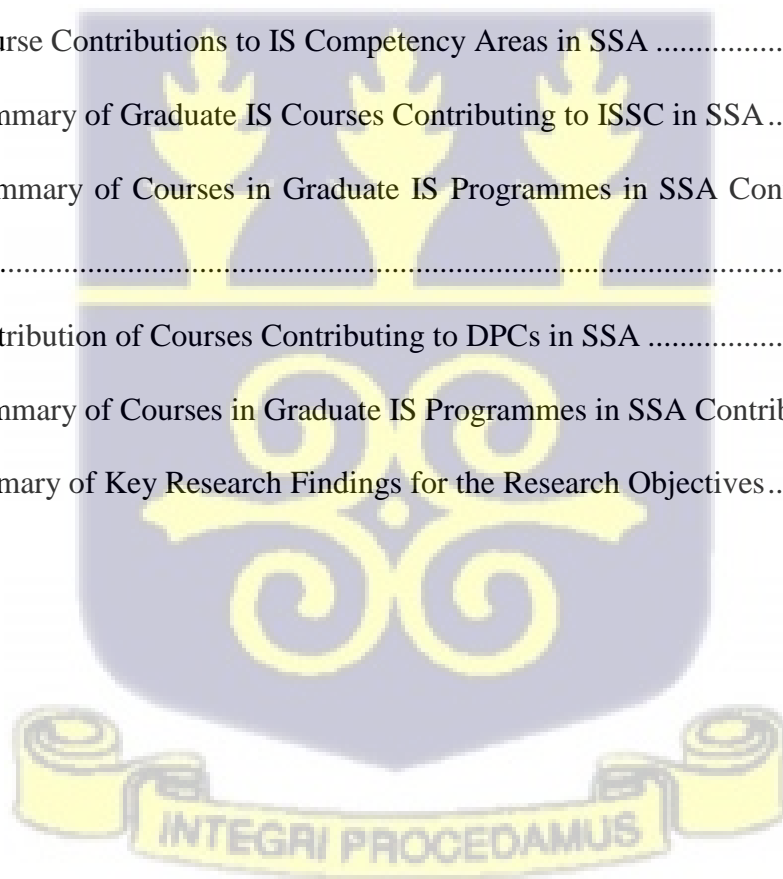
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CHAPTER ONE

INTRODUCTION

1.1 Research Background

The role of information systems (IS) in meeting contemporary societal aspirations cannot be overemphasised. Several societal transformations in the areas of social relations, politics and economics are intertwined with information technologies (IT) (Faik et al., 2020; Majchrzak et al., 2016). For developing countries, including Sub-Saharan Africa (SSA), there has been a great expectation of information and communication technologies (ICTs) to improve societal challenges in areas such as socio-economic development (Alderete, 2017; Effah et al., 2020; Palvia et al., 2017; Roztockii et al., 2019), social inclusion (Asongu & Odhiambo, 2019), poverty alleviation (Alimi & Okunade, 2020) and democratic stability (Ali, 2020; Chidubem, 2018). However, historical and current narratives of failed information system projects in developing countries abound in extant literature (Foster & Heeks, 2014; Gupta et al., 2019; Heeks, 2002; Ochara et al., 2014). In fact, on the contrary, IT has rather enabled the perpetuation of some negative practices in some developing countries. For example, Addo & Avgerou (2020) and Addo & Senyo (2020) explain how the anti-corruption affordances of an IT implemented at the customs of Ghana rather enabled perceived petty corruption. These outcomes are not new and had previously been explained as “irrational” or unintended consequences of IT (Addo, 2016) with some factors accounting for that. One dominant account is that IT carries the values, norms and culture of the West where most of these information systems were designed and these conflicts with the developing country context reality (Heeks, 2002). One suggested solution, to the increasing failing IS projects in developing countries, was to develop local capabilities and competencies to be able to design, develop and implement information systems to meet developing country actualities (Heeks, 2002). Close to twenty years on, not much is known about how computing-related

educational and training programmes in SSA, respond to this call. This brings information systems education in developing countries, including SSA, into sharp focus.

On the other hand, extant literature is replete with studies of IS programmes, particularly in the US and the UK. These studies have mainly focused on the nature of undergraduate and graduate IS programme course offerings (Apigian & Gambill, 2014, 2010; Bell et al., 2013; Bohler et al., 2020; Mills et al., 2012; Stefanidis et al., 2012; Yang, 2012). They often compare the IS programmes being studied with a standard model IS curricula, developed by a joint task force of the Association for Information Systems (AIS) and the Association for Computing Machinery (ACM). The most recent models are the IS2020 (Vreede et al., 2019) for undergraduates and the MSIS 2016 (Topi et al., 2017) for graduate degree programmes in information systems. For example, Bohler et al. (2020) surveyed the undergraduate IS programmes of 89 AACSB schools in the US and found varied adherence to the IS2010 model IS curriculum (Topi et al., 2010). The authors recommended that these studies should be done in a non-US university. Yang (2012) however emphasised that these studies should be done for almost “neglected” graduate IS programmes. What, then, is the state of graduate academic programmes in IS in SSA?

First of all, in SSA, very few studies have looked at the IS curriculum (Ayalew et al., 2012; Dasuki et al., 2015; Larsson & Boateng, 2010; Ponelis et al., 2012). These studies have focused on undergraduate IS curricula by either developing conceptual models of how the internationally developed model IS curricula could be adapted (Larsson & Boateng, 2010) or reporting empirical experiences of how individual IS departments developed their own contextualised undergraduate IS curricula (Ayalew et al., 2012; Ponelis et al., 2012). These

studies are held together by an underlying assumption that western-developed model IS curricula may not fully meet the contextual specificities of SSA (Ayalew et al., 2012; Dasuki et al., 2015; Larsson & Boateng, 2010). Additionally, IS departments in developing countries may not have the resources to fully appropriate such model IS curricula (Kang & Park, 2017). Whilst these studies are valuable, they do not fully tell the story of the nature of graduate IS programmes in SSA.

Second, for IS programmes to be relevant, there has been a shift towards competency-based IS education (Topi, 2016, 2019). Information systems curriculum studies have therefore been strongly associated with IS competency studies (Aasheim, Li, et al., 2009; Andoh-Baidoo et al., 2014; Cummings & Janicki, 2020; Gardiner et al., 2017; Kappelman et al., 2016; Mitchell & Benyon, 2018). These studies identify the knowledge, skills and attitudes required by industry or society and make recommendations for the development or revision of an IS curriculum. For example, Cummings & Janicki (2020) explored the information systems skills sought after by employers to inform the preparation of students for the workforce. In addition, Stefanidis et al. (2013, p. 1) claim that “there is an expectation that IS graduates possess sufficient skills to make their transition into graduate employment as seamless as possible”. As a result, organisations are gradually eliminating trainee positions and prefer to hire graduates with relevant competencies (Anderson, 2017). According to Benamati et al. (2010), an earlier hiring model that required new hires to spend time programming whilst using the period to learn about the organisation may now be outmoded since large programming and other highly technical tasks may be outsourced to another country. Whilst these studies are important, they have focused on entry-level positions with little attention paid to mid-level to senior-level positions (Kappelman et al., 2016). Moreover, less is known

about regions beyond the US and the UK (Cummings & Janicki, 2020) like SSA. It is important to find out the nature of IS competencies relevant to organisations in SSA.

Third, whereas the nature of graduate IS programmes in SSA and mid-level to senior-level IS competencies are critical, IS curriculum development, though taken for granted, is a complex process involving some human and non-human actors (Tatnall, 2010). Different stakeholders have different expectations of the IS curriculum. For example, students have expectations that the IS curriculum provides them with the relevant competencies that enable them to acquire employment after graduation (Firth et al., 2015; Kumar & Kumar, 2013). Similarly, the government's general expectation of a higher education programme is to provide the competencies that enable graduates to secure jobs and solve socio-economic challenges such as unemployment. These expectations may sometimes conflict with the interest of academics that are oriented toward the advancement of knowledge in a particular discipline and do not necessarily focus on vocational skills (Bunduchi, 2017). Again, for SSA, there have been concerns about the western nature of existing curriculum and learning resources and how they advance the values and interests of former western colonial societies. There have been calls, for example, to decolonise (Fomunyan & Teferra, 2017) and Africanise (Tedre et al., 2009; Shipepe et al., 2021) the IS curriculum to be more responsive to the SSA context. In addition, emergencies like the Sars-Cov-2(COVID-19) pandemic have transformed teaching and learning (Gul & Khilji, 2021; Rashid & Yadav, 2020; Kolog et al., 2022). Whilst there has been a technological response, through e-learning in its various forms, not all academic programmes benefited from the technological intervention. This is probably because, apart from the traditional technological, organisational and environmental factors, successful e-learning implementation also depends on the nature of the courses (Ansong et al., 2017). This suggests that the curriculum should be developed in a way that makes it resilient to

emergencies. These various, sometimes conflicting expectations and demands on the IS curriculum, coupled with the rapidly changing nature of technology constitute an institutional complexity (Besharov & Smith, 2014; Bunduchi et al., 2020; Greenwood et al., 2009, 2011) that confronts IS curriculum innovation in SSA. Information systems departments are expected to navigate this complexity to develop contextually relevant and responsive curricula. Consequently, a related question is: How do these societal-, field-, organisational-, and individual-level factors influence graduate IS curricula innovation and how does it impact the responsiveness of graduate IS curricula in SSA?

1.2 Research Problem

Studies on IS curriculum innovations, despite their relevance, are not many globally (Illig et al., 2014) and in particular they have been largely conducted in the North America and the UK (Yang, 2012). From the reviewed literature, four main interrelated gaps identified are of relevance to this study.

First, existing research on competency-based IS curriculum innovations suggests a strong linkage to IS job skills required by the industry (Cummings & Janicki, 2020; Kappelman et al., 2016; Topi et al., 2017; Vreede et al., 2019). For example, as early as the 1980s, Cheney & Lyons (1980) through a survey of IS managers in 32 US companies, identified a combination of technical and managerial skills, required by IS professionals and made suggestions to the prevailing IS curriculum at the time. Subsequently, existing studies have either analysed current IS skills required by employers (see Aasheim, Williams, et al., 2009; Lee & Han, 2008; Osmani et al., 2016; Stefanidis et al., 2013; Stevens et al., 2011; Tan et al., 2016) or analysed in longitudinal studies how IS skills have evolved or changed over the years (see Aasheim & Shropshire, 2012; Burns et al., 2018; Todd et al., 1995). These studies

normally suggest implications for hiring, training and education (Bullen et al., 2009). However, the extant literature on IS knowledge and skills required by industry, whilst valuable, has focused on entry-level competencies of IS professionals with little or no emphasis on IS competency expectations from mid-level to senior-level IS managers (Kappelman et al., 2016). Again, the existing literature is replete with IS job skills studies done in the UK and North America with less evidence from other regions including SSA (Cummings & Janicki, 2020). However, Bullen et al.'s.(2009) study of information technology workforce trends and its implications on hiring and curriculum in the US suggests that organisations in different geographical regions, with different wage levels, may emphasise different IS competencies. For example, Kaiser et al. (2011) found relative IS skill value differences between high-wage regions such as the US, Western Europe, and Australia and low-wage regions such as Latin America, India, China, Eastern Europe and the Commonwealth of Independent States (formerly the Soviet Union). It may, therefore, be possible that the IS competencies required by organisations in the UK or US or their levels of emphasis and relevance may be different from those in SSA. Consequently, Cummings & Janicki (2020) suggest the need for this topic to be studied in other regions of the world. It is, therefore, important to *explore the IS competencies required of mid-level management IS professionals relevant to organisations in SSA*. According to Kappelman et al. (2016), mid-level IS managers are IS professionals at levels below the CIO but above entry-level organisational IS positions. They suggest such competencies may be acquired through graduate MBA or Master of Science IS academic programmes or from relevant special training. But even so, what competencies are required and how do they inform the content and delivery of these graduate IS programmes?

Second, contextually relevant graduate IS programmes in SSA present an opportunity to develop contextual solutions to the myriad of problems challenging the region and other less developed countries (Syler & Venkatesh, 2018). However, few studies in SSA have focused on this subject. These studies assume that the contextual particularities make it impractical for IS departments in SSA to fully adopt an internationally-developed IS curriculum. They, therefore, focus on studying how contextualised IS curriculum could or have been developed in universities in SSA (Ayalew et al., 2012; Dasuki et al., 2015; Larsson & Boateng, 2010; Ponelis et al., 2012; Tedre et al., 2009). Whilst these studies are valuable in emphasising the need for contextualising IS curricula, they have focused on undergraduate programmes and the empirical cases do not demonstrate the complex social interactions among key stakeholders and the context from which contextually relevant IS curricula emerge. This means that, though graduate IS curricula innovation occurs in an institutionally plural environment (Greenwood et al., 2009), existing studies have not *theoretically* focused on how such institutions influence IS curricula. Institutions of societies are reproduced by a set of assumptions, beliefs, material practises and symbolic constructions called institutional logics that are available to organisations and individuals (agents) to elaborate on (Friedland & Alford, 1991). Drawing from the institutional logics perspective (Thornton et al., 2012) which essentially accommodates society and its role in an organisation, there is the *need to explain how institutional logics and agent actions influence graduate IS curriculum innovations in non-western societies such as SSA.*

Third, Faik et al. (2020) suggest a recursive relationship between societal institutions and micro-practices. In other words, societal factors shape organisational practices and these organisational practices also influence societal change. For instance, existing studies have looked at the influence of institutional logics on IT implementation and its impact on societal

issues such as petty corruption (Addo & Avgerou, 2020). Hence, flowing from the institutional logics perspective in IS research literature, there is a need to understand the consequences of institutional logics and agent actions' influence on organisational practises (Cinar & Benneworth, 2021). However, little attention has been paid to such consequences or the impact of institutional effects on organisational practices in the IS literature. In relation to this study, it is not clear the outcomes of the influences of institutional logics on graduate IS curricula responsiveness. Curriculum responsiveness is the ability of a curriculum to meet individual, organisational and societal needs (Moll, 2004). The third research gap, therefore, espouses *the need to understand the consequences of the influences of institutional logics and agent actions on graduate IS curricula responsiveness in SSA*.

Fourth, while considerable research has examined the nature of IS academic programmes course offerings at the undergraduate level (see Andoh-Baidoo et al., 2014; Bell et al., 2013; Bohler et al., 2020; Clark et al., 2017; Lo & Cruz, 2014; Mills et al., 2012; Osatuyi & Garza, 2014), there is less of these studies at the graduate level (e.g. Apigian & Gambill, 2014; Kumar et al., 2017; Yang, 2012). These studies are important to examine what other IS programmes are offering to guide new or existing IS academic programmes. However, many of these studies are predominantly conducted in the North American context (Bohler et al., 2020; Helfert, 2011). Such results may not be appropriate to inform all other IS programmes because regional, national and local factors influence the structure of IS curricula (Ayalew et al., 2012; Bohler et al., 2020; Clark et al., 2017; Kaiser et al., 2011; Larsson & Boateng, 2010). Hence, Yang (2012) and Bohler et al. (2020) suggest that researchers should investigate the nature of graduate IS programmes in non-US universities, preferably in other regions of the world. Whilst other regions are responding to this call, little is known from

SSA. Therefore, there is *a need to explore the nature of graduate IS programme offerings in SSA*.

In summary, this doctoral study focuses on four research gaps. First is the need to explore mid-level management IS competencies from industry (Kappelman et al., 2016) in SSA, a region outside the US and the UK (Cummings & Janicki, 2020). Second is the need to explain how institutional logics and agent actions influence graduate IS curricula innovations in SSA. The third research gap is the need to explain the consequences of the influences of institutional logics and agent actions on graduate IS curricula responsiveness in SSA. Fourth is the need to explore graduate IS programmes course offerings in SSA, a region beyond the US and UK with its distinct context (Apigian & Gambill, 2014; Bohler et al., 2020; Yang, 2012). These gaps guided the formulation of the research purpose.

1.3 Research Purpose

In light of the identified gaps, this doctoral study, first of all, through a Delphi study, and guided by the MSIS2016 global competency model, explore the nature of current and future IS competencies of mid-level IS managers from industry experts. These become critical inputs for the development of a graduate IS curriculum. However, IS curricula decisions are conditioned by some institutional logics and agent reactions which this study has uncovered. This study, further explains how the influencing logics and agent actions impact the responsiveness of a graduate IS curriculum in SSA. The study also presents a survey of graduate IS programmes in SSA using the MSIS2016 global competency model as a guide, to characterise the nature of graduate IS programmes in SSA. Consequently, the purpose of this study is:

To develop a framework for the development of contextually relevant and industry-responsive graduate information systems curricula for Sub-Saharan Africa.

1.4 Research Objectives

Based on the research purpose, which was motivated by the four research gaps that constituted the research problem, the following consequential research objectives are formulated. The first research objective is to respond to the first research gap which espoused the need to explore mid-level management IS competencies relevant to organisations in SSA (Cummings & Janicki, 2020; Kappelman et al., 2016). Mid-level IS management positions are those levels below the chief information officer (CIO) but above an entry-level IS job (Kappelman et al., 2016). Hence, the first research objective flowing from the first gap is:

a. To explore current and future mid-level management IS competencies relevant to organisations in Sub-Saharan Africa.

This research objective is achieved through a Delphi study (explained in Section 4.6) of diverse experts who have a very deep understanding of the mid-level management IS competency requirements of organisations in SSA. Using the MSIS 2016 as a guide, a consensus ranking of the relevance of current and future mid-level management IS competencies were discovered and categorised. The Delphi method helps to capture current and to forecast future IS competencies, which previously used methods have not addressed.

The second research objective responds to the second research gap identified in Section 1.2. This highlights the need to explain how institutional logics existing in non-western societies

(Thornton et al., 2012) and agent actions influence graduate IS curricula innovations in SSA.

In response to this gap, the second objective of this study is:

b. To explain how institutional logics and agent actions influence graduate IS curricula innovation in SSA.

To meet this research objective, a case study of a graduate IS programme developed in a faith-based private university in SSA (method explained in Section 4.7) was adopted to capture some institutional logics and agent actions which influence graduate IS curricula innovation at the societal, field, organisational and individual levels.

The third research objective is related to the third research gap which amplifies the need to explain the consequences of the influences of institutional logics and agent actions on graduate IS curricula in SSA. Consequently, the third research objective is:

c. To explain the consequences of the influences of institutional logics and agent actions on graduate IS curricula responsiveness in SSA.

This objective is met through a case study (described for objective b). Using the curriculum responsiveness perspective as a theoretical lens, the study captures how graduate IS curricula could be responsive.

The fourth research objective espouses the need to explore the nature of graduate IS programmes course offerings in SSA (Apigian & Gambill, 2014; Bohler et al., 2020; Yang, 2012). The fourth research objective is, therefore:

d. To explore the nature of graduate IS programme course offerings in Sub-Saharan Africa.

To meet this research objective, this study presents a survey of graduate IS programmes in SSA. Key characteristics of graduate IS programmes such as dominant nomenclature, resident faculties, courses and competency contributions are explored. A popularity rank of dominant IS courses (Table 5.5), among others, is discovered through a method discussed in Section 4.5.

1.5 Research Questions

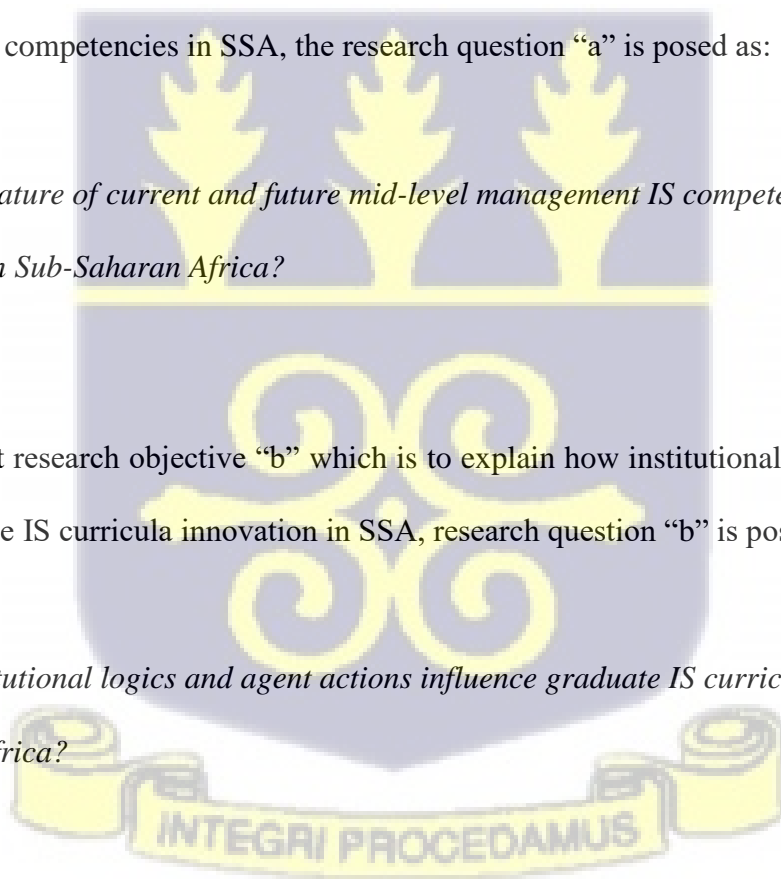
The corresponding research questions underpinning the research objectives are then posed. First of all, to meet research objective “a” which is to explore the nature of mid-level management IS competencies in SSA, the research question “a” is posed as:

a. What is the nature of current and future mid-level management IS competencies relevant to organisations in Sub-Saharan Africa?

Second, to meet research objective “b” which is to explain how institutional logics and agent actions influence IS curricula innovation in SSA, research question “b” is posed as:

b. How do institutional logics and agent actions influence graduate IS curricula innovation in Sub-Saharan Africa?

Third, to meet research objective “c” which is to explain the consequences of the influences of institutional logics on graduate IS curricula responsiveness, we ask:



c. What are the consequences of the influences of institutional logics and agent actions on graduate IS curricula responsiveness in Sub-Saharan Africa?

Lastly, to meet research objective d, which is to explore the nature of graduate IS programmes in SSA, we ask:

d. What is the nature of graduate IS programme course offerings in Sub-Saharan Africa?

1.6 Significance of the Research

This study has relevant implications for research, practice and policy. In terms of research, first of all, the study contributes empirically to IS curriculum innovation research globally and in SSA in particular. Additionally, the study contributes to IS curriculum innovation research at the graduate level which extant literature reports paucity (Apigian & Gambill, 2014; Yang, 2012). Furthermore, the study contributes to IS competency research by refocusing attention on the competencies of mid-level management from entry-level IS competencies. The value of this study lies in it being a benchmark study for other studies in a different context or for longitudinal studies that focus on changing IS competencies over time. Second, the study makes an interesting methodological contribution. in two folds. The study departed from the dominant IS job posting analysis method of identifying important IS competencies, which had been criticised for its inability to uncover difficult-to-be-observed competencies (Litecky et al., 2012), and applied the forecasting capabilities of the Delphi technique. This technique was used to elicit relevant current and future IS competencies of mid-level IS professionals, required by organisations in SSA. Third, whilst contextualisation is not new in the IS literature, especially in developing countries, little published research, in SSA, conceptualised the IS curriculum innovation (see Ayalew et al., 2012; Dasuki et al.,

2015; Larsson & Boateng, 2010), especially for graduate programmes. This study developed a conceptual framework that is useful in explaining how societal, organisational and individual factors interact to shape contextually relevant and industry-responsive curricula in SSA. The framework may also be significant for evaluating the responsiveness of other curricula.

This study makes some contributions to practice. First of all, the graduate IS course survey framework developed for the analysis of graduate IS course offerings as a research methodology, is also useful to curriculum developers. The framework provides IS curriculum developers a tool to understand dominant course offerings to guide the revision or development of a new curriculum. Second, the list of dominant course offerings identified in this study could be used as a guide for the revision or development of new graduate IS curricula in SSA. Third, the relevant mid-level management IS competencies elicited have implications for hiring, training and IS education (Ho & Frampton, 2010; Kappelman et al., 2016; Keil et al., 2013). According to Ho and Frampton (2010), competency characteristics such as creativity, teamwork and adaptability, though difficult to acquire through training and education, are critical to employee success and must therefore be relevant during hiring. A trait such as the “ability to be flexible and adapt to change” identified in this study are relevant during the hiring of IS professionals to fill mid-level management positions. Similar to the menu of dominant IS courses, the indicated mid-level management IS competencies relevant to industry could serve as inputs to develop institution-specific graduate IS curriculum. Again, for IS departments, the awareness of the institutional logics identified will help them develop more responsive curricula with limited resources available to them. Furthermore, at the macro level, industry-responsive graduate IS curricula, presents a benchmark for regulatory institutions, such as accrediting institutions that have been

mandated to accredit IS graduate programmes in various countries in SSA. This study provides a framework that is practically useful in the assessment of existing and proposed graduate IS programmes to ensure responsiveness.

Finally, the findings of this study have the potential of informing policy at the national level on Information and Communication Technology (ICT) education in various countries in Africa. Some countries in Africa develop national ICT policies that include ICT education in tertiary institutions (see Farrell, 2007). This study is a relevant input into any national policy considering the teaching of ICTs at the graduate level, and even at the lower levels of education in Sub-Saharan Africa. The study presents the nature of prevailing and emerging technologies that are relevant to industry and that must be considered in an IS curriculum. Moreover, the government is interested in how higher education (public, private and hybrid) academic programmes meet national objectives or development agendas. This study would be interesting to the government to demonstrate how the government may achieve this goal from graduate IS curricula offered by hybrid universities.

1.7 Synopsis of Chapters

This thesis is organised into seven (7) chapters and follows the following structure. The first chapter which has been covered provided an overview of the research. The problem statement and objectives were formulated and the significance of the study and a synopsis of the rest of the chapters are presented. Chapter two presents a definition of key concepts and a systematic review of IS curriculum research that emphasises the research gaps espoused in chapter one. In chapter three, the global IS competency model, the institutional theory and the curriculum responsiveness perspective are reviewed as the theoretical foundation of the study leading to the development of a conceptual framework used in the study of contextually relevant and

industry responsive graduate IS Curricula in SSA. Chapter four presents the philosophical underpinning of this study and describes the research strategy for the collection and analysis of data. The results are presented in Chapter five. In Chapter six, the analysis and discussions of the results are presented and key findings are formulated. The relevant conclusion, contribution to knowledge and the IS discipline, practical and policy implications of this study and directions for future research are presented in Chapter seven.



CHAPTER TWO
INFORMATION SYSTEMS CURRICULUM RESEARCH-A SURVEY OF
EVIDENCE

2.1 Overview of Chapter

The background, research problem, objectives, the significance of the study and a synopsis of the rest of the chapters have been introduced in chapter one. IS curriculum innovation enjoys attention from scholars who publish in diverse academic journals and conference proceedings. This chapter presents a literature review of IS curriculum innovation research highlighting the key issues that are being studied and the relevant research gaps. The chapter also examines at the theoretical and methodological approaches to IS curriculum research to inform the course of this study.

2.2 Conceptualising Information System Curriculum Research

In the IS curriculum literature, IS scholars have not defined IS curriculum. This may be because IS is a relatively younger discipline compared to other computing and related academic programmes (Hirschheim, Saunders & Straub, 2012). IS curriculum researchers may have entered this field with previous conceptualisations and practical experience of a curriculum from other older academic fields. It is, however, important to define IS curriculum, not to only provide a distinction from other curricula, but also to provide a shared understanding among IS curriculum researchers. Consequently, this study borrows from the broader education literature to examine the definitions of curriculum and compare them to the nature of IS curriculum research. One of the highly cited definitions is the one by Marsh (2009) who defines a curriculum as:

“...the totality of learning experiences provided to students so that they can attain general skills and knowledge at a variety of learning sites” (p.7).

This definition espouses the characteristics of the notion of a curriculum as used in IS curriculum research. First, IS curriculum studies focus on identifying relevant competencies, which are knowledge, skills and attitudes required by employers (Topi, 2016). These studies may make recommendations on the academic courses that could provide those competencies (Benbasat et al., 1980; Gorgone et al., 2006; Topi et al., 2010, 2017; Vreede et al., 2019). Second, the focus of this definition is on what must be learnt instead of what must be taught. This attention to learning is at the heart of competency-based IS curriculum development. However, in this study, the experiences learners should acquire must be related to information systems.

In addition, there are varied definitions for IS in the literature. The existing definitions were formulated based on the focus of the study. For instance, given systems and organisational function, Davis (2006, p.12) defines IS in organisations as “...both the systems that deliver information and communication services to an organisation and also the organisation function that plans, develops, operates, and manages the information systems”.

Given academic discipline, Avison and Elliot (2001, p. 5) noted a UK Academy of Information Systems definition of information systems as “a multidisciplinary subject [that] addresses the range of strategic, managerial and operational activities involved in the gathering, processing, storing, distributing and use of information, and its associated technologies, in society and organisations”. These definitions provide, at a broader level, what IS competencies are required by organisations and society. However, this study is

developed from the perspective of IS being a profession with employment orientation for which students are prepared, hence a definition that captures the role of IS professionals is desired. Consequently, this study view IS as:

“a field that prepares students to interface between non-technical organisational employees and managers and very technical IT professionals, with a focus on functions that are unlikely to be off-shored” (Westfall, 2012, p. 66).

Given that IS competencies involve knowledge, skills and attitudes required to play a defined role, we can therefore define IS Curriculum (ISC) as:

“...the totality of learning experiences provided to students so that they can attain general Information System competencies at a variety of learning sites”.

This definition covers the planned, implemented (enacted) and experienced curricula (Marsh, 2009). With the understanding of the concepts of IS competencies and their relationship to IS curriculum research, the next section explains the systematic literature review method adopted.

2.3 Review Methodology

2.3.1 Systematic Literature Review Approach

This study adopts a Systematic Literature Review (SLR) approach to analyse the key research issues, and conceptual/theoretical and methodological approaches in IS curriculum research. This was done by adopting the *Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) approach* (Van Laar et al., 2017). According to Van Laar et al. (2017), SLR uses systematic and categorical methods to identify, select, assess, collect and analyse data from studies selected for the review. Consequently, this review began with a search

action conducted on ProQuest Central, Elsevier, ACM (Digital Library) and EBSCOhost, which are well-accepted IS databases housing most IS journals (Levy & Ellis, 2006). The Boolean search “(Information Systems OR IS) AND (Curriculum OR Skills OR competencies)” was used for all the selected databases in this study. This was done initially for a period up to 2018 and later extended to 2020.

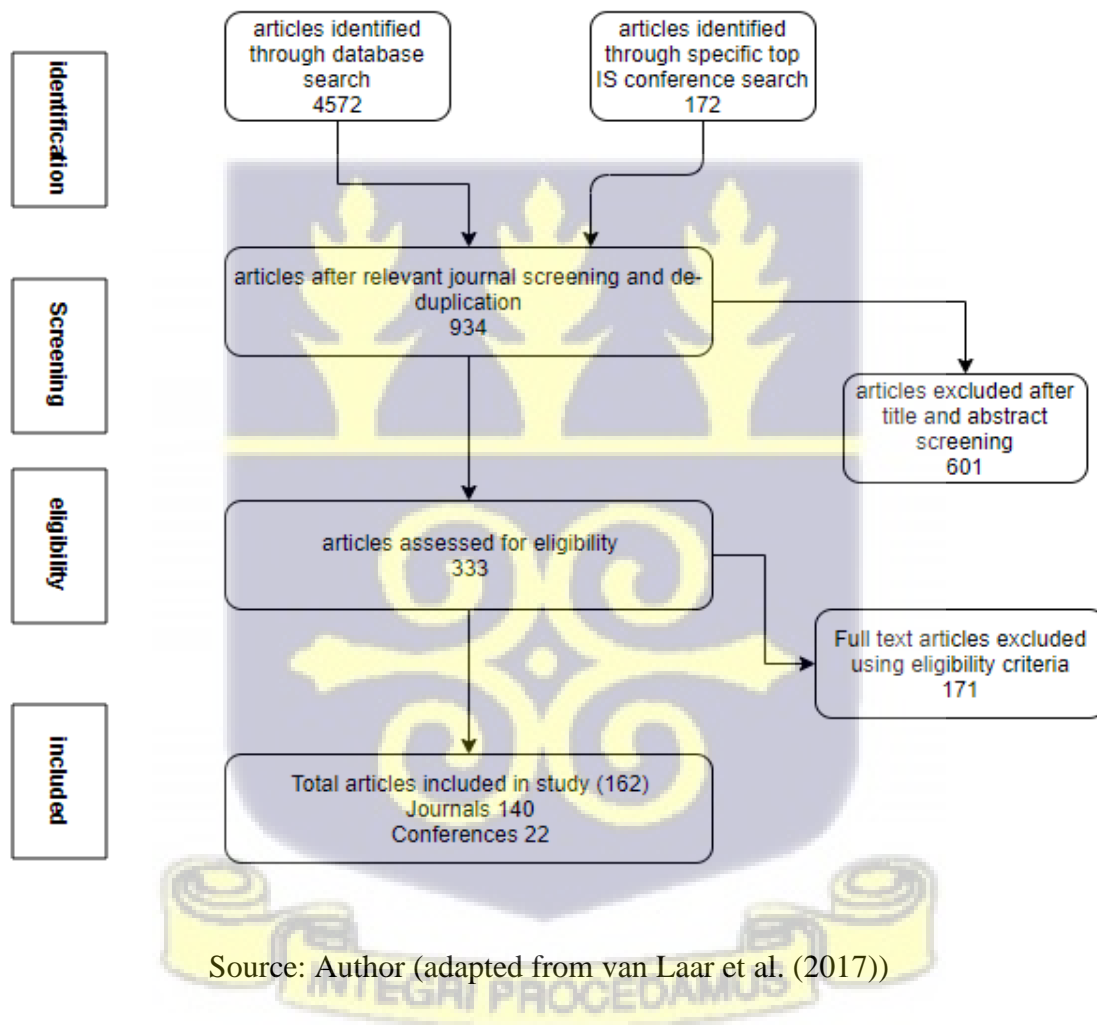
2.3.2 Inclusion and Exclusion Criteria

The selection of the papers was limited to peer-reviewed articles in journals published in the English language. High-quality IS conferences such as the AIS Conferences (ICIS, AMCIS, ECIS, and PACIS) and its affiliate conferences such as HICSS were also searched using the same Boolean search criteria up to 2020 (September). The result was practically screened using the following eligibility (inclusion and exclusion) criteria:

1. The article must have been published in a peer-reviewed journal or a proceeding from an IS conference.
2. Only empirical IS curriculum or IS competency research papers were included in the Conferences. For instance, teaching cases were excluded.
3. The article must be focused on IS curriculum at the post-secondary level or institutions of higher learning (IHL).
4. Articles on a curriculum of other disciplines with IS as a single or introductory course were excluded.
5. Articles on the curriculum of other related disciplines either than IS, for example, IT or Computer Science, were also excluded.
6. Instructional medium, pedagogy and other issues related to the broader IS education were also disregarded.

The eligibility was applied through three steps. First, by screening the titles of the articles and second, by the abstracts and finally by using the full paper using the eligibility criteria, at each stage, as a filter. Third, the results were categorised by names of authors, year of publications, key research issues, journal/conference, level of analysis, academic level (undergraduate or graduate), methodology, theoretical/conceptual framework, country and region.

Figure 2.1: Literature Selection Flowchart



2.4 Review Results

The initial database search resulted in a total of 4,572 peer-reviewed articles from scholarly journals and 172 conference papers from IS conferences. Publication restrictions to IS and educational journals and de-duplication were conducted, resulting in the remaining 934 articles. These were further screened using the title and abstracts to exclude 601 articles remaining 333 full texts that were read and assessed using the eligibility criteria. The study included 140 journal articles and 22 Conference articles that met the eligibility criteria. The flow chart in Figure 2.1 details the various stages.

2.5 Key IS Curriculum Research Issues

Based on the results from the systematic review, key issues of interest to IS curriculum researchers emerged. The main themes in IS curriculum research include “IS programme characterisation”, “IS competencies”, “IS curriculum innovation”, “IS curriculum model development”, “IS curriculum model adoption and adherence”, “IS curriculum innovation outcomes” and “IS curriculum contextualisation”. In the next sections, details of these different strains of IS curriculum research are explained with their attendant gaps.

2.5.1 Information Systems Programme Characterisation

The nature and character of IS programmes in universities continue to attract interest from researchers due to their multidisciplinary nature. This is evident in the names of IS or similar programs and the varied resident or host faculties or schools of these programmes in academic institutions. Pierson et al. (2008), for example, investigated the incidence of computer-related majors in accredited business schools and examined their names. They found that information systems, management information systems, computer information systems, business information systems, and information technology are some of the names

referring to the same or similar disciplines. The authors further suggested a periodic review of the names to examine the characteristics of different IS curricula across the globe. Similar results of different names were found by Apigian and Gambill (2010). Consequently, Brooks et al. (2016), like previous studies, concluded that there was no move towards standardisation and suggested the need to study this topic in other regions outside the US and UK.

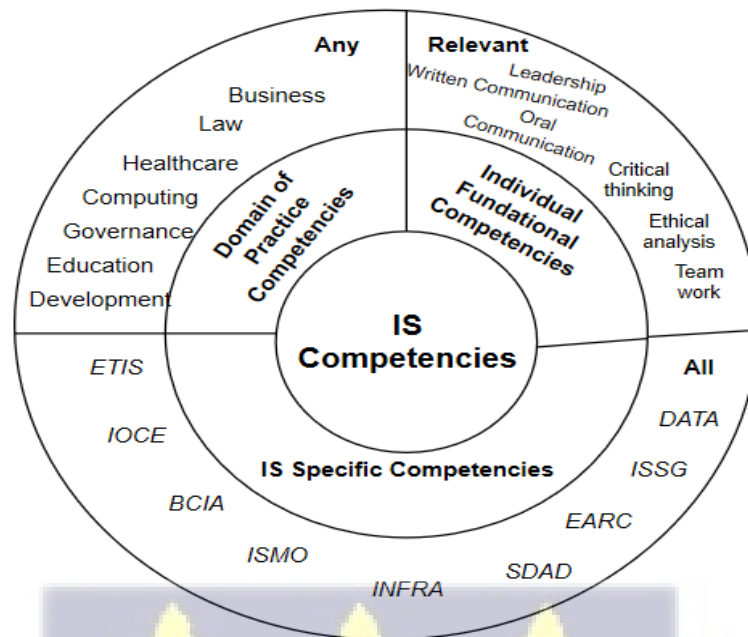
2.5.2 IS Competencies

This category of research looks at eliciting critical IS competencies relevant and needed by organisations and may suggest implications to IS curriculum or IS education in general. Such studies are also relevant to organisational training and competency sourcing (Bullen et al., 2009; Ho & Frampton, 2010; Poston & Dhaliwal, 2015). There is almost a consensus that the goal of IS curriculum design and delivery is to aid in producing graduates with some competencies that are required by organisations or industries (Benamati et al., 2010; Jarvenpaa et al., 1991; Topi et al., 2017). These competencies are required for high organisational performance (Akman & Turhan, 2017). It is therefore not surprising that IS curriculum research focused on developing, redesigning, integrating, revising, overhauling, adopting or adapting a model curriculum or a curriculum profile will often start with identifying relevant IS competencies or roles. This strand of research is critical due to the rapidly changing nature of technology resulting in the demand for changing IS competencies, resulting in what some researchers have described as aiming a *moving target* (Lee & Han, 2008). Two sub-strands of studies that focus on IS competencies have been identified in the literature.

First, is a group of studies that focus on classifying or categorising IS competencies. Ashenhurst's (1972) work on guidelines and recommendations for graduate IS programmes provided a valuable initial classification of IS knowledge and skills. The author classified IS

knowledge and skills into people, models, systems, computers, organisations and society. Based on this classification, Cheney et al. (1990) studied past (1978-1987), current (1988) and future (1995, five years) trends of IS knowledge and skills through interviews with IS managers in the US. The results were compared to the existing IS curriculum guidelines and recommendations, and further recommendations were made. Different variations of Ashenhurst's (1972) classification have been developed and used by other authors (see Aasheim, Li, et al., 2009; Cheney & Lyons, 1980; Debusse & Lawley, 2009; Havelka & Merhout, 2009; Jones et al., 2016; Lee & Han, 2008; Lee et al., 2002; Stevens et al., 2011; Trauth et al., 1993). Except for Ashenhurst (1972), which was originally targeted at graduate IS knowledge and skills of graduate IS programmes, the rest are largely targeted at entry-level knowledge and skills of undergraduate IS programmes. The most recent of the models that guide graduate IS programmes is the global competency model for graduate IS programmes, MSIS 2016 (Topi et al., 2017). The MSIS 2016 classifies IS competencies as IS Specific Competencies (ISSC), Domain of Practice Competencies (DPC) and Individual Foundational Competencies (IFC). The ISSCs are further categorised into competencies in Business Continuity and Information Assurance (BCIA), Data, Information and Content Management (DATA), Enterprise Architecture (EARC), Ethics, Impacts and Sustainability (ETIS), Innovation, Organisational Change and Entrepreneurship (IOCE), IS Management and Operations (ISMO), IS Strategy and Governance (ISSG), IT Infrastructure (INFR) and Systems Development and Deployment (SDAD). The MSIS 2016 also recognises the application of IS in other domains of practice beyond business such as healthcare, education, law and government. Individual foundational competencies such as written and oral communication, critical thinking, ethical analysis, teamwork and leadership are also specified in the MSIS 2016. The structure of the MSIS 2016 classification is illustrated in Figure 2.2.

Figure 2.2: IS Competency Categories



Source: Author (Adapted from MSIS 2016)

The relationship between the MSIS 2016 classification and earlier classifications is summarised in Table 2.1. This study adopts the MSIS 2016 classifications.

Table 2.1: IS Competencies Classification

Earlier Classifications	MSIS 2016 Classification		
	<i>IS Specific Competencies (ISSC)</i>	<i>Domain of Practice Competencies (DPC)</i>	<i>Individual Foundation Competencies (IFC)</i>
Ashenhurst (1972)	Models, Systems, Computers	Organisations, society	People
Cheney and Lyons (1980)	Systems Design, Hardware and Software, IS Management, Computer processing		Quantitative

	methods		
Trauth et al. (1993)	IS Tasks, Technical Skills		Abilities
Todd et al. (1995)	Technical Knowledge, Systems knowledge	Business Knowledge	
S. Lee et al. (2002)	IS Core Knowledge	Organisation and Society	Personal, Interpersonal Skills
C. K. Lee and Han (2008)	Architecture/network, Hardware, Software, Development	Business, Management, Social	Problem Solving
Havelka and Merhout (2009)	Technical Knowledge	Business Knowledge	Personal traits, professional skills
C. L. Aasheim, Li, et al. (2009)	Technical Skills	Organisational/ Managerial	Interpersonal, Personal skills Experience and Grade Point Average
Debuse and Lawley (2009)	Technological Skills	Business Skills	People Skills and Experience
Stevens et al. (2011)	Core IS Knowledge	Business Expertise	Personal Attributes, Proficiency
Jones et al. (2016)	Technical Skills	Knowledge Areas	Intrapersonal/ Interpersonal skills

Source: Author

The second is a group of studies focused on specific IS job knowledge and skills. These studies vary according to job focus, region and methodology. Many studies on IS job skills focus on particular IS jobs, roles or career tracks. For example, by interviewing senior IS managers in a longitudinal study (1978, 1987, 1988), Cheney et al. (1990) identified which knowledge, skills and abilities were relevant to project managers, systems analysts and programmers, which the authors identified were the dominant IS entry jobs in the 80s and early 90s. At the same time, Todd et al. (1995) by analysing the content of job advertisements or postings in four major newspapers over 20 years (1970-1990) identified relevant

knowledge and skills for programmers, systems analysts and IS managers. These studies reported a change in the skills of all those IS jobs studied over time. Subsequently, Gardiner et al. (2017), also analysing job postings, investigated big data knowledge and skills required by the industry. They found that many big data jobs required competencies in developing analytical information systems and other soft skills to complement emerging hard technological skills.

Other studies have looked at the knowledge and skills of IS entry jobs without regard to a particular job. For example, in a survey to compare the importance of IS knowledge and skills between IT managers and IS faculty, Aasheim, Li, et al. (2009) found out that, whilst IT managers and IS faculty differed on the importance of some individual knowledge and skills, they largely agreed on their order of importance when they were put into broader categories. This corroborated with an earlier survey by Lee et al. (2002) who compared the perception of IS professionals and academia on the importance of IS knowledge and skills. Their study found that, whilst IS professionals ranked organisational and societal competencies higher than competencies in IS technologies, IS academics ranked organisational competencies as less important than other competencies, especially in IS technologies. Such misalignments inform both employers and faculty on how training and curriculum should be developed. A summary of previous IS job competencies studies is presented in Table 2.2. It is observed, from Table 2.2, that many of the previous studies have been conducted in the US with little evidence from other regions. With expected IS competency differences from different geographical regions, IS job competency studies are expected from other regions Cummings and Janicki (2020) including SSA. However, little evidence of IS job competency studies in SSA exists. For example, using online job postings analysis, Parker and Brown (2019) determined a descriptive set of skill requirements needed

by cyber-security professionals to work in South Africa. Whilst their study is important and among the few computing-related job competency studies in SSA, it is focused on a specialised area of computing, though related, outside the scope of IS (Topi et al., 2017). It is still, therefore, not clear the nature of IS job skills in SSA. At the same time, existing IS job competency studies have focused on general IS skills or entry-level skills with little or no special focus on middle and top-level IS competencies. Kappelman et al. (2016) suggest the need to focus attention on the competencies of mid-level and senior-level IS professionals whilst Cummings and Janicki (2020) express the need for IS competency studies beyond the US.

Table 2.2: A Summary of Previous IS Job Competencies Studies

Author(s)	Method/ Source of data	Job Level	Region / Country
Cheney et al. (1990)	Interview Senior IS Managers	Entry-level	North America US
Todd et al. (1995)	Job advertisements Newspapers	General	North America US
Lu et al. (1999)	Survey IT Managers	General	Pacific Asia
S. Lee et al. (2002)	Survey IS Professionals IS Faculty	Entry-level	North America US
Noll and Wilkins (2002)	Survey IS Professionals	Entry-level	North America US
C. L. Aasheim, Li, et al. (2009)	Survey IT Managers IS Faculty	Entry-level	North America US
Litecky et al. (2012)	Data Mining Job Postings	General	North America
Harris et al. (2012)	Job advertisement Online Job adverts	General	North America US
Jones et al. (2016)	Survey IS Professionals	General	North America US
Kappelman et al. (2016)	Interview CIOs	Mid-level and senior-level	North America US
Burns et al. (2018)	Job advertisement Online Job adverts	Entry-level	North America US
Cummings and Janicki (2020)	Survey IS professionals/Managers	Entry-level	North America US

Source: Author

2.5.3 IS Curriculum Innovation

IS curriculum innovation (Tatnall, 2010) is the dominant research area in IS curricula. This area of research reports the processes and experiences in the development of courses or curricula, revision of existing curricula, or integration of new courses into existing curricula to reflect current competencies required from graduates. It took about 10 years after the last IS curriculum models were developed for new ones to be recommended (IS2010 to IS2020 and MSIS2006 to MSIS 2016). This, obviously, will not catch up with the pace at which information and communication technologies change. IS departments, therefore, may update or develop new curricula to reflect the current state of ICTs. The identified consensus competencies are drafted into learning outcomes (Topi et al., 2008). These processes are not to be seen as linear but as complex activities (Tatnall & Davey, 2004) that are receiving attention from IS Curriculum researchers.

Furthermore, it is rational to expect a change in curriculum as a response to changing innovation and technologies characterising the information systems field (Kesner, 2008; Topi, 2010; Topi et al., 2008). The adoption and use of information systems in new domains beyond business, such as health (Zhang et al., 2014) may trigger a change in the traditional IS curriculum or an IS model curriculum to cater for the specificities of the new domains. New IS roles have also served as a basis for curriculum change (Lee & Han, 2008). A number of strategies such as revision and integration of new courses into existing IS programmes may be used to improve an IS curriculum. For example, curriculum revision (Stevens et al., 2011; Veltri et al., 2011) results in a curriculum change by assessing the curriculum and deciding on removing less valued competencies and including new important or valuable competencies. The dominant strategy in IS curriculum change is integration (Fichman et al.,

2014; Gupta et al., 2015; Jones & Liu, 2017; Martz et al., 2017; Mitri & Palocsay, 2015; Ramesh & Gerth, 2015; Sidorova, 2013; Wilson & Tulu, 2010). Table 2.3 summarises studies on key competencies that have been integrated into IS curricula over the period. Though not formally defined, competency integration involves the inclusion of courses, which gives opportunities to students to acquire new competencies, into an existing IS curriculum. Two main strategies have been identified. The first is to create a single standalone course based on the new competencies (see Urbaczewski et al., 2011) or to spread the required competencies across some existing courses (see Carey et al., 2004).

Terms such as *infusion* (Urbaczewski et al., 2011; Wymbs, 2016) and *incorporation* (Jones & Liu, 2017) have been used in the same sense as integration. Integration of several technical, foundational and domain competencies into IS curricula continues to be a subject of interest in pre and post-MSIS 2016 (Table 2.3). For example, some researchers continue to make a case for the integration of big data and its related competencies even after MSIS 2016 was developed (Jafar et al., 2017) whilst others have looked at the integration of new foundational competencies such as creativity and problem solving (Martz et al., 2017) and intercultural communication (Mitchell & Benyon, 2018). It is interesting to note that, beyond the business domain, health is the other domain receiving attention from IS scholars (Lawler et al., 2016; Zhang et al., 2014; Zheng et al., 2014).

Table 2.3: Summary of Competency Integration into IS Curriculum up to 2020

Competency Dimension	Competencies Integrated	Selected Studies
IS Specific	<i>Big Data, Data Analytics, Data Science</i>	(Gardiner et al., 2017; Gupta et al., 2015; Jafar et al., 2017; Parks et al., 2018; Sidorova, 2013; Zheng et al., 2014)
	<i>ERP</i>	(Hepner & Dickson, 2013; Wang, 2011)
	<i>Cloud Computing</i>	(Chen et al., 2012; Hwang et al., 2016)
	<i>Information Security</i>	(Harris & Patten, 2015; Sauls & Gudigantala, 2013; White et al., 2013)

	<i>Entrepreneurship</i>	(Jones & Liu, 2017; Lang & Babb, 2015)
	<i>IT Service Management</i>	(Cater-Steel et al., 2010; Urbaczewski et al., 2011)
Individual Foundational	<i>Creativity and Problem Solving</i>	(Martz et al., 2017)
	<i>Ethics and Social Responsibility</i>	(Cellucci et al., 2011; Harris & Lang, 2011)
	<i>Service Learning</i>	(Jones & Ceccucci, 2018)
	<i>Inter-Cultural Communication</i>	(Mitchell & Benyon, 2018)
	<i>Virtual Team Work</i>	(Chen et al., 2008)
Domain of Practice	<i>Health</i>	(Lawler et al., 2016; Zhang et al., 2014; Zheng et al., 2014)
	<i>Programming (computing)</i>	(Babb et al., 2014; Reynolds et al., 2017)
	<i>HCI(Computing)</i>	(Janicki et al., 2015)
	<i>Green IT</i>	(Sendall & Shannon, 2011)

Source: Author

2.5.4 IS Curriculum Models

In response to the need for a global standard and consistent IS curriculum that meets the needs of organisations, a joint committee of the Association for Information Systems (AIS) and Association for Computing Machines (ACM) periodically develops IS curriculum models for both undergraduate and graduate programmes. A summary of the IS curriculum models is presented in Table 2.4. As early as 1972, the IS community recognised the need for guidelines and recommendations on IS curriculum. Consequently, models by Ashenhurst (1972) and Couger (1973) for graduate and undergraduate programmes respectively were developed and presented. Subsequently, these guidelines have been periodically reviewed to reflect current IS competency needs. The most recent of these models are the IS 2020 (Vreede et al., 2019) for undergraduate programmes and the MSIS 2016 global competency model (Topi et al., 2017) for graduate degree programmes. The IS 2020 and MSIS 2016, departing from their predecessors, the MSIS 2006 (Gorgone et al., 2006) and the IS 2010, are competency-based and do not provide guidelines and recommendations, but rather specify competencies that must be attained from IS programmes.

Table 2.4: Summary of sample undergraduate and graduate IS curriculum models

Undergraduate IS Curriculum models	Graduate IS Curriculum models
IS '95(Couger et al., 1995)	MSIS 2000 (Gorgone et al., 2000)
IS 2002 (Gorgone et al., 2003)	MSIS 2006 (Gorgone et al., 2006)
IS 2010 (Topi et al., 2010)	MSIS 2016 (Topi et al., 2017)
IS 2020 (Vreede et al., 2019)	

Source: Author

2.5.5 IS Curriculum model Adoption and Adherence

The IS model curricula are recommendations that can be adopted or adapted and utilised by institutions. An analysis of situated adoption or adaptation and use of the IS model curriculum has empirical value to the IS community (see Apigian & Gambill, 2014, 2010; Bell et al., 2013; Bohler et al., 2020; Mills et al., 2012; Reynolds et al., 2016; Yang, 2012). These studies vary from assessing levels of adoption and adherence to narrating the experiences of the adoption of an IS curriculum model. For example, Bell et al. (2013), after the publication of the IS 2010, evaluated the level of program adoption of the IS 2010 curriculum guidelines by collecting curriculum data from 127 AACSB-accredited undergraduate information systems programmes across the United States. After comparing their data with the IS 2010 recommendations, it was realised among others, that IS programs exhibited a wide range of adherence to the IS 2010 core curriculum guidelines. The study is akin to the Lifer et al. (2009) study which mapped IS curriculum implemented in US universities, to the IS 2002 guidelines and recommendation.

Mills et al. (2012), through a survey and a cluster analysis, categorised IS curriculum into independent, focused, adoptive, and flexible based on the levels of adherence to the IS2010. Whilst these studies are valuable, they have focused largely on undergraduate IS model curricula and particularly undergraduate academic programmes in North America and the UK. Few such studies have, however, been done for graduate IS programmes (Apigian & Gambill, 2014; Yang, 2012). For example, Apigian and Gambill (2014) discovered that graduate IS programmes in the US did not fully follow the MSIS 2006 at that time. Again in a recent study by Bohler et al. (2020), the authors suggest that the health and value of IS programmes and the extent to which they follow IS curriculum models should be studied in other regions. A summary of similar studies is presented in Table 2.5.

Table 2.5: Summary of IS Curriculum Model Adoption and Adherence Studies

Study	Referenced IS Curriculum model	Region	Non-Adherence issue
Kung et al. (2006)	IS 2002	North America	No university followed all the core courses presented in the IS 2002.
Lifer et al. (2009)	IS 2002	North America	Non-compliance to the IS 2002.
Mills et al. (2012)	IS 2010	North America	Four curriculum profiles were identified resulting from non-adherence to the IS 2010.
Bell et al. (2013)	IS 2010	North America	Found an average adherence of about 48%.
Osatuyi and Garza (2014)	IS 2010	North America	Reported 65.9% adherence to IS course sequence.
Reynolds et al. (2016)	IS 2002 and IS 2010	North America	Implemented curricula more adherent to the IS 2002 compared to IS 2010.
Yang (2012)	MSIS 2006	North America	Non-adherence to the MSIS 2006 with 5 out of 8 MSIS courses required by less than 50% of surveyed institutions.
Apigian and Gambill (2014)	MSIS 2006	North America	Six out of 11 required courses from the MSIS 2006 were not taught by any university.
Kevor et al. (2020)	MSIS 2016	Sub-Saharan Africa	General non-adherence to the broad IS competency categories specified in the MSIS 2016.

Source: Author

2.5.6 Contextualising IS curriculum

Whilst some studies have focused on examining IS curriculum model adoption and adherence, other studies have made the case for why it is impractical to fully adopt an internationally developed IS curriculum model. For example, Tatnall and Davey (2004) explained using an ecological model of how environmental factors make it imperative for IS curriculum adaptation instead of adoption.

Few of the IS curriculum studies in SSA have focused on the contextualisation of the IS curriculum models (Ayalew et al., 2012; Dasuki et al., 2015; Larsson & Boateng, 2010; Mikko et al., 2006; Ponelis et al., 2012; Tedre et al., 2009). For example, Larsson and Boateng (2010) explained that local factors may enable or constrain the adoption of a global IS curriculum model. These factors may be political, social or economic and may exist at the societal or organisational levels. Based on these contextual realities, Ayalew et al. (2012), explains the contextualisation of an undergraduate IS curriculum in Botswana. Similar studies are summarised in Table 2.6. Whilst these studies emphasise the need for contextualisation, they have been focused on the undergraduate IS curriculum with little or no exemplars from graduate IS programmes to guide other contextualisation pursuits.

Table 2.6: Summary of Studies on the Contextualisation of IS Programmes in SSA

Study	Type/ Country	Contextual Factors Considered	Academic Level	Outcome
Larsson and Boateng (2010)	Conceptual SSA	Social Political Economic Sustainability IS2010 Guidelines	Undergraduate	Conceptual Model

Ayalew et al. (2012)	Empirical Botswana	Institutional Factors External Factors IS Graduates Needs Industry Needs IS2010 guidelines	Undergraduate	Contextualised IS Curriculum
Ponelis et al. (2012)	Empirical South Africa	Industry Needs National Objectives Academy IS Graduates Needs	Undergraduate	Contextual Factors
Dasuki et al. (2015)	Empirical Nigeria	Internal Factors Economic Socio-cultural Political Legal Technological	Undergraduate	Contextual Factors

Source: Author

2.5.7 Information Systems Curriculum Outcomes

This category of research looks at issues related to the impact of IS curriculum implementation and adoption or what happens after an IS curriculum is developed. Currently, IS curriculum outcome studies have focused on communicating an IS curriculum, IS curriculum assessment, evaluation, and the impact of IS curriculum innovation on IS students' enrolment. Research issues around communicating and marketing an IS curriculum are scanty. For example, May and Lending (2015) developed a conceptual model for communicating an IS curriculum and they demonstrated how the model could be useful to various stakeholders.

The next IS curriculum innovation outcome study is IS curriculum assessment, which is different from curriculum evaluation in that, evaluation benchmarks the curriculum with some standards or model whilst assessment focuses on improving the programme (Merhout et al., 2008). Bacon and Stewart (2017) have, however, criticised the current assessment approach as lacking the statistical power to make valid conclusions that can change the

curriculum and called for new assessment approaches. In IS curriculum evaluation, some studies look at expected outcomes or delivered outcomes (Anderson, 2017; Gill & Ritzhaupt, 2013; Karsten & Roth, 2015). For example, Anderson (2017), studied how pedagogy influences the learning outcomes of an IT curriculum. Also, Chan et al. (2014) studied students' satisfactory factors from an IS curriculum whilst others evaluated an implemented curriculum with standardised models (Charland et al., 2015; Jacobson et al., 2011; McCoy et al., 2015).

Again, issues of IS enrolment, though not new, continue to receive renewed attention. There seems to be a deterministic notion that the solution to solving dwindling IS enrolment is through innovative IS curricula. It is therefore not surprising to find IS curriculum research paying attention to IS enrolment as outcome of a successful IS curriculum strategy (Kizior & Hidding, 2010; Mills et al., 2017). For example, Mills et al. (2017) studied, empirically, how curriculum-oriented and promotional interventions meet enrolment demands by introducing SQL into foundation information systems curricula. Others have studied factors that influence students' choice or selection of information systems as a major (Akbulut-Bailey, 2012; L. Chen et al., 2016; Eom et al., 2015; Merhout et al., 2016). A summary of the issues of IS curriculum research is presented in Table 2.7.

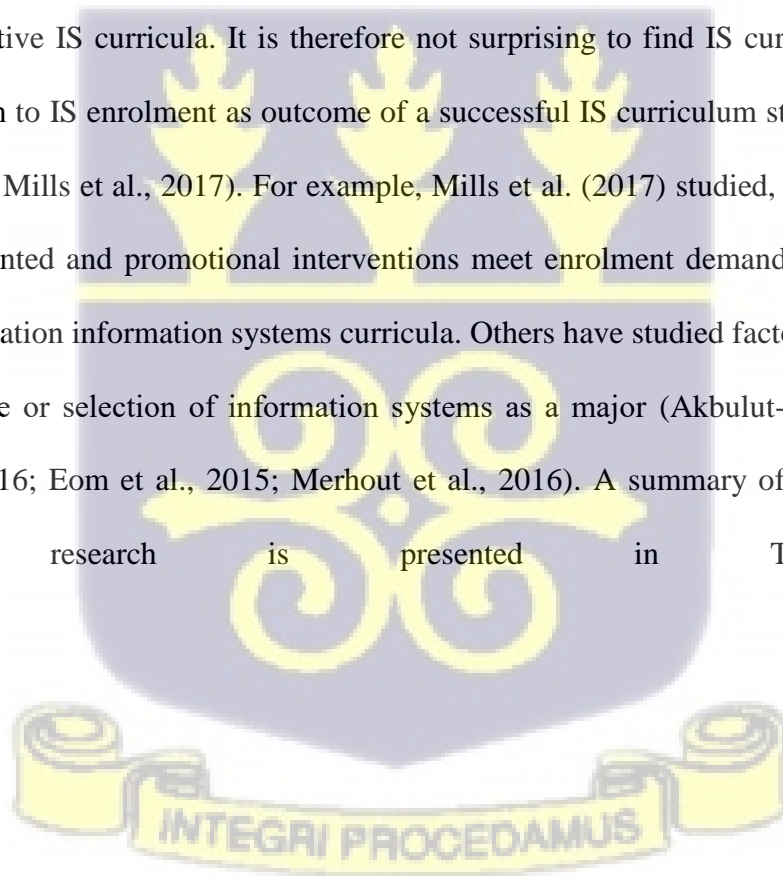
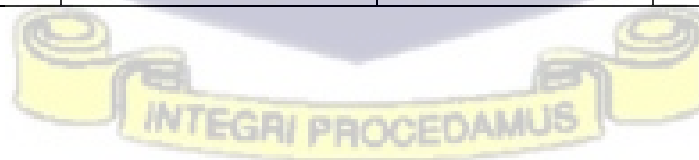


Table 2.7: A Summary of the Issues of IS curriculum Research

Research Theme	Sample Studies	Old Research Premise	New (Expanded) Research Premise	Contemporary Trends	Research Thrust	Theory Development Needed
Theme 1: IS programme Characterisation	Apigian and Gambill (2014), Bohler et al. (2020), Stefanidis et al. (2012), Yang (2012)	IS academic programmes should have a unique identity.	IS academic programmes are increasingly becoming multidisciplinary.	<ul style="list-style-type: none"> ● IS academic programmes naming. conventions ● Examining the nature of IS programme course offerings. 	What is the nature of IS academic programmes?	Models for the description of IS programme course offerings.
Theme 2: Identifying Organisational IS Competencies	Cummings and Janicki (2020), Bullen et al. (2009), Ho and Frampton (2010), Poston and Dhaliwal (2015)	Relevant IS competencies from organisations will help develop new or revise existing IS curriculum.	IS competencies change rapidly in different dimensions, hence the need to close the gap through continuous assessment and technology forecasting.	<ul style="list-style-type: none"> ● IS Competency Frameworks. ● IS Job skills forecasting. ● IS Competency Gap analysis. ● Context specificities. 	What IS competencies are relevant, now and in the future, to organisations?	<ul style="list-style-type: none"> ● IS Competency Models. ● IS Competency evolution. ● IS competency mining and forecasting approaches.
Theme 3: IS Curriculum Model Development	Gorgone et al. (2006), Topi et al. (2017), Vreede et al. (2019)	The need for IS curriculum models that specifies specific modules that must be taught in IS programmes.	The need to specify IS competencies from which different IS curricula or models could be developed for IS programmes.	<ul style="list-style-type: none"> ● Competency-based Education. 	What IS curriculum model is relevant to IS programmes at the global, regional or local levels?	<ul style="list-style-type: none"> ● IS Curriculum design and development methods. ● The structure of IS curriculum and models.



Theme 4: IS Curriculum innovation	Gardiner et al. (2017), Gupta et al. (2015), Jafar et al. (2017)	IS curriculum must follow existing models developed by the IS professionals.	Technologies and IS competencies change rapidly far ahead of curriculum models and hence there is a need to respond to these changes.	<ul style="list-style-type: none"> ● Integration. ● Development ● Revision 	What new Competencies or Courses should be integrated into an existing IS curricula?	<ul style="list-style-type: none"> ● Strategies for integrating new IS competencies into the existing IS curriculum
Theme 5: IS Curriculum Model Adoption and Adherence	Mills et al. (2012), Bell et al. (2013)	IS model curriculum, once developed by professional bodies would be adopted by various Universities and non-adherence was an anomaly.	Adoption of IS Curriculum model is strategic and informed by a complex interaction of factors within and outside the control of the Faculty.	<ul style="list-style-type: none"> ● From Adoption to Adaptation. ● Contextualisation ● Glocalisation (Global yet locally relevant) of IS curriculum. 	What informs the innovation of IS curriculum at international, regional and local levels for undergraduate and graduate programmes?	<ul style="list-style-type: none"> ● Triggers of IS curriculum innovations. ● IS Curriculum adaptation. ● Need to explain how IS curriculum innovation decisions occur.
Theme 6: Contextualising IS curriculum	Ayalew et al. (2012), Dasuki et al. (2015), Larsson and Boateng (2010), Tedre et al. (2009)	International IS Curriculum models carry values and norms of where they were developed and are not appropriate for other regions	Contextual factors influence the adoption or development of an IS curriculum.	<ul style="list-style-type: none"> ● Contextualisation 	How could contextually relevant IS curricula be developed?	<ul style="list-style-type: none"> ● The relationship between context and IS curriculum design factors.



<p>Theme 7: IS Curriculum Innovation Outcomes</p>	<p>Kumar and Kumar (2013), Mills et al. (2017), Thouin, Hefley, & Raghunathan (2018)</p>	<p>IS curriculum innovations impact focused on addressing global dwindling IS enrolment.</p>	<p>IS curriculum impacts broadened, beyond, enrolment to other resources within and beyond the universities into organisations.</p>	<ul style="list-style-type: none"> ● IS alumni tracer studies. ● IS competency gap analysis. ● Hiring and training of IS professionals. ● Contextualised IS curricula exemplars. ● IS Curriculum responsiveness 	<p>What are the outcomes of IS Curriculum innovations on IS professionals?</p>	<ul style="list-style-type: none"> ● The value of IS curriculum innovations. ● Multiple stakeholders (alumni, faculty, students, employers) perception of IS curriculum innovations. ● IS hiring models. ● Contextualised model IS curricula.
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Source: Author



2.6 Theoretical or Conceptual Approaches used in Studying IS Curriculum Issues

There is generally a lack of theoretical or conceptual models used in the study of IS curriculum. First of all, in identifying relevant IS competencies, most studies are exploratory and not guided by any theory or conceptual framework. However, some such studies also rely on the competency classifications summarised in Table 2.1 or an IS curriculum model summarised in Table 2.4. Again, based on management theory, the iceberg competency model (Spencer & Spencer, 1993) has been used to identify critical competencies of IT architects (Ho & Frampton, 2010). According to Spencer and Spencer (1993), high job performance is causally related to certain underlying characteristics of employees, called competencies. These competencies have easily observable characteristics such as skills and knowledge, and less observable characteristics such as self-concepts, traits and motives in a form of an iceberg. Though popular in management studies in eliciting and classifying employee competencies, it has been sparingly used in information systems studies. Competency studies in IS have historically focused on skills and knowledge with less emphasis on attitudes (self-concepts, traits and motives).

Second, only one study used a theoretical model in analysing IS curriculum gaps. This study was based on the Design-Reality model (Heeks, 2002). Based on this model, Dasuki et al. (2015) identified gaps in a locally developed IS curriculum in Nigeria using an international British curriculum as a benchmark. There is a need to theoretically explain how these IS curriculum gaps are closed.

Third, in explaining how an IS curriculum innovation occurs, through contextualisation or adaptation, some models have been proposed. For example, based on the contextual specificities of a region, Larsson and Boateng (2010) proposed the curriculum adaptation

model. Similarly, Tatnall and Davey (2004) provide three useful models of IS curriculum development based on the interaction of various stakeholders. First, the researchers presented the *negotiation model* which recognises an IS curriculum as a product of negotiation of stakeholders with conflicting goals. Second, they suggested the *Actor-Network approach* to curriculum development, whose approach considers IS curriculum as an innovation created from the enrolment of powerful actors who have an interest in the IS curriculum. The third approach is the ecological model, which borrows biological ecological concepts to explain the complex relationships between the various stakeholders in the development of the IS curriculum. Apart from Tatnall (2010) actor-network account of how curriculum innovation occurs in an institution, there is a lack of empirical study, within the period study, of how these other models have been used in explaining curriculum innovation. One of the earliest studies to recognise how environmental factors shape the development of an IS curriculum is by Sandman (1994). Earlier studies had taken the view of an IS curriculum development as a planned action that goes through a manufacturing process (Tatnall & Davey, 2004). Sandman (1994) identified some factors, referred to as environmental forces, that shape IS curriculum leading to successful adaptation. These environmental forces include the IS academy, faculty, community, technology, students, competition and organisational constraints.

2.7 Methodological Approaches to IS curriculum issues

A considerable mix of methodologies has been used to study the issues of IS curriculum with a high number being case studies of experiences of IS curriculum development and implementation in the universities' "real life". For example, Ramesh and Gerth (2015) presents a case study describing how IS faculty, considering local requirements and guiding principles, designed a unique and innovative integrated core curriculum for a graduate IS

programme. This is similar to other IS curriculum research case studies (Chatterjee et al., 2013; Gupta et al., 2015; Mitri & Palocsay, 2015; Ponelis et al., 2012).

Additionally, surveys have been used to identify and rank IS competencies and to study IS competency gaps or IS curriculum gaps (Aasheim, Li, et al., 2009; Jones et al., 2016; Stefanidis et al., 2012; Stevens et al., 2011). For example, in a comprehensive analysis of undergraduate IS programme course offerings in the UK, Stefanidis et al. (2012) used a survey together with a content analysis technique to analyse modules from 228 undergraduate IS programmes from 84 universities in the UK. The survey method has also been used to study IS curriculum adoption or adherence and course integration (Clark et al., 2017; Mills et al., 2012; Sendall & Shannon, 2011). Similar to the Stefanidis et al. (2012) survey study, Clark et al. (2017) surveyed the undergraduate IS programmes of 263 schools in the US to determine the adherence to existing IS curriculum models. The value of the survey technique is to obtain data from a large sample of the population.

Other methodologies used include routine design where descriptive accounts of IS curricula design are given by putting together consensus competencies or learning outcomes (Topi et al., 2010, 2017) or a design science approach (Carlsson et al., 2010). IS curriculum recommendations and guidelines have been considered as products or artefacts of design science research (DSR) (Offermann et al., 2010) and some IS curriculum design papers were expected to follow this method. However, not many studies have used this approach in the development of their IS curricula. According to Alturki et al. (2012), it is possible to differentiate design science and routine design based on the notion that the former develops new scientific knowledge whereas the latter applies scientific knowledge to solve problems. They also differentiate design science from action research (AR), though some authors either

consider them as the same or the latter as a special instance of the former. AR has been used in IS curriculum research (Campbell et al., 2015; Dunaway, 2017; Eom et al., 2015). For example, in the Campbell et al. (2015) study, that sought to improve students' marketability, a special data analytics course was developed and implemented with a number of active-learning techniques. The results were measured which suggested that students gained skills in real-life application of big data analytics. Again, reports from the academic panel of experts' discussion on particular issues of IS curriculum activities have been useful and featured in articles (Topi et al., 2008, 2011; Urbaczewski et al., 2011). For instance, based on a panel discussion, Urbaczewski et al. (2011) suggested ways of infusing an information technology service management course in a graduate IS programme. Such expert panel discussions provide agility to the revision of IS curricula.

Another popular methodology is a content analysis of job postings in popular newspapers or on websites over a period. This approach has been used to identify IS competencies required by organisations and dominant IS roles in organisations (Gardiner et al., 2017; Harris, Greer, Morris, Clark, et al., 2012; Lee & Han, 2008; Murawski & Bick, 2017). For example, to better understand the nature of big data knowledge and skills required by industry, Gardiner et al. (2017) analysed 1216 job advertisements that had "big data" in the job title. Similarly, based on the analysis of job advertisements, Murawski and Bick (2017) derived empirically, a typology of data professionals. Whilst this method is valuable in directly understanding the IS competency requirements of organisations, it has received criticism. For example, according to Litecky et al. (2012), the use of job postings or advertisements overly yields technical competencies, since job postings mostly publish technical competencies. This creates a false emphasis on technical competencies over soft competencies which other studies have suggested are highly required.

Additionally, this method lacks the forecasting capabilities to predict future, what competencies organisations are likely to require. Such a method is needed to be able to catch up with the pace of changing technologies. This study, also, found the use of the Nominal Group Technique (NGT) for IS curriculum research (see Havelka & Merhout, 2009; Merhout et al., 2016). The NGT is a structured group technique for solving problems involving individuals who have experience with the issue under study. In the Merhout et al. (2016) study, the NGT of alumni was used to identify the factors, like lucrative job opportunities and career advancement, which influence students' decision to study information systems.

In addition, the mixed-method approach has also been used in IS curriculum research. This includes the use of different methods within the same research (e.g. Chen et al., 2008; Helfert, 2011; Sivakumar & Kwok, 2017). For example, Sivakumar and Kwok (2017) using a case study, design and survey studied how students, through academic exchanges, are transformed into inventors. There are other emerging methods which have been sparingly used in IS curriculum research. For example, Charland et al. (2015) used an experimental game to assess their ERP competencies after students have been exposed to an IS curriculum. Again, Cater-Steel et al. (2010) also used a narrative enquiry method to describe how IT Service management was embedded in an undergraduate IS curriculum. Based on the review of the state of information systems curriculum issues, methodologies and theories, the next section discusses the Gaps that could be explored in future research.

2.8 Gaps for Future Research

This chapter presented a systematic review of issues in IS curriculum research. Though not exhaustive, the attempt by this review to identify the key issues in IS curriculum research has unearthed a considerable number of gaps in the literature worth exploring in future. There is a

need for more knowledge in the design and delivery of IS curricula that enhance the competencies of graduates globally and in specific regions to meet individual, organisational and societal challenges. From this review, issues, theoretical or conceptual and methodological gaps are identified with a clear implication for future research. We present these gaps as follows:

2.8.1 IS Curriculum Issue Gaps

First, the IS competencies and roles reported in the literature were largely solicited from North America and Europe. There has been a recommendation for studies in other regions (Cummings & Janicki, 2020) since IS competencies are context-sensitive (Kaiser et al., 2011; Osatuyi & Garza, 2014). So far, it is not clear whether the competencies identified in other regions are sufficient and relevant to organisations in other regions. Such a study will empirically and conceptually improve the global IS competency framework.

Second, there is generally little research on the graduate IS curriculum compared to the undergraduate level. This is evident in this review and corroborated by previous work (Bohler et al., 2020; Kumar et al., 2017). Future research may pay attention to exploring the nature of graduate IS programmes, particularly in other regions beyond the US and UK.

Third, whilst there have been efforts to quantitatively measure the levels of adherence and adoption of implemented IS curricula to IS model curricula (e.g. Bell et al., 2013; Mills et al., 2012), it is unknown the factors enabling or constraining non-adherence. Other researchers have argued that non-adherence may be strategic in response to local or situated factors (Ayalew et al., 2012; Larsson & Boateng, 2010; Syler & Venkatesh, 2018). A study of such

nature will guide IS departments to improve on their adoption or adherence and also provide critical input to a future revision of the IS model curricula.

Closely related to the third gap is the level of analysis. There is predominantly micro-level research dealing with various stakeholders (IS professionals, managers, employers, employees, alumni, students, faculty, and curriculum developers) with little known about meso-level factors such as the university policies, philosophy, culture and how they influence the design and delivery of IS curricula. This could be expanded to the influence of macro factors such as the role of regulatory bodies such as accreditation, national policies and legislation, and national culture as well as the influence of meta-issues, such as grand global challenges, on the IS curriculum innovation. Such a multi-level analysis is important to understand the role of society, institutions, organisations and individuals in shaping IS curricula.

The fifth suggestion for future research deals with a proper conceptualisation of IS curriculum success that has been loosely used in the literature. There is a need for an understanding of what constitutes IS curriculum success and failure. With such an understanding, it is easier for researchers to share lessons learnt from successful or failed design or delivery of IS curricula. Moreover, understanding the outcomes of IS curriculum innovations and their impact has not been explored.

2.8.2 Methodological gaps

Despite the preponderance of case study research on IS curriculum, there is little evidence from other regions outside North America. Case studies of IS curriculum activities are valuable in showcasing how the experiences in universities in these other regions compare

with reported global case studies and lessons learnt could be shared or used to improve the global IS curriculum models. Again, it is observed that existing case studies do not report the special characteristics of the universities or IS departments and how they influence IS curricula innovation. This is important, for example, to compare the innovation experiences of different university or IS department types.

Second, rigorous design science research seems to be the logical approach to IS curriculum design since the stages in design science research almost logically map to the stages of the design and delivery of an IS curriculum yet little evidence of its use exists in extant literature. Future research should therefore consider DSR in the development of IS curricula.

Third, with such heterogenous stakeholders involved in IS curricula innovation, the mixed method of case studies and surveys has the potential to provide a deeper understanding of the issues identified in this study.

Finally, future studies could also explore the use of the Delphi technique in identifying IS competencies. This technique has successfully been used in other non-IS research fields and in identifying competencies in other disciplines. The Delphi technique has forecasting abilities and also the ability to reveal important but difficult to observe competencies that existing competency study methods like job posting analysis lack.

2.8.3 Theory or Conceptual Gaps

There is a general lack of theory in IS curriculum studies. There is therefore the need to develop a theoretically grounded understanding of the issues in IS curriculum research. First of all, there is a need for increased empirical evidence of the use of existing IS curriculum

innovation or adaptation models such as those suggested by Tatnall and Davey (2004) and Larsson and Boateng (2010).

Second, information systems competency frameworks focus on knowledge and skills ignoring critical competency characteristics that are causally related to organisational performance. The challenge is that, IS curricula may ignore those critical competencies undermining comprehensive IS education. There is therefore the need to, for example, adopt other competency models, like the iceberg competency model which has not been used in IS competency research, to identify relevant competencies required by organisations.

Third, there is the need to theoretically examine the relationship between IT affordances and IS competencies. This is because existing literature treats IT as a black box in relation to organisational IS competencies. Future studies could open up the box and see how certain information technologies in use or emerging affords IS competencies.

Fourth, how an IS model curriculum is accepted, adopted or contextualised has not been theoretically explained (Osatuyi & Garza, 2014) and there is a need for future studies to pay attention to it. Any theorisation should consider the role of society, institutions, organisations and individuals in shaping IS curricula.

Again, notwithstanding few studies in IS curriculum contextualisation, there is a lack of exemplars of contextualised IS curricula (Larsson & Boateng, 2010) in the literature to guide the revision of existing or the development of new IS curricula. In addition, there is also the need to explain theoretically the phenomenon of adherence and non-adherence in the wake of empirical evidence showing non-adherence of implemented IS curricula to the IS model

curricula where contextualisation is unplanned. Finally, there is the need to theoretically explain IS curriculum innovation outcomes. This would, for example, involve the development of frameworks to examine how IS curricula meet the expectation of different stakeholders.

The foregoing research gaps in the literature and potential research questions are summarised in Table 2.8.

Table 2.8: Summary of Key Research Gaps and Suggested Research Questions

Gap	Type	Research Questions
Lack of IS competency and IS curriculum studies in Region X (regions beyond the US and UK) for both undergraduate and graduate studies.	Context	<ol style="list-style-type: none"> 1. What is the nature of entry-level IS competencies in Region X? 2. What is the nature of mid-level IS competencies in Region X? 3. What is the nature of senior-level IS competencies in Region X? 4. What is the nature of undergraduate IS programmes in Region X? 5. What is the nature of graduate IS programmes in Region X?
Lack of explanation of the influence of multi-level factors on IS curriculum innovation	Theoretical	<ol style="list-style-type: none"> 6. How do societal, field, organisational, individual and technological factors influence IS curriculum innovation?
Lack of understanding of the outcomes and impact of IS curriculum innovation	Theoretical	<ol style="list-style-type: none"> 7. What constitutes an IS curriculum innovation success or failure? 8. How does IS curricula respond to the context-specificities of Region X?
The need to conceptualise the relationship between IT affordances and IS competencies	Theoretical	<ol style="list-style-type: none"> 9. How do IT affordances influence IS competencies?

Source: Author

2.9 Summary of Chapter

This chapter presented a systematic literature review of studies on IS curriculum innovations.

It was observed that dominant IS curriculum innovation studies had been conducted in the

North Americas and the United Kingdom with a dearth of research in other regions. These studies had also been done predominantly around undergraduate IS programmes with few studies on graduate IS programmes with MSIS 2006 as a framework. The main themes of IS curriculum research identified include “IS programmes characterisation”, “IS competencies”, “IS curriculum model development”, “IS curriculum model adoption and adherence”, “IS curriculum innovation”, “IS curriculum innovation outcomes” and “IS curriculum contextualisation”. Consequently, details of these different strains of IS curriculum research are explained with attendant gaps. Also, due to the complexity of IS curriculum innovations, different methodological approaches have been used in the literature. Again, IS curriculum innovation processes have not benefited from theory. These and other gaps for future research are suggested. The findings support the gaps espoused in the problem statement in Chapter 1.



CHAPTER THREE

THEORETICAL FOUNDATIONS AND CONCEPTUAL FRAMEWORK

3.1 Overview of Chapter

The previous chapter revealed the lack of use of theory and or conceptual models in the studying of IS curriculum issues. Having examined the research gaps and frameworks, this chapter presents models and theories adopted for this doctoral study. Specifically, this chapter first reviews the MSIS 2016 global IS competency model. This is useful in guiding the study of the nature of graduate IS programmes and analysis of mid-level management IS competencies relevant to organisations in SSA. Second, this chapter presents the institutional theory, and in particular, the institutional logics perspective that is relevant for the analysis of societal, institutional, organisational and individual-level influences on graduate IS curricula in SSA. Finally, this chapter reviews the dimensions of curriculum responsiveness such as socio-economic, disciplinary, cultural and pedagogical responsiveness. This is important in explaining the outcomes of graduate IS curricula innovation in SSA. For a computing programme like information systems, this study introduces *technological responsiveness* as a new dimension of curriculum responsiveness. The outcome of this chapter is a conceptual framework with research significance of explaining how contextually relevant and industry responsive graduate IS curricula are developed in SSA and also with a practical significance of being used as a guide in developing contextually relevant and industry responsive graduate IS programmes in SSA.

3.2 The Global Competency Model for Graduate Degree Programmes in IS

The first objective of this doctoral study seeks to explore mid-level management IS competencies required by organisations in SSA. It is therefore important to identify and

review an existing competency model relevant to meeting this objective. The most recent IS competency model is the MSIS 2016. This model is also relevant to guide meeting the fourth research objective which is to explore the nature of graduate IS programmes in SSA. The MSIS 2016 has been described in Section 2.5.4. Further description and its utilisation has been presented in the subsequent sub-sections.

3.2.1 Model Background and Description

Following the recent emphasis on competency-based approaches to IS curriculum design and delivery, the joint task force of the Association for Computing Machinery (ACM) and the Association for Information Systems (AIS) developed the global competency model for graduate programs in IS (MSIS 2016). This was a departure from previous IS model curriculum recommendations and guidelines. According to Sutcliffe and Chan (2004) and Topi et al. (2014), this approach is more flexible than the course-based approach, which specifies that certain courses must always be taught. The MSIS 2016 is the first step in developing a truly global model IS graduate programme that captured the concerns of other regions other than the North Americas (Vreede et al., 2019). Moreover, whereas its antecedents provide specific recommendations, the MSIS 2016 is a meta-model that specifies necessary competencies and provides guidance for the development of IS curricula or models. The following forms fundamental principles underpinning the MSIS 2016 (Topi et al., 2017, p. MSIS-iii):

1. *MSIS is a professional practice master's degree that always integrates the development of competencies in the realms of information systems (including both computing and IT and IS management), a specific domain of practice, and individual foundational competencies.*

2. *MSIS is based on a completed undergraduate degree that provides a foundation in all three major competency realms (see #1 above). Missing competencies can be developed with pre-programme bridge courses.*
3. *MSIS does not have any general expectations regarding prior professional experience (although an individual programme can set its professional experience requirements).*
4. *The central element of this recommendation comprises specifications for a hierarchy of competency areas, competency categories, and sample competencies for IS. Besides, it provides general descriptions of required areas of individual foundational competencies and examples of areas of a domain of practice competencies.*
5. *The target professional profiles of various MSIS programs vary (sometimes significantly).*
6. *Different professional profiles require different sets of competencies. MSIS 2016 specifies four levels at which a student can attain competencies in a category: Awareness, Novice, Supporting (role), and Independent (contributor). A competency profile specifies for each competency category the level the graduates of a programme should attain.*
7. *A programme can demonstrate compatibility with MSIS 2016 by showing that all of its graduates attain at least the minimum level of competency specified in this recommendation in each of the categories.*
8. *Competency categories and their attainment levels (see #6 above) form the foundation for determining modules (courses and equivalents) and their learning objectives. The structure, delivery modes, pedagogy, and content of the modules will be highly dependent on program-specific conditions and requirements.*

The MSIS 2016 also categorises graduate competencies into IS specific (ISSC), individual foundational (IFC) and domain of practice competencies (DPC). There are 9 broad areas of IS competencies with 88 specific IS competencies and 11 indicative foundational competencies. In recognition of the use of IS beyond the business domain, the model proposes competencies in other domains such as Health, Law and Government. The main broad competency areas are summarised in Table 3.1.

Table 3.1: Summary of broad competencies provided in graduate IS programmes

Competency Realm/Category	Broad Competency Area/examples
IS Specific Competencies (ISSC)	Innovation, Organisational Change and Entrepreneurship (IOCE)
	Ethics, Impacts and Sustainability (ETIS)
	Enterprise Architecture (EARC)
	Business Continuity and Information Assurance (BCIA)
	Data, Information and Content Management (DATA)
	IS Management and Operations (ISMO)
	IS Strategy and Governance (ISSG)
	IT Infrastructure (INFS)
	System Development and Deployment (SDAD)
Individual Foundational Competencies (IFC)	Critical Thinking; Creativity; Collaboration and Teamwork; Ethical Analysis; Intercultural Competency; Leadership; Mathematical and Statistical Competencies; Negotiation; Oral Communication; Problem-Solving; Written Communication
Core Competencies in a Domain of Practice (DPC)	Business, Health, Law, Government

Source: MSIS 2016

3.2.2 Related Studies

Previous IS curriculum innovation studies have used MSIS 2006 as a reference frame (Apigian & Gambill, 2014; Yang, 2012). These studies surveyed graduate IS programmes in the US and compared their adherence to the MSIS 2006 guidelines and recommendations. Since the introduction of the MSIS 2016, only a preliminary study of graduate IS programmes in SSA and a description of their level of adherence exist (Kevor et al., 2020).

For graduate IS programmes in SSA, different adherence levels to the MSIS 2016 were observed, similar to previous studies at both the undergraduate and graduate levels (see Apigian & Gambill, 2014; Bell et al., 2013; Mills et al., 2012; Yang, 2012).

The decision of what courses should be included in or retired from an IS curriculum may not only be technical but influenced by other social factors. Hence, the next section presents a theory that helps explain the social influences on IS curriculum decisions which produces the contextualised IS programmes that are experienced.

3.3 Institutional Theory

The second objective of this doctoral study seeks to explain how institutions and individuals influence graduate IS curriculum decisions in SSA. Institutional theory is appropriate for explaining how institutions shape social behaviour. In particular, the institutional logic perspective emphasises the agentic response to institutional pressures resulting in unique outcomes from social behaviour. The next Sub-sections present a review of institutional theory, and in particular, the institutional logic perspective, and its utilisation in IS research.

3.3.1 Transitions of Institutional Theory

The New Institutional Theory (NIT) or institutionalism presents an alternative opportunity to study the motivations behind social behaviour such as IS curriculum decisions. According to Scott (2008), an institution is a social structure that provides lines of actions to an organisation or individual to perform whilst constraining and controlling them at the same time. Old institutionalism had assumed that, social behaviour were motivated by technical and economic rationality and organisations acted in ways that are efficient and effective

(Mignerat & Rivard, 2015). However an organisation in an institutional field act according to pressures from various stakeholders with varying interests or expectations to remain legitimate (DiMaggio & Powell, 1983; Meyer & Rowan, 1977). This legitimacy is essential for the acquisition of resources (DiMaggio & Powell, 1983; Suchman, 1995), such as students and research funds in the case of universities, from the environment, needed for the long, survival of the organisation (Meyer & Rowan, 1977; Mignerat & Rivard, 2015).

In the context of IS, “how institutions influence the design, use and consequences of technologies” is relevant to researchers (Orlikowski & Barley, 2001). A fundamental assumption of the new institutional theory is that organisations in the same institutional field conform to similar institutional pressures and become isomorphic or similar over time (DiMaggio & Powell, 1983). DiMaggio & Powell (1983) identified three forms of isomorphic pressures-Coercive, Normative and Mimetic. The NIT became an important theory in explaining particularly homogeneity in IS adoption and use behaviour.

3.3.2 New Institutional Theory and IS Research

The NIT has been useful for explaining how resilient social structures such as regulations, norms and cultural cognitive mechanisms, shape social actions and interactions (Effah, 2016; Scott, 2008). For example, Effah (2016) explained the role of institutions in enabling and constraining e-payment entrepreneurship in a developing country, through the lens of the NIT. Other researchers have explained how institutional pressures influence the adoption of specific innovations such as financial electronic data interchange (Teo et al., 2003), B2B e-marketplace (Son & Benbasat, 2007), customer relationship management systems (Wang & Swanson, 2008), information security management (Cavusoglu et al., 2015), electronic health records (Sherer et al., 2016) and national biometric identification (Owusu-oware et al.,

2017). However, from the literature review, IS curriculum innovation research is yet to benefit from institutional theory.

Despite the potential usefulness of the NIT in explaining IS curriculum innovation, the theory privileges processes over agency. Information systems research that used the NIT focused on how organisations within the same institutional field become isomorphic over time (Mignerat & Rivard, 2015). The theory assumes linearity and that all the pressures lead to a particular outcome. If such assumptions should hold, then the following could, for example, be observed for the outcome of IS curriculum decisions. First, IS departments within the same institutional fields will be isomorphic and run the same IS curriculum or IS programmes. Second, IS curriculum models would be adopted with similar levels of adherence. The reality, however, is that IS programmes differ, even for universities in the same institutional field and different levels of adherence to IS curriculum models have been reported (Bell et al., 2013; Mills et al., 2012). This is because, the isomorphism conception has not accounted for the fact that IS departments are not just passive victims of institutional pressures who are only being constrained or enabled by institutions but IS departments also have agency (Greenaway & Chan, 2005) which they could decide to exercise. Such an agent-centric view of institutionalism provides an opportunity for the third wave of institutional theory research which looks at how agents interact with institutions to yield heterogeneous outcomes. In particular, this study adopts the institutional logics perspective of institutional theory.

3.3.3 The Institutional Logics Perspective

According to the institutional logic perspective (ILP), institutions reproduce their subsistence through a central logic: “a set of material practices and symbolic constructions such as

assumptions, beliefs” (Thornton & Ocasio, 2008) known as institutional logics which are available to individuals and organisations to elaborate (Friedland & Alford, 1991). This perspective emerged after a call by Friedland and Alford (1991) to bring society back into research and shifted institutional studies from explaining organisational homogeneity(similar outcomes) to explaining heterogeneous outcomes.

Institutional logic represents the materiality of institutions. They provide identity to institutions and distinguish one from the other (Johansen & Waldorff, 2017). Institutional logics shape the social behaviour of individuals and organisations by acting as a cognitive frame of reference(Johansen & Waldorff, 2017) and linking local actions to broader societal institutional structures (Friedland & Alford, 1991; Tumbas et al., 2015). In other words, the institutional logics prescribes institutional scripts that individuals and organisations are expected to follow(Thornton et al., 2012; Tumbas et al., 2015). Friedland and Alford (1991) identified resilient broader institutional structures such as capitalism, family, the bureaucratic state, democracy, and Christianity as “central logics” of western societies. These, over the period, have been modified to seven overarching institutional orders of western societies (Thornton et al., 2012). These include the state, the corporation, the market, the family, religion, professionalism and the community known as the inter-institutional system (Thornton et al., 2012) (see Appendix 7). There have been suggestions to capture central logics of non-western societies that influences individual and organisational practices (Johansen & Waldorff, 2017; Thornton et al., 2012) which this study contributes to.

Beyond the societal level logics are the field, organisational and individual level logics(Johansen & Waldorff, 2017; Thornton & Ocasio, 2008). In other words, institutional logics occurs or exists at multiple levels(Dang, 2021; Thornton et al., 2012). For example, the

editorial logic was captured to exist at the industry level (Thornton & Ocasio, 2008) in the publishing industry. Similarly, in the higher education field, the teaching and research logics were found to be dominant (Bunduchi, 2017; Cai & Mountford, 2021). Similarly, institutional logics may be enacted at the organisational or individual levels. However, the instantiation of logics within fields, organisations and individuals draws from and is nested within the societal level logics (Besharov & Smith, 2014). For example, academic logic (see Cai & Mountford, 2021), and teaching and research logics (Bunduchi, 2017) are instantiations of societal level professionalism in the higher education field.

One major shift from new institutionalism is the notion of agency. From the institutional logic perspective, the agency is privileged. However, the agency of organisations and individuals is embedded within their respective logics (Hathaway & Askvik, 2021; Thornton et al., 2012). In other words, there is the assumption “that the interests, identities, values, and assumptions of individuals and organisations are embedded within prevailing institutional logics. Decisions and outcomes are a result of the interplay between individual agency and institutional structure” (Thornton & Ocasio, 2008, p. 103). Moreover, it provides an opportunity for change through an individual and collective agency (Hathaway & Askvik, 2021).

3.3.4 Multiple Institutional Logics and Institutional Complexity

From the previous section, the presence of institutional logics at multiple levels was recognised. In addition, multiple institutional logics may exist for a particular situation. Such institutional plurality (see Greenwood et al., 2009; Tumbas et al., 2015) presents organisational actors with an institutional complexity (Bunduchi et al., 2020; Greenwood et al., 2011; Lounsbury & Boxenbaum, 2013) where these multiple institutional logics may

complement, compete or contradict each other (Berente et al., 2019). For example, the logics of IT professionalism and the logics of education were found to have competed in an ICT4D education project (Stratton et al., 2016). Again, in a study of a nationwide healthcare-IT implementation project, Bunduchi et al. (2020) revealed that the public-sector logic, the corporate logic, the market logic and the professionalism logic, together focused the attention of actors on the organisational problem the innovation was supposed to solve. In addition, Frenken et al. (2020) identified, that in the gig economy, misalignment of the market, corporate, and state logics had become evident from the growing tensions and controversies surrounding digital platforms such as Uber and other ridesharing platforms. In summary, “organisations face institutional complexity whenever they confront incompatible prescriptions from multiple institutional logics” (Greenwood et al., 2011, p. 352).

3.3.5 Hybridity

Hybridity refers to the co-existence of two or more competing institutional logics (Heeks et al., 2020; Lepori, 2016; Pache & Thornton, 2020). Often in a hybrid situation, no one particular logic is significantly dominant over the other. For example, Heeks et al. (2020) explain how business logic that focuses on making a profit may co-exist with a development logic of achieving Sustainable Development Goals (SDGs) in some organisations. Similarly, Slavova and Karanasios (2018) observed hybrid information practices among Ghanaian farmers where the smallholder and value chain logics existed. Such organisational hybridity influences organisational practices (Pache & Thornton, 2020).

In the higher education field, competing logics co-exist, presenting universities as hybrid organisations (Bunduchi, 2017; Lepori, 2016). For example, the logics of managerialism that position the university as a business unit, seeking profits and seeking to expand and grow,

competes with the academic logic that focuses on independently creating and sharing knowledge (Lepori, 2016). At the same time, competing logics of the state, corporation, teaching and research, influenced students' information systems innovation in a university (Bunduchi, 2017).

Whilst hybrid organisations have become a novel territory for institutional theory (Johansen & Waldorff, 2017), the current literature on hybridity have focused on organisational forms and practices (Pache & Thornton, 2020). There is however lack of studies that consider hybrid sub-organisations (Mignerat & Rivard, 2015) (such as an IS academic department within a university) with actors playing hybrid roles (like a Head of department who is a manager and an academic) and how they influence organisational practices such as an IS curriculum innovation.

3.3.6 Responses to Institutional Complexity

Organisations and individuals are not passive victims of the influence of institutional logics. They have the agency to respond, in particular, to conflicting and incongruent logics (Greenwood et al., 2011). There are a number of studies that focused on how individuals and organisations cope with institutional plurality or complexity. Most of these studies have roots in the typology of strategic and tactical responses enacted by individuals and organisations under multiple institutional pressures (Oliver, 1991) to create, maintain or repair their legitimacy (Mignerat & Rivard, 2015). Oliver (1991) identified five strategies such as acquiescence, compromise, avoidance, defiance and manipulation. These represent a variation in the active agency, ranging “from passivity to increasing active resistance” (Oliver, 1991, p. 151). Beyond this, it had been observed, that organisations decoupled their

practices to symbolically comply with institutional scripts whilst focusing on material practices that bring them efficiency (Meyer & Rowan, 1977; Oliver, 1991; Scott, 2008).

These strategic responses have been useful in understanding how agents cope with multiple institutional logics (see Berente et al., 2019; Bunduchi et al., 2020; Greenwood et al., 2011; Kodeih & Greenwood, 2014; Minbaeva et al., 2020; Waeger & Weber, 2019). For example, in analysing user responses to an enterprise system implementation, Berente et al. (2019) observed that depending on the strength of the pressure to comply and whether the logics were congruent or incongruent, users' responses could be faithful appropriation, loose coupling, co-optation or resistance. Similarly, in a study of a nationwide health IT implementation project, Bunduchi et al. (2020) identified different responses to dissonant logics at different innovation stages of the project. For example, users acquiesced at the comprehension stage, compromised at the adoption stage and enacted some responses such as acquiescence, avoidance, defiance, compromise and manipulation at the implementation stage. At the individual levels, responses such as hybridisation, bridging and buffering were, for example, used to resolve conflicting institutional logics (Minbaeva et al., 2020).

3.3.7 The Institutional Logics Perspective and IS Research

Whilst the institutional theory is not new to IS research, there is a growing interest in the use of the institutional logic perspective in IS studies. Some of these studies have focused on capturing institutional logics at different levels and their role and sometimes consequences at various stages of information systems innovation (e.g. Addo & Avgerou, 2020; Dang, 2021; Oborn et al., 2021). For example, Addo and Avgerou (2020) examined how the managerial logics of an information system implemented was incongruent with the logics of users resulting in street-level corruption at the ports of Ghana. Another example is how institutional

logics influenced the implementation of telemedicine in Israel in the wake of the covid-19 pandemic. Similarly, Dang (2021) examined the influence of the logics of managerialism, professionalism and users on the implementation of enterprise architecture by government agencies in Vietnam.

On the other hand, other studies have looked at the institutional logics together with agentic responses enacted by individuals or organisations in particular for conflicting logics (see Berente et al., 2019; Berente & Yoo, 2012; Bernardi & Exworthy, 2020; Boonstra et al., 2018; Bunduchi et al., 2020; Meijerink et al., 2021). In particular, responses agents enact range from a passive agency such as acquiescence or faithful appropriation (Berente et al., 2019; Bunduchi et al., 2020) to middle-range active responses like covert practices, devolution, loose coupling, hybridisation, outsourcing, avoidance, manipulation and compromise (see Asangansi, 2012; Berente et al., 2019; Berente & Yoo, 2012; Boonstra et al., 2018; Bunduchi et al., 2020; Meijerink et al., 2021) and to active resistance, defiance or rejection (see Berente et al., 2019; Bunduchi et al., 2020; Meijerink et al., 2021).

Moreover, these studies are mostly in the domain of IS innovation in the domains of health (Asangansi, 2016; Bernardi & Exworthy, 2020; Boonstra et al., 2018; Bunduchi et al., 2020; Oborn et al., 2021), with few in other areas like NASA (Berente & Yoo, 2012) and port management. These studies have specifically focused on innovations such as telemedicine, enterprise systems, digital platforms and port management systems. Table 3.2 presents a summary of similar IS studies based on an institutional logics perspective.

Table 3.2: Summary of Related IS studies based on the ILP

Authors	Domain	IS Innovation	Method	Complimentary Theory	Country/Region	Logics	Responses
Dang (2021)	Government	Enterprise Architecture	Qualitative	NA	Vietnam/Asia	<ul style="list-style-type: none"> • Managerialism • Professionalism • User 	NA
Meijerink et al. (2021)	Gig work (HRM)	Online labour platform	Qualitative	NA	Netherland/ Europe	<ul style="list-style-type: none"> • Market • corporation 	<ul style="list-style-type: none"> • Rejection • covert practices • devolution • Outsourcing
Oborn et al. (2021)	Health	Telemedicine	Qualitative	Technology Affordance	Israel/ Europe	<ul style="list-style-type: none"> • State • Corporate • Professional 	NA
Addo and Avgerou (2020)	Port	Tradenet (customs information systems)	Qualitative	None	Ghana/ SSA	<ul style="list-style-type: none"> • Managerialism • Government Administration 	NA
Bernardi and Exworthy (2020)	Health	Telehealth	Qualitative	NA	England/ UK	<ul style="list-style-type: none"> • Managerialism • Medical professionalism • Patient-Centric Care 	Hybrids
Bunduchi et al. (2020)	Health	HRIS	Qualitative	NA	North Europe	<ul style="list-style-type: none"> • Public • Corporate • Professional • Market 	<ul style="list-style-type: none"> • Acquiescence • Compromise • Avoidance • Defiance • Manipulation

Berente et al. (2019)	various	ERP	Qualitative	NA	Global		<ul style="list-style-type: none"> • Faithful appropriation • Loose coupling • Co-optation • Resistance
Boonstra et al. (2018)	Health	IT Governance	Qualitative	NA	Netherlands/ Europe	<ul style="list-style-type: none"> • Managerialism • Medical professionalism • IT Professionalism 	hybrids
Asangansi (2016)	Health	mHealth	Qualitative	NA	Nigeria SSA	<ul style="list-style-type: none"> • Network • Hierarchical 	hybrids
Berente and Yoo (2012)	NASA	Enterprise Information Systems	Qualitative	NA	US/ North America	Managerialism	Loose coupling

Source: Author



3.4 Curriculum Responsiveness and the SSA Context

The third research gap for this doctoral study espouses the need to understand the impact of the influence of institutional logics and agent actions on curriculum responsiveness. The study, therefore, extends the curriculum responsiveness dimensions to the graduate IS curriculum.

According to Moll (2004), curriculum responsiveness is the ability of a curriculum to meet the needs of students, society or a particular context (Maphosa et al., 2014). For example, for an IS curriculum to be relevant, it must respond to the needs of students, society or some other contextual factors. These needs have been categorised into four curriculum responsiveness dimensions: socioeconomic, cultural, learning and discipline responsiveness (Fomunyam & Teferra, 2017; Moll, 2004). These dimensions of curriculum responsiveness are however shaped by contextual factors (Fomunyam & Teferra, 2017). The next subsections explain the four dimensions of curriculum responsiveness and how they are contextually shaped and then introduce the fifth dimension.

3.4.1 The Socio-economic Responsiveness

Economic responsiveness refers to the ability of a curriculum to respond to the competency needs of the economy (Moll, 2004). Specifically, industries forming part of the regional and national economy require specific competencies for high organisational performance which students should acquire. It is therefore important that IS curricula innovation responds to the IS competencies needs by the industry (Cummings & Janicki, 2020). However, IS curricula should not only respond to existing job competency demands but should be able to respond to solving socio-economic challenges such as creating sustainable jobs (Fomunyam & Teferra, 2017). According to Pade-Khene (2015), higher education must respond to the socio-

economic need of Africans and also be sensitive to the developmental agenda of governments. It is therefore important to consider in this study that, IS curriculum must be socio-economically responsive by aligning to the needs of industry and society. Consequently, two factors are considered in discussing the socio-economic responsiveness of IS curricula. First, the IS competencies required by industries, and the second is a response to national objectives. Governments may have their developmental agenda that academic programmes must respond to (Ayalew et al., 2012; Dasuki et al., 2015; Larsson & Boateng, 2010). Again, the regional and national context may influence how an IS curriculum responds to the economy (Ayalew et al., 2012; Larsson & Boateng, 2010; Tedre et al., 2009). For example, Larsson and Boateng (2010) suggest consideration of how the social, political and economic situations at the national level enable or constrain the development of an IS curriculum. This influences the selection of career tracks that determines the IS competencies an IS curriculum should deliver. This consequently determines the selection of appropriate curriculum course contents.

3.4.2 Disciplinary Responsiveness

Disciplinary responsiveness refers to a response to the tenets of the underlying discipline, in terms of the way knowledge is produced and disseminated to students (Moll, 2004). Academic disciplines have unique characteristics that help to differentiate one from the other. It is therefore important for academics to keep up to date with the trends in their fields (Pade-Khene, 2015). Again, this must also be looked at with reference to the global, regional or national context. For example, IS curriculum developers may look at similar or dominant IS programmes at the national or regional level to understand dominant course offerings in IS programmes. Whilst being disciplinary responsive at the regional and national levels, IS curricula must also exhibit common global characteristics (Pade-Khene, 2015; Topi et al.,

2017). Consequently, the global IS community develop IS curriculum guidelines and recommendations (Gorgone et al., 2006; Topi et al., 2010) and currently global IS competency models (Topi et al., 2017; Vreede et al., 2019) to guide the development of undergraduate and graduate IS curricula.

3.4.3 Cultural Responsiveness

Cultural responsiveness refers to the ability of the curriculum to respond to the cultural dissonance in the classroom (Moll, 2004) and in society (Nkomo, 2014). This requires that the curriculum should be sensitive to the cultural diversity of students and society by integrating several cultural reference points that accept diversity and offer a range of alternative routes for students (Moll, 2004; Nkomo, 2014). In the development of an IS curriculum, there must be a consideration for the need to incorporate national, organisational or workplace culture and also the diverse cultural background of the students. For example, many countries in SSA have communal, rather than individualist cultures and may therefore align well with teamwork and studying in groups.

3.4.4 Pedagogical or Learning Responsiveness

Pedagogical, learning or educational responsiveness refers to the capacity of the curriculum to adapt to the instructional needs of students. According to Moll (2004), all students entering university are disadvantaged in one way or another, particularly because they have to adjust to an institutional and epistemological background that is unfamiliar to them. The background of students and the level of competencies they enter an academic programme with, therefore become very important. For example, students enrolling on computing academic programmes come with different computing competencies due to prevailing inequalities to access, and to the use of ICTs in teaching in lower levels of education in SSA

(Brown et al., 2008). It is important to recognise the need to bridge the experiences of prospective students to enable them to fully transit to their new academic programme by integrating foundational courses into the IS curriculum (Topi et al., 2010, 2017). For graduate IS curriculum, the key factors here are the IS graduate experiences students bring onto the graduate IS academic programme and the resources required to support the learning of the relevant courses.

3.4.5 Technological Responsiveness

Whilst existing literature does not mention technological responsiveness per se, it is important to suggest this factor, particularly for computing academic programmes. An information systems curriculum must respond to the prevailing, emerging and technological changes required for teaching and by industry. According to Larsson and Boateng (2010), in developing a contextualised IS curriculum, it is important to consider the current ICT status of the country or region served by the university in terms of readiness for, availability, uptake and impact of ICT. It is critical that IS curricula designers understand the ICT environment in the marketplace to equip IS practitioners with appropriate skills to promote the switch from the university context to the marketplace, and this is particularly important for practical sessions (Ayalew et al., 2012). One may argue, that the technological environment influences competencies required by industry and hence being socio-economically responsive may encompass technological responsiveness. This may not hold entirely because emergent technologies change so fast that it takes time for them to be institutionalised in the work processes of industries. However, curricula should be sensitive to such rapidly changing nature of technology to adequately prepare students for the future of work and changing society. Consequently, technological responsiveness refers to the ability for a curriculum to

respond to the prevailing and emerging ICTs required for teaching and likely to be used by industry.

A summary of IS curriculum responsiveness dimensions and sub-factors is presented in Table 3.3.

Table 3.3: Summary of IS Curriculum Responsiveness Dimensions

IS Curriculum Responsiveness	Sub-factors	Study	Level of Analysis	Rationale
Socio-economic Responsiveness	<ul style="list-style-type: none"> ● IS Industry competencies ● National Objectives ● Global Megatrends 	<p>Ayalew et al. (2012), Larsson and Boateng (2010),</p> <p>Stefanidis et al. (2013), Winter and Butler (2011)</p> <p>Brocke, Watson, Dwyer, Elliot, and Melville (2013)</p>	<p>Regional</p> <p>National</p> <p>Global</p>	IS Curriculum must respond to industry competency and societal needs.
Disciplinary Responsiveness	<ul style="list-style-type: none"> ● Similar IS programmes ● IS academy (MSIS 2016) 	Ayalew et al. (2012), Larsson and Boateng (2010), Sandman (1994)	<p>Regional</p> <p>National</p> <p>Global</p>	IS curriculum must respond to the underlying IS discipline.
Cultural Responsiveness	<ul style="list-style-type: none"> ● Institutional Culture ● National culture 	Larsson and Boateng (2010), Dasuki et al. (2015)	<p>Institutional</p> <p>National</p>	IS curriculum must respond to a diverse culture.
Pedagogical Responsiveness	<ul style="list-style-type: none"> ● IS Graduate experiences ● Organisational Constraints 	Ayalew et al. (2012), Ponelis et al. (2012), Dasuki et al. (2015)	Institutional	IS curriculum must respond to the learning needs of students.
<i>Technological Responsiveness</i>	<ul style="list-style-type: none"> ● <i>Current ICT State</i> ● <i>Emerging ICTs</i> 	<p>Ayalew et al. (2012), Dasuki et al. (2015),</p> <p>Larsson and Boateng (2010),</p> <p>Sandman (1994)</p>	<p><i>National</i></p> <p><i>Regional</i></p> <p><i>Global</i></p>	<i>IS curriculum must respond to prevailing and emerging technologies needed for teaching and</i>

				<i>by industry.</i>
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Source: Author

Based on the theories and models reviewed, the next section explains how these theories, models and frameworks support this study.

3.5 The Conceptual Framework

This study proceeds on four assumptions. The first assumption is that graduate IS curriculum innovation is a decision-making process engaged by the relevant academic department and it involves deciding on what courses or modules or particular IS competencies to include or retire in the academic programme. The second assumption is that the decision to include or retire a course or a programme or an IS competency is influenced by multiple, maybe incongruent, institutional logics presenting an institutional complexity to graduate IS curriculum innovation. The third assumption is that an IS department or agents enact strategic responses in the face of institutional complexity. The fourth assumption is a consequence of the third: that, institutional logics and the agent actions influence a graduate IS curriculum and make it contextually responsive to a number of factors (Table 3.3). Based on these assumptions, a conceptual framework (Figure 3.2), is presented, to explain how a contextually responsive graduate IS curriculum innovation occurs in SSA.

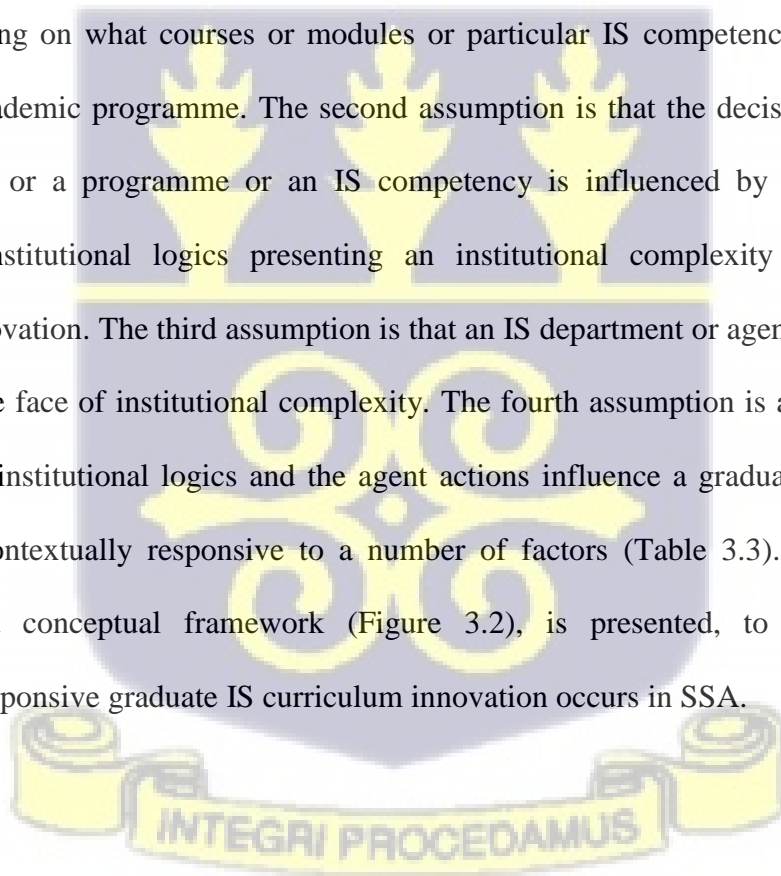
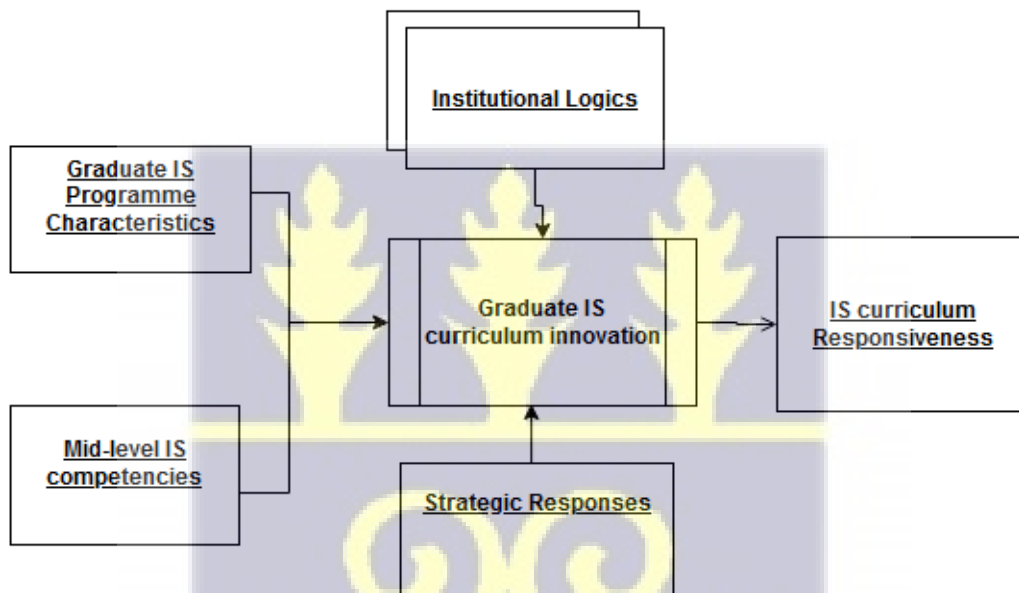


Figure 3.2: Conceptual Framework for Understanding Graduate IS curriculum Innovation in SSA



Source: Author

3.6 Summary of Chapter

This chapter reviewed the selected model and theory relevant to the study of IS curriculum innovations in SSA. Specifically, the chapter reviewed the MSIS 2016 global competency model that is relevant to examining the nature of mid-level management IS competencies in SSA and graduate IS programmes (research objectives a and d). In addition, the chapter reviewed the institutional theory, and in particular, the institutional logics perspective, which

provides an opportunity for a social view of graduate IS curriculum innovation (research objective b). The chapter then reviewed curriculum responsiveness and how it could be useful in examining the consequences of institutional logics on the responsiveness of a graduate IS curriculum in SSA (research objective c). The study also suggests the concept of technological responsiveness which is not mentioned in curriculum responsiveness literature. Subsequently, a conceptual framework (Figure 3.2) has been developed to guide the study.



CHAPTER FOUR

RESEARCH METHODOLOGY

4.1 Overview of Chapter

In the previous chapter, the conceptual framework to aid in the study of contextually relevant and responsive graduate IS curricula in SSA has been developed. There is a need to present the philosophical assumptions underpinning the study of IS curriculum innovation in the SSA context. The chapter explains why the nature of the research gaps and the research objectives or questions requires a mixed-method approach to enquiry. Consequently, the survey, Delphi and case study methods and how they have been used in this study to collect and analyse data are presented.

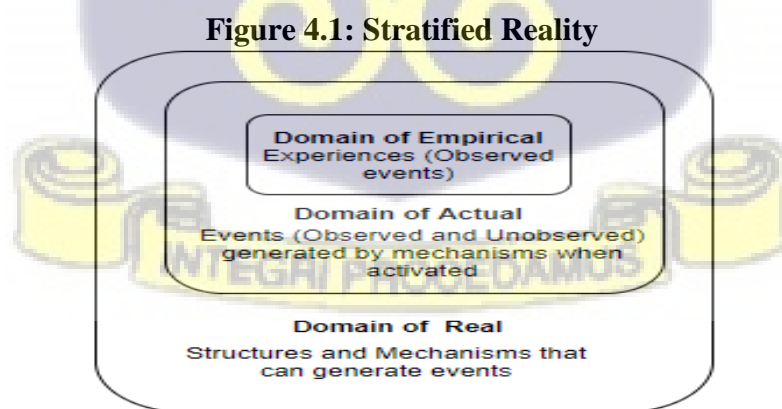
4.2 Philosophical Assumptions of the Research

Research, consciously or not, is guided by a collection of beliefs, assumptions, values and techniques shared by members of a scientific community, known as paradigms (Burrell & Morgan, 1979) or worldviews (Creswell, 2009). A research paradigm is characterised by certain philosophical assumptions, including assumptions about human knowledge (epistemology), what constitutes reality (ontology), the extent to which a researcher's values influence the study (axiology) and the language of reporting the research (rhetoric) (Creswell, 2009). These assumptions, essentially, inform the methodological choices a researcher makes and guides the overall design of the research (Saunders & Bezzina, 2015).

After examining a number of IS research publications over a period, Orlikowski and Baroudi (1991) found that, IS research has historically been dominated by positivist, followed by interpretive (Chen & Hirschheim, 2004; Myers & Klein, 2011; Orlikowski & Baroudi, 1991; Tsang, 2014; Wynn & Williams, 2012) approaches. Such dominance, limits IS researchers to

the kind of research problems that can be studied (Orlikowski & Baroudi, 1991). In the quest to broaden the breadth and depth of what IS problems could be studied, the positivism and interpretivism paradigms have been challenged or possibly complemented, among others, by another paradigm known as the Critical Realism paradigm (CR) (Bygstad & Munkvold, 2011; Mingers et al., 2013; Volkoff et al., 2007; Wynn & Williams, 2012). Based on the nature of the study, this research considers CR as the main philosophical paradigm for this study.

Critical Realism is a paradigm within the philosophy of science that has been developed primarily by Roy Bhaskar over the past three decades (Bhaskar, 1978; Sayer, 1999). In essence, it maintains a position that is opposed to both positivism (empiricism) and interpretivism (idealism) while accepting some elements of both. CR strongly espouses ontological realism—that is, the existence of a reality independent of our knowledge of it, yet also accepts epistemological relativism—that is, that our knowledge of that reality will always be locally situated (Archer et al., 2013; Mingers et al., 2013). Essentially, there must be some intransitive domain of objects and events, which are independent of our perceptions of them. This stratified view of reality is illustrated in Figure 4.1.



Source: Archer et al. (1998)

Epistemologically, CR recognises that our access to this world is limited and always mediated by our perceptual and theoretical lenses (Dobson, 2003; Mingers et al., 2013). Moreover, CR accepts epistemic relativity (that knowledge is always local and historical)(Mingers et al., 2013). On the axiological dimension, CR research is value-laden, since access to reality is through the meanings of humans (Wynne & Williams, 2012).

4.3 Critical Realism and IS Curriculum Innovations

According to Dobson (2001), a researcher's purpose to either describe or explain a phenomenon should be settled earlier in the research since such a decision must align with the chosen philosophical paradigm. For example, the CR paradigm is more suited to studies that seek explanation, whilst the interpretivism paradigm is more suited for descriptive studies (Dobson, 2001). In this study, there is the need to, beyond describing the nature of graduate IS curricula and mid-level IS competencies in SSA, explain how institutional logics influence graduate IS curricula innovation in SSA and its consequences on IS curriculum responsiveness. Therefore, with this study, CR helps to uncover the structures (institutional logics) and the mechanisms (agent actions) that influence graduate information systems curricula innovations in IS departments in SSA. Information systems curriculum innovation is a complex phenomenon that occurs in the empirical domain. The study further makes assumptions that there are some events which may not be experienced or experienced that influence IS curriculum innovations which exist in the actual domain and this study seeks to uncover. These events in the domain of actual are generated by real structures and mechanisms in the domain of real.

Epistemologically, this study assumes that knowledge of IS curriculum innovations can be obtained through the meanings and interpretations the researcher makes through the selected theoretical lenses. This knowledge of reality is therefore limited by the theoretical lens and hence fallible or falsifiable, satisfying the epistemic relativity principle of CR (Wynn & Williams, 2012). For example, for this study, interpretations are done through the lens of the conceptual framework developed in Section 3.5. This framework helped to uncover relatively enduring structures such as relevant organisational IS competencies from industry, dominant IS courses in SSA and institutional logics which influence graduate IS curriculum responsiveness.

In addition, the study makes an axiological assumption that the values and prior experiences of the researcher, as an academic, could influence the interpretation of the data. The researcher has a post-graduate degree in ICT Management, and has been an IS faculty for over 10 years in SSA. The researcher, therefore, brings to the research his understanding and values of what graduate IS competencies are required by organisations in Africa and its implications for curriculum innovations. In this case, the study is value-laden (Saunders et al., 2009). Nevertheless, such values do not in any way injure the findings but rather help build richer insights and understanding of the phenomena under study. Based on the underlying CR philosophical assumptions, an appropriate research approach is explained in the next sections.

4.4 The Mixed-Method Approach

Critical Realism lends itself to a Mixed-Method Research (MMR) approach (Shannon-Baker, 2016). According to Johnson et al. (2007, p. 123), MMR is “the type of research in which a researcher or team of researchers combines elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis,

inference techniques) for the broad purposes of breadth and depth of understanding and corroboration.” This implies that the researcher applies different methods to a set of related studies within a single study or programme of research (Johnson et al., 2007; Venkatesh et al., 2016). Teddlie and Tashakkori (2010) suggest, combining qualitative and quantitative methods complements each other and provides advantages such as: simultaneously addressing confirmatory and explanatory research questions, providing stronger inferences than any of the individual methods would have provided and providing an opportunity to produce a greater assortment of complementary and divergent (Venkatesh et al., 2016) findings. It is therefore important to note that the nature of the research questions and expected outcomes influences the suitability of MMR.

Due to the nature of the complexity of phenomena studied by critical realists, the MMR seems to be appropriate for studying such heterogeneous components of graduate IS curriculum innovations, requiring different ontological and epistemological approaches (Wynn & Williams, 2012). In this study of IS curriculum innovations in universities in SSA, four related questions were asked and each of these four questions required different approaches. For example, understanding the nature of graduate IS programmes in SSA requires a different approach from eliciting relevant IS competencies from organisations, just as understanding the curriculum innovation process within IS departments in universities in SSA. The methods selected for each question in the study are summarised in Table 4.1.

Table 4.1: Summary of Methods based on Research Questions

Research Question	Method	Data Collection Method	Data Source	Sample Size
a. What is the nature of mid-level management IS	Delphi technique	Three round email responses; first	IS experts who take hiring and strategic decisions	56

Research Question	Method	Data Collection Method	Data Source	Sample Size
competencies required by organisations in Sub-Saharan Africa?		to an open question and then closed ended Questionnaires	in different organisations in SSA.	
b. How do institutional logics and agent actions influence graduate IS curricula innovation in Sub-Saharan Africa? c. What are the consequences of the influences of institutional logics and agent actions on graduate IS curricula responsiveness in Sub-Saharan Africa?	Single Case Study	Interviews Survey Artefact observation Focus Group	Stakeholders involved in the development of a graduate IS programme in a faith-based private university in Ghana, SSA.	1
d. What is the nature of graduate IS programme course offerings in SSA?	Survey	Direct Web Survey	Websites of Universities in SSA	200

Source: Author

Even though the research questions, in this study, are related and sequenced, they did not affect the design. Consequently, data collection, for example, for research questions “a” and “d” were done concurrently using each of the methods selected. The mixed-method research is not new to IS research as it has been used, for example, in understanding technology acceptance (Wu, 2012) (Wu, 2012). The different specific research methods are discussed for each research objective.

4.5 Delphi Technique for exploring Mid-level Management IS Competencies

The first research gap for this study is the need to explore the nature of mid-level management IS competencies (Kappelman et al., 2016) in SSA, a region beyond North America (Cummings & Janicki, 2020). To fill this gap, objective “a”, which is to explore mid-level management IS competencies in SSA must be met. The main method, the Delphi technique for identifying and arriving at a consensus list and a category of current and future IS competencies, is presented.

4.5.1 The Delphi Technique

Different methods have been used to study IS job skills. The dominant method has been the analysis of IS/IT job advertisements, either in paper-based newspapers (Todd et al., 1995) or job postings on online portals (Burns et al., 2018; Harris, Greer, Morris, & Clark, 2012; Litecky et al., 2012; Parker & Brown, 2019). This method is unobtrusive and provides the researcher with a large set of data to analyse, especially with data mining tools available. However, the job postings analysis approach has been criticised for an overemphasis on technical skills than non-technical skills, since employers hardly emphasise soft skills in job position advertisements (Litecky et al., 2012) and there had been a call to gather job skills data from IT or IS Managers (Gallagher et al., 2008).

Moreover, with the analysis of the job posting method, it is difficult to predict future skills which are relevant for preparing IS graduates and providing training intervention for existing IS professionals. Other studies have also been based on traditional questionnaire-based surveys of IS professionals or IT managers (Jones et al., 2016; Lee et al., 2002; Lu et al., 1999). Whilst surveys provide a more focused approach to gathering the IS job skills from

those who matter, it is difficult to obtain further information for clarity after the initial data has been analysed. At the same time, interviews have been used to elicit IS job skills from Senior IS Managers (Cheney et al., 1990). The challenge of such a method is the resource involved to interview a large number of IS professionals scattered in different geographical areas and from different industries. There is therefore the need for a method that adequately addresses these gaps.

To meet the first research objective, of this study, data from experts across different countries in the sub-regions of SSA, with extensive experience in the IS competencies required by organisations, currently and in the future, was required. The Delphi technique (Dalkey & Helmer, 1963), is hence, adopted to elicit relevant IS job skills, now and in the future, to organisations in SSA. The approach involves the use of 2 or more rounds of questionnaires, administered to a purposefully selected panel of experts that are anonymous to each other (Ponelis, 2019) to achieve consensus or an acceptable level of concordance on a phenomenon of study. Its use, especially for technology forecasting (Barnes & Mattsson, 2016; Hirschhorn, 2019), makes it well suited for this study that seeks to also identify future competencies. The Delphi technique is not a new approach in IS research. A recent literature review, of its use in IS research published in top IS journals by Alarabiat and Ramos (2019), demonstrates its value in qualitative exploratory research or in identifying constructs or variables for further quantitative research. For example, in IS research, the Delphi technique has been used, among others, for understanding cloud computing issues (El-gazzar et al., 2016), identifying criteria and which of them were most important for the selection of cloud providers (M. Lang et al., 2016, 2018), predicting future applications of blockchain in business and management (White, 2016), understanding organisational social media risk (Gangi et al., 2017), eliciting insights on the role of cultural values for digital transformation

(Hartl & Hess, 2017) and understanding current and future issues in collaborative consumption (Barnes & Mattsson, 2016).

Job skills studies in different fields, such as marketing (Yeoh, 2019) have also benefitted from the Delphi technique. However, the Delphi technique has been used, in a few computing-related job skills studies, such as identifying the critical skills for managing IT Projects from IT project management experts (Keil et al., 2013) and investigating the main tasks, necessary skills, and the implementation of the offshore coordinator's role to facilitate knowledge transfer in information systems (IS) offshoring (Strasser et al., 2018). However, the Delphi technique has not been used in identifying current and future IS competencies required by organisations in SSA. Again, Delphi studies have been used traditionally for forecasting or ranking the importance of identified factors (Yeoh, 2019). This study utilises the Delphi technique to identify and rank IS skills, currently and in the future, relevant to organisations in SSA. It is therefore both a ranking and forecasting type Delphi study.

4.5.2 Selection of Delphi Panel

For a successful Delphi study, it is important to collect data from experts who are personally involved in hiring IS professionals from the middle to senior levels and must come from diverse or varying backgrounds (Yeoh, 2019). This according to Hirschhorn (2019) is done in two steps: identifying the relevant expertise and identifying individuals with this expertise. In this study, the experts were employers who employ IS professionals to fill middle or senior management positions, IS Consultants or Senior IS managers in a strategic management position of organisations who influence the hiring of IS professionals to fill middle or senior management positions. These experts came from different geographical regions of SSA (Ghana, Ethiopia, Nigeria and South Africa) and industries (Education, Telecommunication,

Media, IT, Consulting and Banking) to ensure expert diversity. The choice of the specific experts, and their countries, have been through convenience and ease of access. These experts had no less than 10 years of experience as a senior manager or CIO or equivalent. There is however no consensus, in literature, on the number of experts required in a Delphi study and whether the size of the panel influences the reliability or validity of the final consensus (Alarabiat & Ramos, 2019). Researchers argue that the knowledge and experience of the experts are more relevant to a Delphi study than their numbers, with panel sizes ranging between 7 and 76 in IS research that used the Delphi technique (Alarabiat & Ramos, 2019). Consequently, a panel of 56 experts, purposefully selected that met the criteria were constituted from different regions in SSA. The characteristics of the experts used in this study are summarised in Table 4.2.

Table 4.2: Characteristics of Delphi Panel Experts

Industry			Country				Total
			Ethiopia	Ghana	Nigeria	South Africa	
Education	Position	IS/IT Manager	2	2	1	1	6
		IS/IT Lecturer	0	1	0	0	1
		HR Manager	1	0	1	1	3
	Total	3	3	2	2	10	
Telecommunication	Position	IS/IT Manager	1	3	4	1	9
		CEO/Owner Managers	0	0	0	1	1
	Total	1	3	4	2	10	
Media	Position	IS/IT Manager	1	3	0	3	7
		Project Manager	0	0	1	0	1
		CEO/Owner Managers	0	0	2	0	2
	Total	1	3	3	3	10	
IT	Position	IS/IT Manager	1	1	1	2	5
		IS/IT Lecturer	0	0	1	0	1

		CEO/Owner Managers	0	1	0	0	1
		Systems Analyst	1	1	0	0	2
	Total		2	3	2	2	9
Consulting	Position	CEO/Owner Managers	1	1	2	0	4
		Systems Analyst	1	2	1	2	6
	Total		2	3	3	2	10
Banking	Position	IS/IT Manager		3	2	2	7
	Total			3	2	2	7
TOTAL			9	15	14	13	56

Source: Author

4.5.3 Delphi Technique Data Collection and Analysis Method

Data was collected in 3 rounds from the experts using a modified brainstorming, narrowing down and ranking process (Schmidt et al., 2001). Unlike (Yeoh, 2019), there were no seeded lists, since not many studies have identified IS competencies at the middle or senior level management or equivalent. Hence, for the first brainstorming round, to elicit current and future competencies required from IS professionals in middle management positions, experts were asked to answer two open questions:

1. *“What are the competencies (knowledge, skills and attitudes) expected from IS professionals in a middle management position?”*
2. *“Which of the competencies (knowledge, skills and attitudes) in question 1 or any other will still be relevant in the next 5 years?”*

The experts were not expected to rank these competencies or put them in any particular order at this stage. The researcher collated the competencies from the experts, de-duplicated and categorised the same competency mentions to obtain two sets of IS competency lists, one for current competencies and the other for future competencies. The researcher validated the lists

with the experts for the panel to have the same understanding of each item. The resulting lists together with additional lists from the MSIS 2016 were sent to the experts, who were asked to rank the competencies on a Likert scale of 1(less important) to 10(most important). At this stage, the narrowing and ranking phases run concurrently to shorten the number of rounds and reduce experts' participation fatigue (Okoli & Pawlowski, 2004). The mean level of importance for each competency was obtained and ranked. Competencies with a mean level of importance less than 4.00 were dropped and the new lists of important competencies were sent back to the experts to rank again using the same Likert scale. At each round and for each list, the mean importance of the mentioned competencies is obtained. Furthermore, to assess the level of expert consensus on the importance of the competencies, Kendall's coefficient of concordance, W , was calculated for each round until we obtained a strong consensus (W greater than or equal to 0.70) or the values level off in concurrent rounds (Schmidt et al., 2001). This process is illustrated in Figure 4.2. The result is a list of consensus competencies, required currently and in the future, of mid-level management IS professionals. The final list was then abstracted to an appropriate aggregate IS competency dimension.

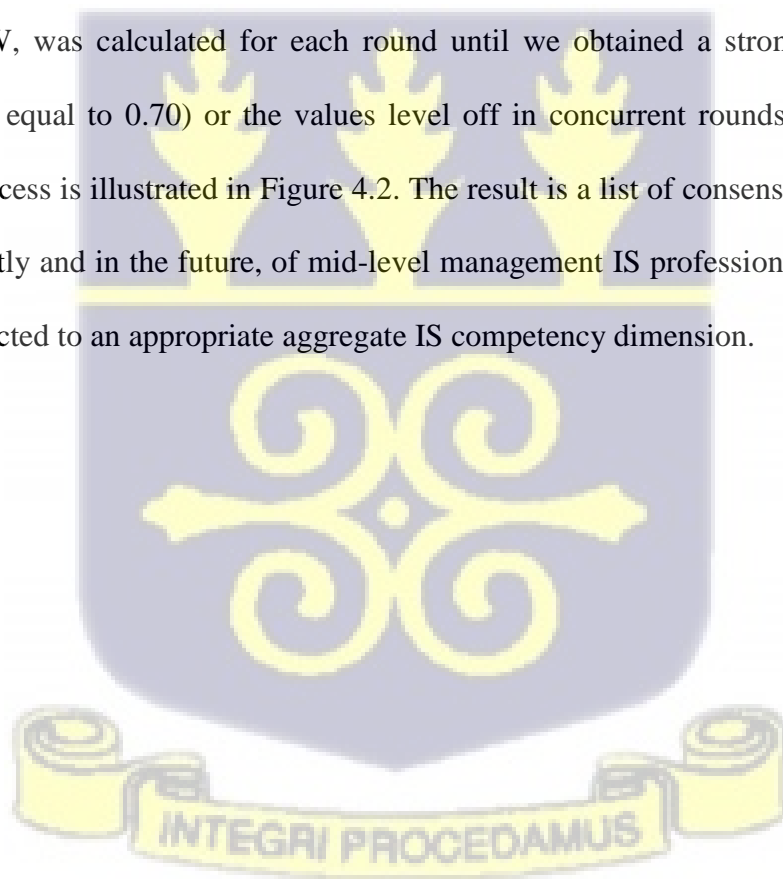
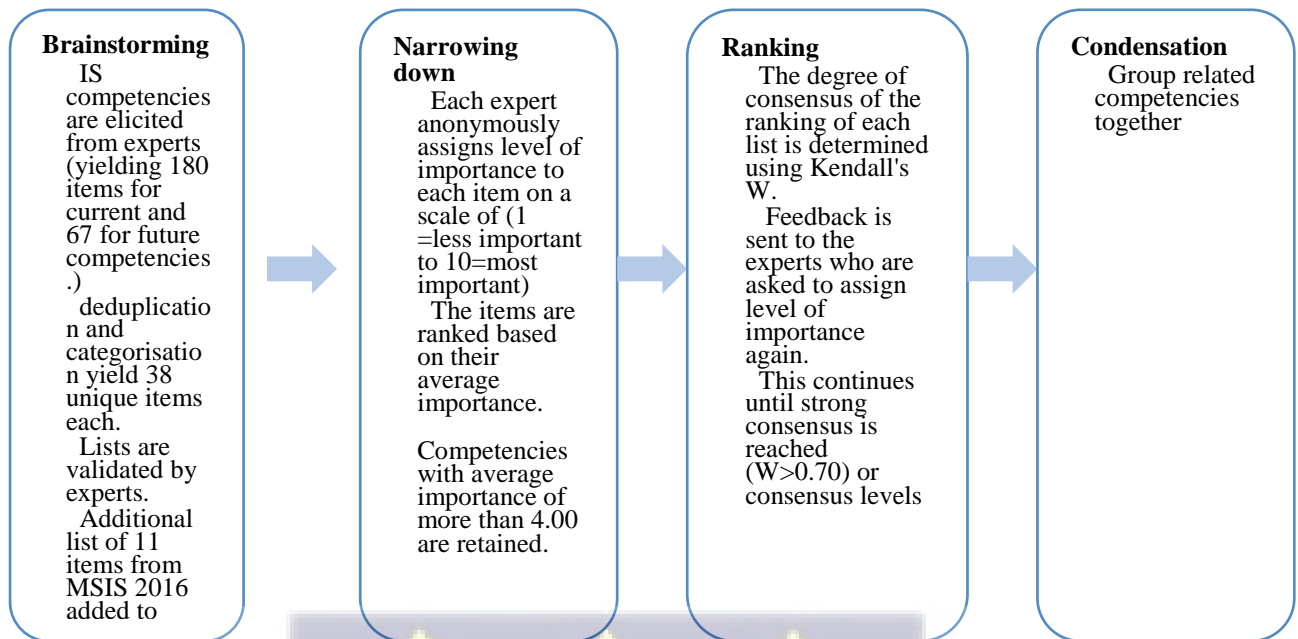


Figure 4.2: Description of the Delphi Process used in this study



Source: Author (Adapted from Schmidt et al., 2001)

4.6 Institutional Logics and Graduate IS Curriculum Responsiveness in SSA: The Case Study Approach

The second research gap espoused the need to capture the influences of institutional logics and agent responses on graduate IS curricula innovation in SSA. In addition, the third gap required an explanation of the consequences of institutional logics influence on graduate IS curricula responsiveness. In meeting research objectives “b” and “c” to fill these research gaps respectively, a case study approach was adopted. This method is described in the next sections.

4.6.1 The Case Study Approach

According to Yin (2003), case studies are preferred when the research is focused more on contemporary issues, the researcher has no control over actual behavioural events and the research questions are mainly of “why” and “how” types. “What” type of questions of

exploratory or explanatory nature, may also be studied with a case study (Saunders et al., 2009). Graduate IS curriculum innovation is a contemporary phenomenon, especially in the context of Sub-Saharan Africa. Furthermore, it is difficult for the researcher to control the structures (such as the institutions) and mechanisms (such as agent actions) that generate the events influencing a graduate IS curriculum innovation. Moreover, careful observation of the research questions indicates explanatory “what” and “how” type of research questions which makes a case study an appropriate research strategy. The nature of the chosen research study, therefore, satisfies Yin’s criteria for a case study strategy.

Despite the plethora of case study studies in other popular IS research paradigms like interpretivism (Avgerou, 2000; Effah, 2014), there is promising emergence of successful case study research within the CR paradigm (Boateng, 2016; Wynn & Williams, 2012). Consequently, a single case study approach to a research design is adopted to understand how institutional logics influences contextually relevant and industry-responsive graduate IS curricula in SSA.

4.6.2 Case Study Design

The goal of CR research is an explanation of the causal mechanisms of a phenomenon as against the prediction of the phenomena (Wynn & Williams, 2012). This study looks at a description of causal explanations of how contextually relevant graduate IS curriculum is developed through the lens of the conceptual framework developed in chapter three. Moreover, the selected case itself is of interest to the researcher and not only plays an instrumental role, hence an intrinsic case study design (Dobson, 2001) is appropriate and chosen for this design. The conceptual framework guided other stages of the case design such as data collection and analysis from the case identified. There is a lack of research on

graduate IS curriculum innovations, especially in Sub-Saharan Africa (Kevor et al., 2020; Yang, 2012), hence the single case study research presents an opportunity to explore the phenomenon deeper in its natural settings.

In this study, the primary unit of analysis is the graduate IS programme selected in a faith-based private university in Sub-Saharan Africa. The focus of the enquiry was guided by the conceptual framework previously presented in chapter 3. This is important to steer the research within feasible boundaries (Yin, 2003).

4.6.3 Selection of the Case University

In the selection of a university in SSA for the case study, randomness does not become a necessary or relevant condition (Saunders et al., 2009; Yin, 2003). This study seeks to explain how institutional logics influences the development of graduate IS curricula in SSA. A two-stage selection procedure was adopted to select the case. For the first stage, a set of criteria based on theory was developed. The institutional logics perspective literature suggests the study of hybrid organisations (Pache & Thornton, 2020). This study was therefore interested in hybrid universities (with multiple co-existing logics such as state, market, corporation, religion, etc) and possibly hybrid sub-organisation like a hybrid ICT department and how the multiple logics influence practices such as IS curriculum innovation in SSA. The study also expected that the IS department of the university had gone through the development of a graduate IS programme. The next stage is a strategic selection of a case from the first stage. The nature of institutions and institutionalised practices requires the researcher to be close to or immersed in the phenomena to be better able to capture often taken-for-granted practices which participants may sometimes find difficult to describe (Reay

& Jones, 2016). It was, therefore, important to consider the proximity of the researcher to the case.

Consequently, a faith-based private university in Ghana (anonymised as PUni) whose ICT department had developed a graduate IS programme in 2017 to be contextually relevant and respond to the needs of the industry was selected. This case was selected because it could help capture institutional logics that was enacted during the development of the graduate IS curriculum and also understand how such curricula respond to the needs of individuals, industry and society in SSA. As a lecturer in the IT department for over 15 years, the researcher was close to the phenomena to better capture institutional practices, however, the research was also aware of his personal biases, so as to not influence observations and other forms of data collected from the field. The characteristics of the case selected are summarised in Table 4.3. For ethical reasons, PUni, a pseudonym has been used instead of the real name.

Table 4.3: Selected Case Characteristics

Name of the University	PUni
Country	Ghana
Name of Programme	MSc Information Systems
Department	ICT
Faculty	Science and Technology
Ownership	Private/ Faith-based
Year of Establishment	2003
Chatter Status	Not Chattered
Affiliation	University of Ghana

Source: Author

4.6.4 Case Data Collection

To understand how institutional logics influence graduate IS curricula in SSA, and the consequences on curriculum responsiveness, data was collected from multiple sources. In line with Wynn and Williams (2012) approach, the following data collection procedure was adopted:

1. Data were obtained through multiple sources. First, a simple tracer study of PUni alumni was conducted to identify their employability, academic progression, their perceptions about the important competencies that they have acquired in and out of school. This was essential to understand what competencies prospective students, who may want to progress academically, bring into the graduate IS programme to support the decision to develop bridge courses to level the knowledge of all students. A simple questionnaire in Google form was sent via the social media (WhatsApp) platform of the Alumni of undergraduate ICT students (see Appendix 6).
2. Second, semi-structured interviews, guided by the conceptual framework, of Faculty members who have led or been part of IS curriculum change within the department over the years in the case university and members of the Curriculum Committee were conducted to obtain other perspectives on IS curriculum change (see Appendix 4).
3. Additional interviews were done with an Assistant Registrar of the programme mentor institution and administrators from two regulatory authorities (now merged as Ghana Tertiary Education Council (GTEC)): The National Accreditation Board (NAB) and the National Council for Tertiary Education (NCTE) (see Appendix 4).
4. All interviews were taped and later transcribed. The transcripts were given back to the interviewees to assess if their views were accurately captured.

5. An observation of the curriculum processes was also done sometimes with the opportunity of the researcher to sit in curriculum development and accreditation meetings to clarify issues.
6. Secondary data sources such as previous accreditation letters/reports and examiners reports, student handbooks, university status, minutes of curriculum meetings, information on websites of NAB and NCTE, and other reports were also analysed.
7. Finally, a focus group discussion of undergraduate ICT students (Business Information Systems option) on their motivations for their choice of study and their expectations was conducted. See Appendix 5 for the question guide for the focused group discussion.

It was expected that such multiple sources of data were relevant to enable triangulation and comparison of various perspectives. A summary of the data collection schedule is presented in Table 4.4.

Table 4.4: Summary of Data Collection Methods, Subjects and Timelines

Data Collection methods	Subject	Date and Duration
Interview	Head of ICT Department	7th August 2019
	Curriculum Committee Chairman	11 th August 2019
	Dean of Faculty of Science and Technology	21 st August 2019
	Vice President, Academic	3rd September 2019
	Institution and Programme Accreditation Administrator	30 th September 2019
	3 members of the Curriculum Committee	11 October 2018
	Head of School of Business and Economics	19 October 2019
	Head of Department of Health and Physician Assistantship	27th October 2019
	An official of NAB	1st November 2019

	An official of NCTE	15th November 2019
	Head of the Computer science department of Mentor Institution	17th November 2019
	Head of ICT Department	22nd November 2019
	Curriculum Committee Chairman	1st December 2019
Focus Group Discussions	Undergraduate ICT Students	21 st January 2020
Survey	Thirty-five (35) IS Graduates	8th October 2019
Artefact examination	ICT Department website, University status, staff and student handbooks, minutes of Curriculum committee meetings. Previous accreditation correspondences.	1st February 2018
participant Observation	3 meetings of the Curriculum committee	8th March 2019
	Meeting with representatives of Affiliate Institution	12 February 2019
	ICT Departmental meeting	20 July 2019

Source: Author

4.6.5 CR Mode of Analysis

Some methods have been proposed for analysis in CR case study research. For example, Mingers et al. (2013) describe a methodology for CR research known as the DREI where the researcher first *describes* the events of interest, *retroduces* explanatory mechanisms, *eliminates* false hypotheses and finally *identifies* the correct mechanisms. This assumes that the analysis started with the selection of the research problem to be solved. Hence a *resolution* of the, often complex, problem into simpler ones is the next activity. The strength of CR is its acknowledgement of reality as complex (Mcavoy & Butler, 2017). Graduate IS curriculum innovation is a complex phenomenon consisting of many heterogeneous stakeholders and being shaped by multiple and often conflicting institutional logics. In this study, the phenomenon has been decomposed into four different objectives. After the resolution of the complex problem into components and describing the events, the next step is

to *re-describe* the event of interest to explain the phenomena. This is often done by using an existing theoretical lens (Archer et al., 2013) to describe the empirical situation (Inuwa & Ononiwu, 2019) focusing on relevant causal events (Armstrong, 2019). For this study, graduate IS curriculum innovation has been explained through the lens of institutional logics and curriculum responsiveness capturing the relevant institutional logics and curriculum responsiveness dimensions. This is followed by the *retroduction* step. Retroduction involves making propositions of candidate causal explanations for the event observed (Wynn & Williams, 2012). The next stage involves *eliminating* non-plausible explanations and *identifying* and *modifying* theory where possible (Armstrong, 2019). For example, the existing theory had not paid attention to academic curricula being technologically and disruptively responsive. These dimensions of curriculum responsiveness have become relevant for computing programmes, especially in this time of a global pandemic.

4.6.6 Case Data Analysis

The second research objective attempts to capture institutional logics which influences graduate IS curricula in SSA. Graduate IS curriculum innovation in SSA was conceptualised as a decision-making process by individual faculties and departments on what courses should be offered to students to acquire the necessary IS competencies. It was, therefore, important to understand what assumptions, beliefs and material practices shape this decision-making process.

Reay and Jones (2016) describes three ways of qualitatively capturing institutional logics by observing patterns which are sets of beliefs and symbols expressed in verbal, visual or written discourse, norms seen in behaviours and activities and material practices that are recognisable and associated with the particular institutional logic or logics. First, the deductive approach is

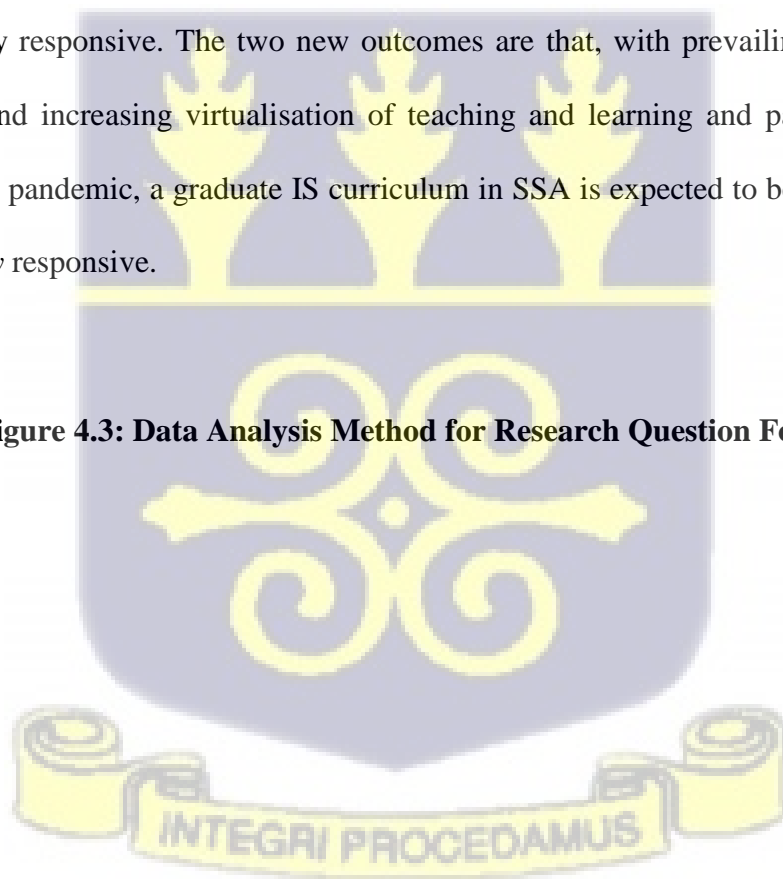
underpinned by a positivist philosophy. In this case, patterns can be observed and counted from large data with those with high occurrence being revealed through analytic techniques. The second approach is pattern matching underpinned by a worldview that the social world is constructed and understanding occurs with iteration between prior theories and current empirical data. In this case, patterns are identified from literature (for example, ideal type institutional logics), and then the data or findings are compared to the ideal types. The third, the inductive approach, focuses on raw data and uses a bottom-up approach to identify patterns that can be compared with extant literature. This approach is underpinned by interpretivism philosophy. In this study, we are interested in focusing on both theory and data to be able to both confirm ideal institutional logic types from literature and also the possibility of revealing new logic types. This loose pattern matching approach combines both the pattern matching method and the pattern deducing methods and aligns with the critical realism philosophy.

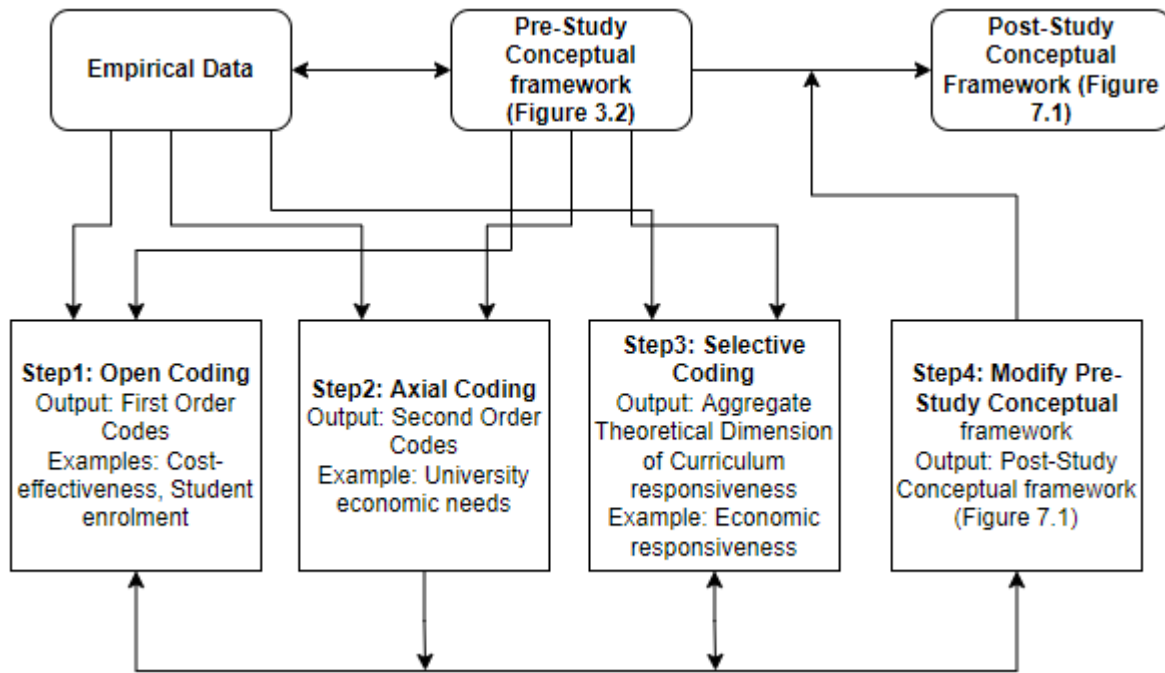
The third objective is to explain the consequences of institutional logic influence on graduate IS curricula responsiveness. Towards meeting this objective, the respondents (Table 4.4) were asked, centrally, about their expectations of the graduate IS programme. The qualitative data gathered were analysed using standard procedures illustrated in figure 4.3. First of all, first-order codes were identified through open coding of interview data into discrete states (Tzeng, 2017). These codes provide descriptive labels of the expectations from the graduate IS programme. For example, conditions such as “employability”, “entrepreneurship”, “promotion”, “cost-effectiveness” and “increased enrolment” were among others, identified from the interview responses. Second, axial codes were generated through a recursive and inductive process of combining similar first-order codes into a higher abstract second-order construct (Tzeng, 2017). For example, first-order codes such as “cost-effectiveness” and

“increased enrolment” were combined into “university economic needs” whilst “employability”, “entrepreneurship” and “promotion” were combined into “Student economic needs”. Finally, selective codes are generated by selecting aggregate theoretical dimensions that appropriately describe combinations of the second-order constructs (Tzeng, 2017). In this case, for example, “university economic needs” and “student economic needs” were aggregated into economic responsiveness. The full details are illustrated in Figures 6.1, 6.2 and 6.3.

In this study, two new aggregate theoretical dimensions were discovered. First, a graduate curriculum in information systems is expected to be socio-economical, pedagogical, cultural and disciplinary responsive. The two new outcomes are that, with prevailing and emerging technologies, and increasing virtualisation of teaching and learning and particularly in the face of a global pandemic, a graduate IS curriculum in SSA is expected to be *technologically* and *disruptively* responsive.

Figure 4.3: Data Analysis Method for Research Question Four





Source: Author (adapted from Tzeng, 2017)

4.6.7 Accuracy, Credibility, Confirmability and Internal Validity

In addition, accuracy, credibility, confirm-ability and internal validity of the case findings were ensured through the following strategies adopted from Creswell (2009, p. 192):

- Building coherent justification through mixed methods triangulation of different data sources to corroborate evidence. For example, the overriding institutional logic of the market influencing graduate IS curricula in SSA was confirmed by different data sources. Also, different conceptual models contributing to understanding the complex phenomenon of IS curriculum innovations were used. For example, the institutional logics perspective and curriculum responsiveness were extended to graduate IS curriculum innovation.
- Member-checking of final accounts of graduate IS curriculum innovation processes in the case provided by participants was done.

- Reporting negative or disconfirming findings alongside the reoccurring themes including verification through follow-up interviews and rewriting the case to accommodate those discrepancies. For example, the graduate IS curriculum in a private university in SSA, with resource challenges may not be socially responsive as expected since these private university's curriculum decisions are highly motivated by economic factors in pursuit of funds to support the cost-effective implementation of the curriculum.
- Presenting findings using rich thick descriptions to enable transferability of findings into new IS departments or graduate IS programmes that share similar characteristics as those described in the cases.
- Clarifying the bias of the researcher through the axiological assumptions. In this case, it has been stated clearly that the study is value-laden due to the researcher's background (MSc. ICT management and lecturer in the IS discipline for more than 15 years) which may have influenced the analysis.
- Peer debriefing with research supervisors and colleague PhD students to review the processes and the draft findings of the cases, eliciting honest feedback by encouraging them to ask hard questions. According to Creswell (2009), peers act as “devil’s advocates” for the study.
- External auditing with senior IS scholars through feedback comments from papers submitted to IS book chapters, journals and conferences.

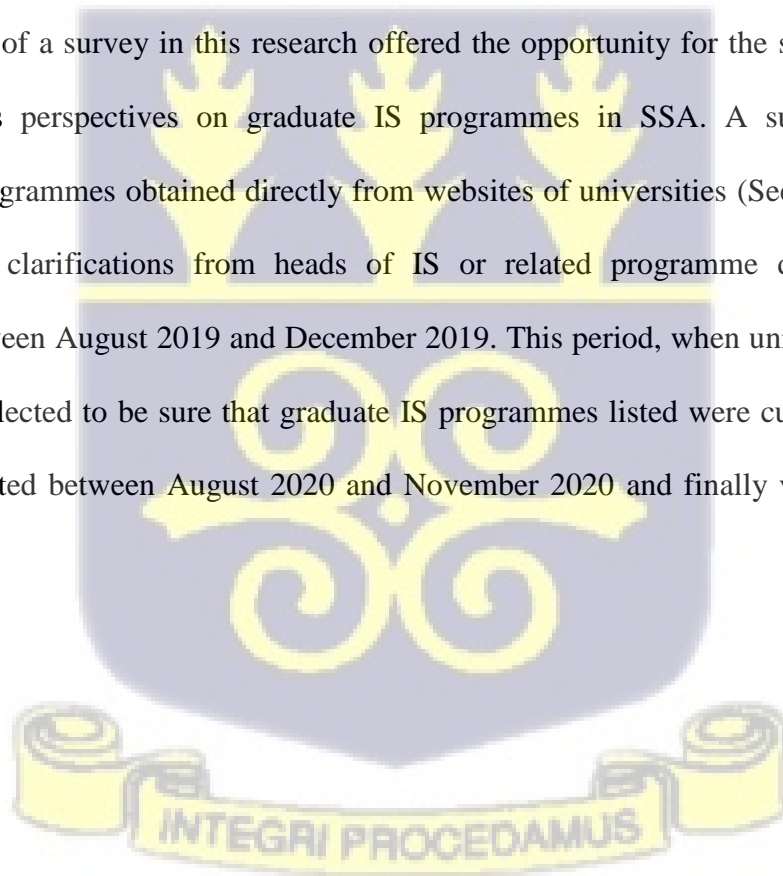
4.7 Survey Method for Exploring Graduate IS Programmes in SSA

The fourth research objective is to explore the nature of graduate IS programme course offerings in SSA. This is related to the fourth research gap, which is the need to explore the

nature of graduate IS programmes course offerings in SSA. The next sections explain the methods used in meeting this objective.

4.7.1 Survey Method

The survey method was adopted to answer the research objective “d” which seeks to explore the nature of graduate IS programme offerings in SSA. The relevance of surveys in IS research has been echoed in the literature (see Pinsonneault & Kraemer, 1993). At best, a survey as a research strategy is “well-suited for answering questions about what, how much and how many, and to a greater extent than is commonly understood, questions about how and why” and the phenomenon must be in its natural setting (Pinsonneault & Kraemer, 1993). Hence, the use of a survey in this research offered the opportunity for the study to examine the universities perspectives on graduate IS programmes in SSA. A survey of current graduate IS programmes obtained directly from websites of universities (See Figure 4.4) and through email clarifications from heads of IS or related programme departments was conducted between August 2019 and December 2019. This period, when universities were in session, was selected to be sure that graduate IS programmes listed were current and active. This was repeated between August 2020 and November 2020 and finally validated in June 2022.



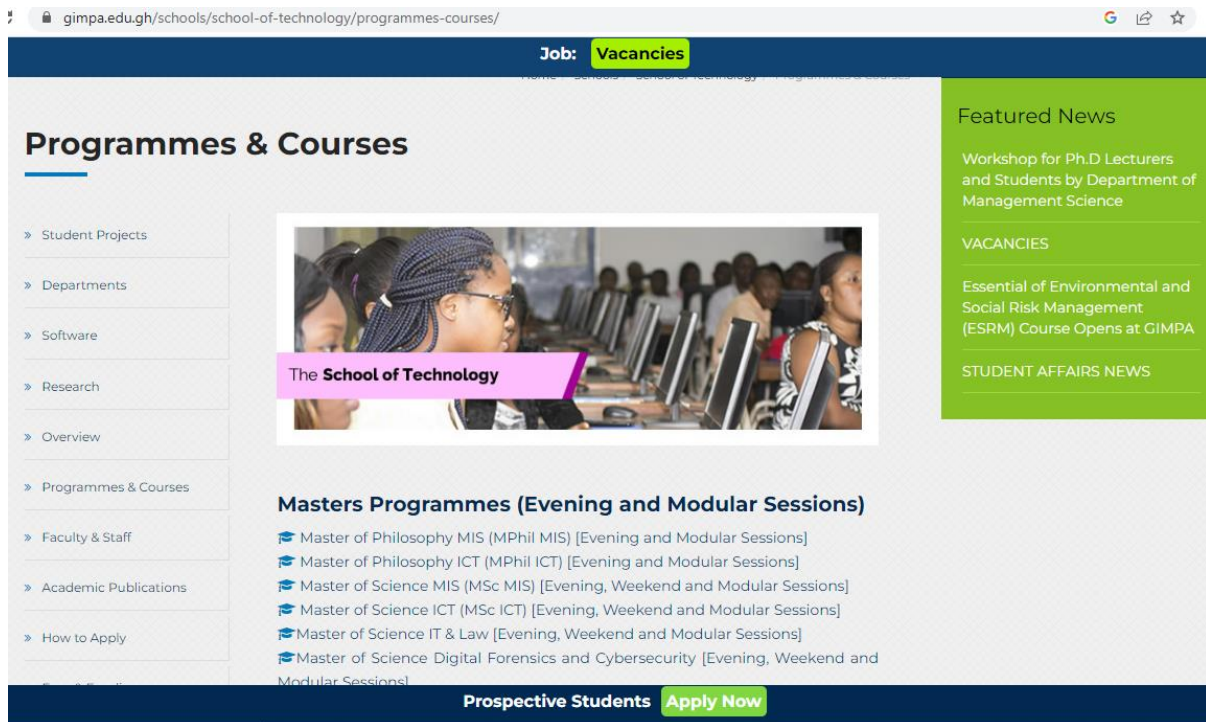


Figure 4.4: An Example of Website where graduate IS programmes data were collected

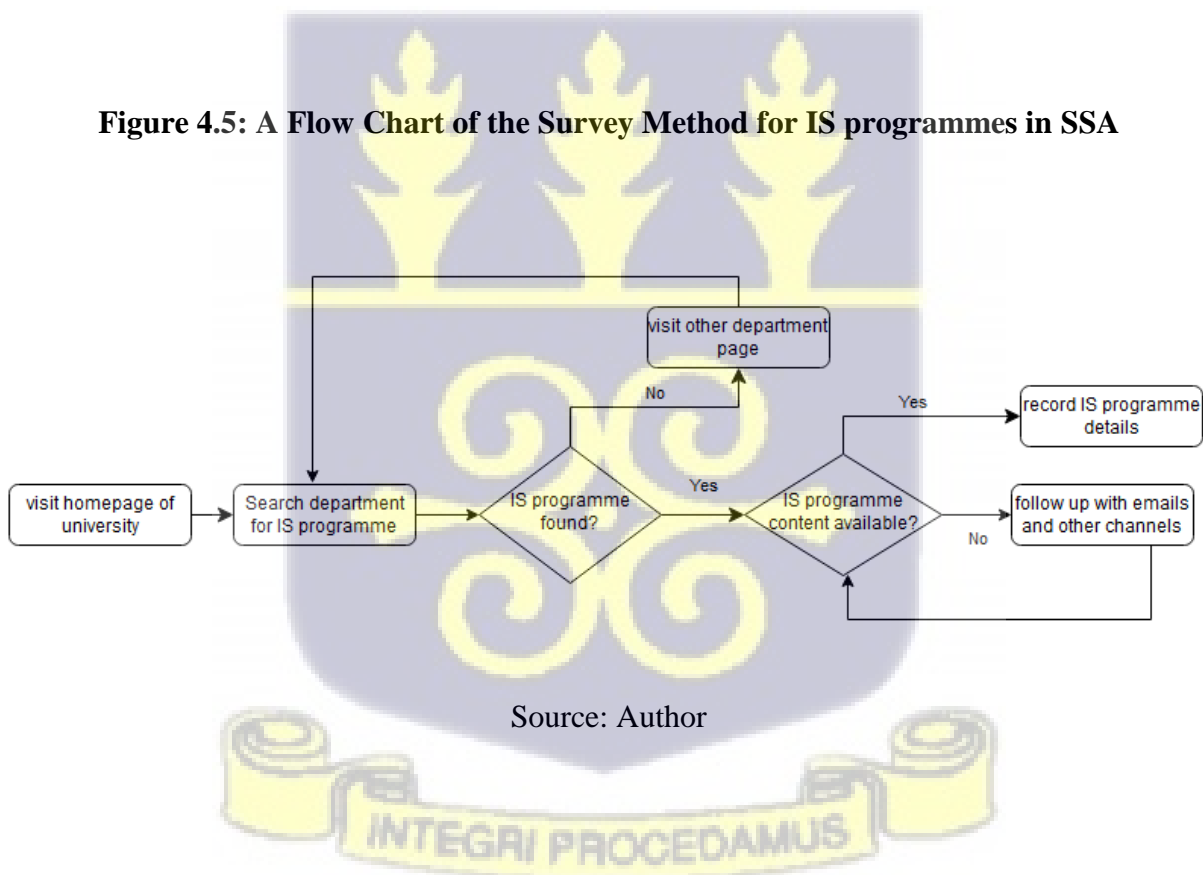
4.7.2 Sampling the Graduate IS programmes

The main focus of this research objective is to explore the nature of IS graduate offerings and to map them to the MSIS2016 competency categories. To do this, it is important to obtain as many data points as possible. Statistical sampling may therefore not be appropriate in this case. The study was therefore interested in all universities in SSA which offered graduate IS programmes. Unlike the US where most IS academic programmes are related through some professional accreditation (see Andoh-Baidoo et al., 2014; Bohler et al., 2020), not many graduate IS programmes in SSA have professional accreditation. There was, therefore, the need to consult a credible university ranking website to have a comparable list of universities in SSA from which to collect the data.

Based on the web ranking of universities in SSA (Webometrics, 2020), the top 200 universities were selected. The websites of these universities were observed and analysed.

This direct survey approach (see Andoh-Baidoo et al., 2014; Apigian & Gambill, 2014; Bell et al., 2013; Yang, 2012) presents an opportunity to focus on a “specific programme of interest, allowing systematic collection and quantification of data” (Bell et al., 2013, p. 77). However, from a preliminary study of the nature of graduate IS programmes in SSA, Kevor et al. (2020) reported low records due to incomplete data from the website. Consequently, in this study, follow-up emails were sent to departmental heads or responsible persons for additional information or clarification. Even though the study targeted the top 200 universities in SSA, the search did not yield any further results after the 121st-ranked university. We however continued until the 200th university, where a point of saturation was assumed. This process is illustrated in Figure 4.5.

Figure 4.5: A Flow Chart of the Survey Method for IS programmes in SSA



4.7.3 Data Collection from Graduate IS programmes

Course catalogues, yearbooks, rule books, brochures and documents, giving details of programmes, were considered. Since there is no uniformity in the name of IS academic programmes globally (Brooks et al., 2016; Kevor et al., 2020; Pierson et al., 2008; Stefanidis

et al., 2012), it was important to analyse course descriptions to be sure the selected IS programme is within the scope of IS as espoused in Avison & Elliot (2001). Graduate IS programme details, such as the name of programme, IS programme type, faculty where the IS department sits, programme duration, entry requirements (especially the requirement for statistics or analytical module in an undergraduate degree), individual courses offered as a core or an option and the presence of bridge modules were recorded. Since MSIS 2016 does not specify courses, there was no prior list of available courses to aid in the gathering of data.

4.7.4 Method of Data Analysis of the nature of Graduate IS programme course offerings

First of all, a crosstab analysis was done to identify relationships and general characteristics of graduate IS programmes in SSA. Second, a popularity analysis of individual courses and the competency contribution was performed. This required coding of individual courses and clustering courses based on their description. Courses with different names but similar content were coded and given a common name. For example, IT strategic planning, IS planning and implementation, strategic IS planning and business strategy for a digital world are only different in nomenclature but have similar course contents contributing to competencies in ISSC, specifically ISSG. These similar courses are assigned a common code and a common name in the final analysis. Similarly, a research dissertation and a long essay or thesis were similar modules contributing to the same IFC. Whilst each course had a code, the coding scheme was done according to competency areas (ISSC, IFC, and DPC) and different codes for the specific ISSC, IFC and DPC.

In addition, IS bridge courses and whether courses were core or option were also identified and coded differently. Composite courses were also broken down and coded differently. For example, a graduate IS module called “project and change management” were separated into

“project management” and “change management”. These courses were taught separately in other IS programmes and also contribute to different IS competency categories. In this case, project management contributes to competencies in ISMO while change management contributes to competencies in IOCE. Based on the frequency of occurrence of each course, a popularity ranking is presented. The share of contribution of the identified courses to each competency area and specific competency categories is also presented.

4.8 Ethical Considerations

To ensure high standards of the research outcomes, clearance was sought from the University of Ghana Ethical clearance committee. This involved a comprehensive evaluation of the research proposals and methods to ensure it met high ethical standards. Moreover, in the collection of data, none of the participants, interviewed or observed, participated under coercion. Appropriate access was sought from the case university and each participant voluntarily consenting to take part in the study. For example, in the Delphi study, some experts did not participate beyond the first round of brainstorming and there was no compulsion on them to take part in subsequent rounds. Furthermore, the data collected were presented and analysed using standard procedures and principles as described in sections 4.5, 4.6 and 4.7. In addition, the findings were accurately reported without biases.

4.9 Summary of Chapter

This chapter looked at the research methodology adopted for this study. The critical realism paradigm is explained as the philosophical basis for this study. The chapter also presented the Mixed-Method Research approach as a natural consequence of the CR paradigm and then explained the three methods adopted for each research question. The survey method, which

was adopted for the study of graduate IS course offerings in SSA, was discussed. Furthermore, the Delphi technique, which was adopted for exploring current and future mid-level management IS competencies required by organisations in SSA, was also discussed. And finally, the single case study method, which was adopted to explain how institutional logics influence graduate IS curricula and its consequences on curriculum responsiveness.



CHAPTER FIVE

THE CONTEXT OF GRADUATE INFORMATION SYSTEMS CURRICULUM

INNOVATION IN SUB-SAHARAN AFRICA

5.1 Overview of Chapter

In the previous chapter, the critical realism paradigm has been presented as the philosophical underpinning of this study. The mixed method research approach was also presented as the appropriate methodology for this study. This chapter presents the results of the data collected for each research question, including a description of the case study. First, the results of the Delphi study of mid-level management IS competencies are presented. This is followed by a case description of a graduate IS curriculum innovation in a faith-based private university in Ghana. This chapter concludes with a presentation of the results of the survey of graduate IS programmes in SSA.

5.2 The Nature of Mid-level Management IS Competencies in SSA

The second research question is: What is the nature of mid-level management IS competencies relevant to organisations in Sub-Saharan Africa? In this section, the results from a Delphi study of IS competencies required of IS professionals at mid-level management positions in organisations in SSA are presented.

5.2.1 Brainstorming Current and Future IS Competencies in SSA (Round 1)

In the brainstorming stage, the Delphi experts were asked two questions. To understand the nature of current mid-level management IS competencies the first question was: “*What are the competencies (knowledge, skills and attitudes) expected from IS professionals in a middle*

management position? For this question, an initial total of 781 IS competencies were suggested by the Delphi experts. These competencies were categorised and de-duplicated to obtain 38 distinct competencies. These were validated by the experts to ensure a shared understanding of the various competencies. Whilst some of these competencies were specified by the MSIS 2016, others were in the MSIS 2016 that were not mentioned by the experts. Consequently, additional 11 competencies selected from the broad categories of the MSIS 2016 were included to obtain an overall list of 49 competencies (See Table 5.1). At this stage, the competencies are unranked and in no particular order.

Table 5.1: Consolidated list of Current required Competencies from the experts and the MSIS2016

No	Competency	Experts	MSIS 2016
	Individual Foundational Competencies		
1	Ability to be flexible and adapt to change	<input type="checkbox"/>	
2	Ability to communicate verbally	<input type="checkbox"/>	<input type="checkbox"/>
3	Ability to think critically	<input type="checkbox"/>	<input type="checkbox"/>
4	Ability to collaborate and work with Teams	<input type="checkbox"/>	<input type="checkbox"/>
5	Ability to demonstrate competencies in mathematics and statistics		<input type="checkbox"/>
6	Ability to demonstrate competencies in personal productivity software skills (like office applications)	<input type="checkbox"/>	
7	Ability to resolve conflicts	<input type="checkbox"/>	
8	Ability to demonstrate creativity		<input type="checkbox"/>
9	Ability to demonstrate curiosity and enthusiasm for the role	<input type="checkbox"/>	
10	Ability to effectively make decisions independently	<input type="checkbox"/>	
11	Ability to demonstrate high emotional intelligence	<input type="checkbox"/>	
12	Ability to demonstrate intercultural competencies		<input type="checkbox"/>
13	Ability to demonstrate interpersonal skills	<input type="checkbox"/>	
14	Ability to demonstrate leadership skills	<input type="checkbox"/>	<input type="checkbox"/>
15	Ability to negotiate with internal and external stakeholders	<input type="checkbox"/>	<input type="checkbox"/>
16	Ability to solve problems independently	<input type="checkbox"/>	<input type="checkbox"/>
17	Ability to demonstrate time management skills	<input type="checkbox"/>	
18	Ability to demonstrate written communication skills	<input type="checkbox"/>	<input type="checkbox"/>
	Information Systems Specific Competencies		

19	Ability to manage and implement information systems security and risks	<input type="checkbox"/>	<input type="checkbox"/>
20	Ability to manage business relationships	<input type="checkbox"/>	
21	Ability to think business before technology	<input type="checkbox"/>	
22	Ability to conduct IS strategic analysis, and develop plans		<input type="checkbox"/>
23	Ability to consider the ethical implications of IS decisions		<input type="checkbox"/>
24	Ability to contribute to organisational development and change management	<input type="checkbox"/>	<input type="checkbox"/>
25	Ability to deploy a new system to organisational use		<input type="checkbox"/>
26	Ability to design and implement a data warehouse using a contemporary architectural solution		<input type="checkbox"/>
27	Ability to design data communication networks, data centres and server solutions	<input type="checkbox"/>	<input type="checkbox"/>
28	Ability to design infrastructure solutions using external service provider(s) (cloud computing)	<input type="checkbox"/>	<input type="checkbox"/>
29	Ability to design, build and maintain an enterprise architecture and use it to influence organisational improvement projects	<input type="checkbox"/>	<input type="checkbox"/>
30	Ability to develop and implement IS/IT policies	<input type="checkbox"/>	
31	Ability to identify and exploit digital entrepreneurial opportunities		<input type="checkbox"/>
32	Ability to implement and manage quality IS audit processes	<input type="checkbox"/>	<input type="checkbox"/>
33	Ability to implement relevant IT governance frameworks such as COBIT, ITIL etc.	<input type="checkbox"/>	<input type="checkbox"/>
34	Ability to install, integrate and test a new application		<input type="checkbox"/>
35	Ability to maintain compliance with legislation, regulations and standards and ensure sustainability.		<input type="checkbox"/>
36	Ability to make a financial case for IS		<input type="checkbox"/>
37	Ability to manage IS development processes including external systems development resources and contemporary practices such as DevOps	<input type="checkbox"/>	<input type="checkbox"/>
38	Ability to manage IS projects and programs and apply broadly used project management tools and techniques	<input type="checkbox"/>	<input type="checkbox"/>
39	Ability to manage IS service production and sourcing models	<input type="checkbox"/>	<input type="checkbox"/>
40	Ability to manage the IS function and IS human capital	<input type="checkbox"/>	<input type="checkbox"/>
41	Ability to monitor technology trends and innovate by exploiting an emerging method or technology	<input type="checkbox"/>	<input type="checkbox"/>
42	Ability to negotiate contracts and manage infrastructure vendors		<input type="checkbox"/>
43	Ability to plan, design and implement a systems solution using a modern programming language	<input type="checkbox"/>	<input type="checkbox"/>
44	Ability to select and implement a database management technology based on the needs of a domain	<input type="checkbox"/>	<input type="checkbox"/>
45	Ability to select and use appropriate data analytics methods	<input type="checkbox"/>	<input type="checkbox"/>
	Specialised Information Systems Competencies		
46	Ability to leverage the benefits of blockchain technologies to the organisation	<input type="checkbox"/>	
47	Ability to leverage the benefits of machine learning to the organisation	<input type="checkbox"/>	

48	Ability to understand and apply AI to specific domains for organisational benefit	<input type="checkbox"/>	
The Domain of Practice Competencies			
49	Ability to demonstrate an understanding of a specific business or domain processes	<input type="checkbox"/>	<input type="checkbox"/>

Source: Author

In all, there were 18 IFCs, 27 ISSCs, 3 specialised IS competencies and a suggestion of the need for a DPC, suggested as current mid-level management IS competencies required by organisations in SSA. These lists were given back to the experts for the next phase of the Delphi study- Ranking.

For the second question which focuses on forecasting future IS competencies, the Delphi experts were asked: *“Which of the IS competencies (knowledge, skills and attitudes) in question 1, or any other, will still be relevant in the next 5 years?”* In all, 510 competencies were submitted by the experts as relevant in future. Next, duplicates were removed and others combined into single competencies. These de-duplication and re-combinations resulted in 23 distinct competencies. This was given back to the experts with notes for them to have a shared meaning of the various competencies. Areas of misunderstanding were clarified. Again, like for the current IS competencies list, 11 additional competencies drawn from literature (MSIS 2016) were added to aggregate 34 candidate IS competencies relevant to organisations in SSA, in future. This list, consisting of 10 IFCs, 18 ISSCs, 1 suggestion of a DPC and 5 Specialised IS Competencies, in no particular order, is presented in Table 5.2.

Table 5.2: Initial List of future IS Competencies relevant to Organisations in SSA

No	Competency	Experts	MSIS 2016
Individual Foundational Competencies			
1	Ability to be flexible and adapt to change	<input type="checkbox"/>	

No	Competency	Experts	MSIS 2016
2	Ability to collaborate and work with teams	<input type="checkbox"/>	<input type="checkbox"/>
3	Ability to demonstrate leadership skills	<input type="checkbox"/>	<input type="checkbox"/>
4	Ability to effectively make decisions independently	<input type="checkbox"/>	
5	Ability to think critically	<input type="checkbox"/>	
6	Ability to demonstrate problem-solving skills	<input type="checkbox"/>	
7	Ability to negotiate with internal and external stakeholders	<input type="checkbox"/>	<input type="checkbox"/>
8	Ability to demonstrate intercultural competencies		<input type="checkbox"/>
9	Ability to demonstrate competencies in mathematics and statistics		<input type="checkbox"/>
10	Ability to demonstrate creativity		<input type="checkbox"/>
	Information Systems Specific Competencies		
11	Ability to design infrastructure solutions using an external service provider(s) (cloud computing)	<input type="checkbox"/>	<input type="checkbox"/>
12	Ability to manage and implement information systems security and risks	<input type="checkbox"/>	<input type="checkbox"/>
13	Ability to select and use appropriate data analytics and visualisation methods	<input type="checkbox"/>	<input type="checkbox"/>
14	Ability to plan, design and implement a systems solution using a modern programming language	<input type="checkbox"/>	<input type="checkbox"/>
15	Ability to negotiate contracts and manage infrastructure vendors	<input type="checkbox"/>	<input type="checkbox"/>
16	Ability to implement relevant IT governance frameworks such as COBIT, ITIL etc.	<input type="checkbox"/>	<input type="checkbox"/>
17	Ability to understand internet governance and its implication in the domain of practice	<input type="checkbox"/>	
18	Ability to manage organisational IS-related crisis	<input type="checkbox"/>	
19	Ability to manage system development using contemporary paradigms such as DevOps	<input type="checkbox"/>	
20	Ability to manage IS projects and programs and apply broadly used project management tools and techniques	<input type="checkbox"/>	
21	Ability to maintain compliance with legislation regulations and standards and ensure sustainability		<input type="checkbox"/>
22	Ability to make a financial case for IS		<input type="checkbox"/>
23	Ability to install, integrate and test new applications		<input type="checkbox"/>
24	Ability to identify and exploit digital entrepreneurial opportunities		<input type="checkbox"/>
25	Ability to conduct IS strategic analysis and planning		<input type="checkbox"/>
26	Ability to consider the ethical implications of IS decisions		<input type="checkbox"/>
27	Ability to deploy a new system to organisational use		<input type="checkbox"/>
28	Ability to design and implement a data warehouse using a contemporary architectural solution		<input type="checkbox"/>
	The Domain of Practice Competencies		
29	Ability to demonstrate an understanding of the specific business or domain processes	<input type="checkbox"/>	<input type="checkbox"/>
	Specialised Information Systems Competencies		
30	Ability to understand and apply AI to specific domains for organisational benefit	<input type="checkbox"/>	
31	Ability to understand and apply Machine Learning to specific domains for organisational benefit	<input type="checkbox"/>	

No	Competency	Experts	MSIS 2016
32	Ability to understand and apply blockchain technologies to specific domains for organisational benefit	<input type="checkbox"/>	
33	Ability to understand, design and implement Internet of Things (IoT) solutions in a domain of practice	<input type="checkbox"/>	
34	Ability to understand and apply edge computing	<input type="checkbox"/>	

Source: Author

5.2.2 Narrowing Down the Lists Through Ranking and Building Consensus among Experts (Rounds 2 and 3)

For both the list of current and future IS competencies, the experts were asked to assign a value, on a Likert scale of 1 (Less important) to 10 (Very important), to each competency item based on how important they feel those competencies are to organisations in SSA. The mean importance of each competency was thus determined and the lists were ranked based on the means. Following other studies, competencies with a mean level of importance less than 4.0 were rejected from the list. Table 5.3 displays the current IS competencies with their means and standard deviations.

Table 5.3: Means and Standard Deviations for Current IS Competencies required by Organisations in SSA

No	Competency	Mean	Std. Deviation
1	Ability to collaborate and work with teams	9.46	0.602
2	Ability to be flexible and adapt to change	9.41	0.532
3	Ability to monitor technology trends and innovate by exploiting an emerging method or technology	9.23	0.934
4	Ability to effectively make decisions	9.20	0.773
5	Ability to manage IS projects and programs and apply broadly used project management tools and techniques	9.18	0.917
6	Ability to demonstrate an understanding of the specific business or domain processes	9.13	0.833
7	Ability to demonstrate leadership skills	9.00	0.953
8	Ability to demonstrate creativity	9.00	0.915
9	Ability to think critically	8.93	0.931
10	Ability to manage IS development processes including external	8.93	0.951

No	Competency	Mean	Std. Deviation
	systems development resources and contemporary practices such as DevOps		
11	Ability to solve problems independently	8.91	0.959
12	Ability to develop and implement IS/IT policies	8.88	1.129
13	Ability to negotiate with internal and external stakeholders	8.84	0.93
14	Ability to effectively manage time	8.79	1.091
15	Ability to make a financial case for IS investments	8.68	1.011
16	Ability to conduct IS strategic analysis and planning	8.64	1.227
17	Ability to negotiate contracts and manage infrastructure vendors	8.62	1.054
18	Ability to identify and exploit digital entrepreneurial opportunities	8.57	1.024
19	Ability to contribute to organisational development and change management	8.55	0.952
20	Ability to implement relevant IT governance frameworks such as COBIT, ITIL etc.	8.54	1.144
21	Ability to implement and manage quality IS audit processes	8.52	1.009
22	Ability to maintain compliance with legislation, regulations and standards and ensure sustainability	8.5	1.009
23	Ability to demonstrate curiosity and enthusiasm for the role	8.46	0.972
24	Ability to manage business relationships	8.46	1.061
25	Ability to manage the deployment of a new system to organisational use	8.41	1.108
26	Ability to manage IS service production and sourcing models	8.38	1.019
27	Ability to communicate orally	8.37	1.071
28	Ability to demonstrate interpersonal skills	8.36	1.182
29	Ability to design infrastructure solutions using external service provider(s) (cloud computing)	8.27	1.382
30	Ability to manage the IS function and IS human capital	8.27	1.286
31	Ability to consider the ethical implications of IS decisions	8.18	1.064
32	Ability to manage and implement information systems security and risks	8.16	1.276
33	Ability to design, build and maintain an enterprise architecture and use it to influence organisational improvement projects	8.13	1.294
34	Ability to demonstrate written communication skills through reports	8.12	1.402
35	Ability to select and use appropriate data analytics and visualisation methods	8.11	1.186
36	Ability to resolve conflicts in a unit and the organisation	8.11	0.705
37	Ability to demonstrate intercultural competencies	8.04	1.321
38	Ability to design data communication networks, data centres and server solutions	7.87	1.322
39	Ability to design and implement a data warehouse using a contemporary architectural solution	7.79	1.124
40	Ability to install, integrate and test a new application	7.73	1.314
41	Ability to think business before technology	7.59	1.125
42	Ability to demonstrate high emotional intelligence	7.59	1.005
43	Ability to select and implement a database management technology based on the needs of a domain	7.48	1.584
44	Ability to plan, design and implement a systems solution using a modern programming language	7.25	1.455
45	Ability to understand and apply Artificial Intelligence to specific domains for organisational benefit	7.07	1.277
46	Ability to leverage the benefits of Machine Learning to the	6.75	1.392

No	Competency	Mean	Std. Deviation
	organisation		
47	Ability to leverage the benefits of blockchain technology to the organisation	6.64	1.407
48	Ability to demonstrate competencies in personal productivity software skills (like office applications)	6.41	1.092
49	Ability to demonstrate competencies in mathematics and statistics	5.79	1.202

Source: Author

From Table 5.3, experts rated competencies in collaboration and teamwork, ability to be flexible and adapt to change, competency in monitoring technology trends and being innovative by exploiting an emerging method or technology, ability to effectively make decisions and manage IS projects and programs, and apply broadly used project management tools and techniques as the top five current IS competencies required by organisations. On the other hand, very specialised and technology-oriented competencies in understanding and leveraging the benefits of “artificial intelligence”, “machine learning” and “blockchain technologies” to an organisation as well as competencies in personal productivity software, mathematics and statistics were rated very low. However, all the competencies were rated above 4.00 and were therefore considered for the next phase.

Furthermore, a non-parametric test to determine the mean ranks and Kendall’s coefficient of concordance (W) for this round was determined. There was a low inter-rater agreement among experts for the current IS competency rankings (W=0.344). Hence, a second round of the ranking was necessary. The initial first-round ranking outcomes were shared with the experts to rethink their original ratings for the competencies. In addition, based on the ordered competencies given back to the experts through their private emails, they were required to consider their initial position on the importance of the competencies. This is the first opportunity for experts to observe, in aggregate, the importance other experts place on

the various competencies. Experts are then expected to reflect and again, on a Likert scale of 1(Less important) to 10 (Most important), indicate the importance of each of the competencies. The data was collected and prepared for analysis. Again, a non-parametric test was performed on the data to determine the mean ranking and Kendall’s coefficient of concordance. The results of both the first and second rankings of the IS competencies with their corresponding Kendall’s coefficient of concordance are presented in Table 5.4. At this point, an appreciable level of agreement among the experts ($W= 0.693$) was obtained. Further, the ranking was halted to avoid participation fatigue since a number of the experts were not showing interest to continue participation in the study.

Table 5.4: Initial and Final Ranking of Current IS Competencies by Experts in SSA

No	Competency	Competency Category	Round 2 Mean Rank	Round 1 Mean Rank	No
1	Ability to collaborate and work with teams	IFC	42.84	38.72	1
2	Ability to monitor technology trends and innovate by exploiting an emerging method or technology	ISSC	42.01	35.82	3
3	Ability to be flexible and adapt to change	IFC	40.88	37.87	2
4	Ability to manage IS projects and programs and apply broadly used project management tools and techniques	ISSC	40.66	34.72	5
5	Ability to demonstrate an understanding of the specific business or domain processes	DPC	39.65	33.94	6
6	Ability to effectively make Decisions	IFC	39.13	35.37	4
7	Ability to negotiate with internal and external stakeholders	IFC	39.07	31.19	13
8	Ability to demonstrate leadership skills	IFC	37.33	32.89	7
9	Ability to develop and implement IS/IT policies	ISSC	37.14	31.89	10
10	Ability to manage and implement information systems security and risks	ISSC	35.52	24.08	31
11	Ability to identify and exploit digital entrepreneurial opportunities	ISSC	35.49	27.44	18
12	Ability to demonstrate creativity	IFC	34.92	32.83	8
13	Ability to solve problems independently	IFC	34.27	32.38	9
14	Ability to think critically	IFC	34.14	31.43	12
15	Ability to make a financial case for IS	ISSC	34.08	28.4	17

	investments				
16	Ability to manage IS development processes including external systems development resources and contemporary practices such as DevOps	ISSC	34.07	31.63	11
17	Ability to effectively manage time	IFC	33.10	30.92	14
18	Ability to conduct IS strategic analysis and planning	ISSC	32.09	29.03	15
19	Ability to negotiate contracts and manage infrastructure vendors	ISSC	31.62	28.79	16
20	Ability to implement and manage quality IS audit processes	ISSC	29.93	26.71	21
21	Ability to demonstrate curiosity and enthusiasm for the role	IFC	29.3	26.39	23
22	Ability to manage business relationships	ISSC	29.17	26.38	24
23	Ability to implement relevant IT governance framework such as COBIT, ITIL etc.	ISSC	29.17	27.23	19
24	Ability to maintain compliance with legislation, regulations and standards and ensuring sustainability	ISSC	29.17	26.78	20
25	Ability to manage IS service production and sourcing models	ISSC	28.05	24.80	29
26	Ability to contribute to organisational development and change management	ISSC	27.96	26.66	22
27	Ability to manage the IS function and IS human capital	ISSC	25.92	24.49	30
28	Ability to communicate orally	IFC	22.55	25.79	25
29	Ability to design infrastructure solutions using external service provider(s) (cloud computing)	ISSC	21.63	25.44	28
30	Ability to demonstrate high emotional intelligence	IFC	20.69	16.69	42
31	Ability to manage the deployment of a new system to organisational use	ISSC	20.43	25.72	26
32	Ability to design and implement a data warehouse using a contemporary architectural solution	ISSC	19.46	19.46	39
33	Ability to select and use appropriate data analytics and visualisation methods	ISSC	16.27	22.72	35
34	Ability to consider ethical implications of IS decisions	ISSC	15.25	23.24	33
35	Ability to resolve conflicts in a unit and the organisation	IFC	14.77	21.68	37
36	Ability to select and implement a database management technology based on the needs of a domain	ISSC	14.62	17.66	41
37	Ability to install, integrate and test a new application	ISSC	14.12	18.79	40
38	Ability to demonstrate interpersonal skills	IFC	14.04	25.54	27
39	Ability to design data communication networks, data centres and server solutions	ISSC	13.36	20.21	38
40	Ability to design, build and maintain an	ISSC	12.82	23.11	34

	enterprise architecture and use it to influence organisational improvement projects				
41	Ability to demonstrate written communication skills through reports	IFC	12.5	23.39	32
42	Ability to demonstrate intercultural competencies	IFC	12.28	22.29	36
43	Ability to think business before technology	ISSC	12.03	16.38	43
44	Ability to plan, design and implement a systems solution using a modern programming language	ISSC	8.38	15.22	44
45	Ability to understand and apply Artificial Intelligence to specific domains for organisational benefit	SISC	8.21	11.76	45
46	Ability to demonstrate competencies in personal productivity software skills (like office applications)	IFC	7.79	6.99	48
47	Ability to leverage the benefits of Machine Learning to the organisation	SISC	6.88	10.35	46
48	Ability to leverage the benefits of blockchain technologies to the organisation	SISC	5.98	9.92	47
49	Ability to demonstrate competencies in mathematics and statistics	IFC	4.25	3.88	49
	Kendall's w		0.343	0.693	

Source: Author

With an acceptable level of agreement among experts ($W=0.693$), the list in Table 5.4, in order of importance, represents current IS competencies required from mid-level management IS professionals, by organisations in SSA. Among the top 10 competencies include 5 individual foundational competencies such as the ability to collaborate and work with teams, the ability to be flexible and adapt to change, the ability to effectively make decisions, the ability to negotiate with internal and external stakeholders and the ability to demonstrate leadership. The top 10 also includes 4 Specific IS competencies such as “monitor technology trends and Innovate by exploiting an emerging method or technology”, “ability to manage IS projects and programs and apply broadly used project management tools and techniques”, and “ability to develop and implement IS/IT policies” and “Ability to manage and implement information systems security and risks”. Besides, the ability to demonstrate an understanding of the specific business or domain processes, a domain of

practice competency, was rated among the top ten current IS competencies required of IS managers, by organisations in SSA. At the same time, specialised IS competencies like leveraging AI, machine learning, and blockchain technologies were among the least 5 rated competencies. In sum, IS managers in SSA are expected to have a hybrid of very technical information systems, non-technical domain-specific and individual foundation competencies.

Similar to the list of current IS competencies, a descriptive analysis was performed on the data collected for future competencies, to find the means and standard deviations of each competency. The result, of the means and standard deviations of information systems competencies of mid-level management IS professionals, relevant to organisations in SSA in the future, is displayed in Table 5.5.

Table 5.5: Means and Standard Deviations of Future IS Competencies required by Organisations in SSA

No	Competency	Mean	Std. Deviation
1	Ability to collaborate and work with teams	9.48	0.687
2	Ability to demonstrate an understanding of the specific business or domain processes	9.36	0.672
3	Ability to manage IS projects and programs and apply broadly used project management tools and techniques	9.36	0.724
4	Ability to demonstrate leadership skills	9.29	0.780
5	Ability to identify and exploit digital entrepreneurial opportunities	9.25	0.958
6	Ability to solve problems independently	9.20	0.840
7	Ability to negotiate with internal and external stakeholders	9.14	0.962
8	Ability to think critically	9.05	0.818
9	Ability to manage and implement information systems security and risks	8.93	0.912
10	Ability to effectively make decisions independently	8.64	0.819
11	Ability to demonstrate creativity	8.61	0.947
12	Ability to maintain compliance with legislation regulations and standards and ensure sustainability	8.61	1.260
13	Ability to manage organisational IS-related crisis	8.59	1.058
14	Ability to select and use appropriate data analytics and visualisation methods	8.59	0.987
15	Ability to negotiate contracts and manage infrastructure vendors	8.55	1.205
16	Ability to understand Internet Governance and its implication on the	8.52	1.095

	domain of practice		
17	Ability to make a financial case for IS	8.41	1.058
18	Ability to manage system development using contemporary paradigms such as DevOps	8.38	1.153
19	Ability to understand and apply edge computing	8.30	1.159
20	Ability to demonstrate intercultural competencies	8.29	1.358
21	Ability to implement relevant IT governance frameworks such as COBIT, ITIL etc.	8.29	1.171
22	Ability to understand, design and implement Internet of Things (IoT) solutions in a domain of practice	8.20	1.341
23	Ability to be flexible and adapt to change	8.00	1.388
24	Ability to consider the ethical implications of IS decisions	7.91	1.283
25	Ability to conduct IS strategic analysis and planning	7.89	1.155
26	Ability to design infrastructure solutions using external service provider(s) (cloud computing)	7.79	1.202
27	Ability to understand and apply Machine Learning to specific domains for organisational benefit	7.64	1.407
28	Ability to understand and apply AI to specific domains for organisational benefit	7.59	1.304
29	Ability to plan, design and implement a systems solution using a modern programming language	7.52	1.525
30	Ability to understand and apply blockchain technologies to specific domains for organisational benefit	7.36	1.407
31	Ability to deploy a new system to organisational use	5.82	1.491
32	Ability to Install, integrate and test a new application	3.32	1.491
33	Ability to design and implement a data warehouse using a contemporary architectural solution	2.48	1.501
34	Ability to demonstrate competencies in mathematics and statistics	2.46	1.334

Source: Author

From Table 5.5, three competencies have mean levels of importance less than 4.00 and hence were dropped for the next phase of the study. These were “ability to install, integrate and test new application”, “ability to design and implement a data warehouse using a contemporary architecture solution” and “ability to demonstrate competencies in mathematics and statistics”. These competencies are likely to be retired by organisations in SSA in future. Moreover, a non-parametric test was used to analyse the data to determine the mean rank for each competency and Kendall’s coefficient of concordance, W among the experts. The result, of the initial mean ranks (for round 2) and the final mean ranks (round 3) of the various IS competencies, is shown in Table 5.6.

Table 5.6: Initial and Final Ranking of Future IS Competencies required by Organisations in SSA

No	Competency	Competency Category	Mean Rank (Round 3)	Mean Rank (Round 2)	No
1	Ability to be flexible and adapt to change	IFC	25.74	26.64	1
2	Ability to collaborate and work with teams	IFC	25.71	26.21	2
3	Ability to demonstrate an understanding of the specific business or domain processes	DPC	24.89	25.23	5
4	Ability to negotiate with internal and external stakeholders	IFC	24.64	23.88	8
5	Ability to identify and exploit digital entrepreneurial opportunities	ISSC	24.46	25.34	4
6	Ability to manage IS projects and programs and apply broadly used project management tools and techniques	ISSC	23.54	25.36	3
7	Ability to demonstrate leadership skills	IFC	23.40	24.74	6
8	Ability to solve problems independently	IFC	22.59	24.48	7
9	Ability to effectively make decisions independently	IFC	22.58	19.69	12
10	Ability to manage and implement information systems security and risks	ISSC	22.11	21.71	10
11	Ability to think critically	IFC	21.81	22.99	9
12	Ability to maintain compliance with legislation regulations and standards and ensure sustainability	ISSC	21.76	19.79	11
13	Ability to select and use appropriate data analytics and visualisation methods	ISSC	21.29	19.20	15
14	Ability to demonstrate creativity	IFC	21.17	19.38	13
15	Ability to manage organisational IS related crisis	ISSC	20.64	19.12	16
16	Ability to negotiate contracts and manage infrastructure vendors	ISSC	18.79	19.21	14
17	Ability to make a financial case for IS	ISSC	16.62	17.92	19
18	Ability to manage system development using contemporary paradigms such as DevOps	ISSC	14.13	17.88	20
19	Ability to demonstrate intercultural competencies	IFC	11.50	17.92	18
20	Ability to consider the ethical implications of IS decisions	ISSC	9.63	15.66	24
21	Ability to implement relevant IT governance framework such as COBIT, ITIL etc.	ISSC	8.96	16.88	23
22	Ability to understand and apply edge computing	ISSC	8.75	17.21	21
23	Ability to understand, design, and implement Internet of Things (IoT)	SISC	8.66	17.18	22

	solutions in a domain of practice				
24	Ability to design infrastructure solutions using external service provider(s) (cloud computing)	ISSC	8.59	13.89	26
25	Ability to conduct IS strategic analysis and planning	ISSC	7.87	14.95	25
26	Ability to plan, design and implement a systems solution using a modern programming language	ISSC	7.53	13.32	27
27	Ability to understand and apply AI to specific domains for organisational benefit	SISC	6.74	12.88	29
28	Ability to deploy a new system to organisational use	ISSC	6.44	6.48	31
29	Ability to understand and apply Machine Learning to specific domains for organisational benefit	SISC	5.76	13.11	28
30	Ability to understand Internet Governance and its implication on the domain of practice	SISC	5.04	18.70	17
31	Ability to understand and apply blockchain technologies to specific domains for organisational benefit	SISC	4.67	11.60	30
	Kendall's W		0.75	0.496	

Source: Author

From Table 5.6, the top five IS competencies that would be relevant to mid-level IS managers in the future are “ability to be flexible and adapt to change”, “ability to collaborate and work with teams”, and “demonstrate an understanding of the specific business or domain processes” “ability to negotiate with internal and external stakeholders” and “identify and exploit digital entrepreneurial opportunities”. On the other hand, the following five competencies were rated as less important: “ability to understand and apply AI to specific domains for organisational benefit”, “ability to deploy a new system to organisational use”, and “ability to understand Internet Governance and its implication on the domain of practice” and “ability to understand and apply blockchain technologies to specific domains for organisational benefit”.

5.3 A Case of a Graduate Information Systems Curriculum Innovation in SSA

In the previous section, a Delphi study of mid-level IS competencies in SSA has been presented. In response to the second and third research gaps, which espouse the need to explain the influence of institutional logics and agent actions on graduate IS curriculum innovation, and their consequences on curriculum responsiveness, this section presents a case description of the events that explicates the context within which a graduate IS programme is developed in SSA. The special case of hybrid, faith-based private university, their resource challenges, and dependencies are presented. Furthermore, the background of the case university and department where a graduate IS programme was developed, and the unique factors that may have shaped the development of the graduate IS programme is presented.

5.3.1 Institutional Context of PUni's MSIS Programme

PUni (anonymised) was established in 2003 as a faith-based private university in Ghana, in response to the “challenge presented by the high demand for student admission in Ghanaian universities (low access), the perceived lowering of academic standards and the erosion of moral and ethical values in the Ghanaian society” (PUni, 2020). Hence PUni, is envisaged as “a university of excellence which blends modern trends that reflect Christian principles.” PUni operates to meet such a broad vision by specifically designing and implementing “relevant academic and professional programmes of teaching, research, and outreach for a global population within the context of Christian ethics that produce holistic human development”. According to PUni, the following, among others, related to the design and implementation of relevant academic programmes shall be considered (PUni, 2020):

- In determining the courses and programmes to be taught, emphasis shall be placed on a balanced pursuit of the humanities, the basic sciences, and *the development,*

application, and management of technology, which are of special relevance to the needs and aspirations of Ghanaians in particular, and others in general.

- Students shall be taught methods of *critical and independent thought* while being made aware that they have a responsibility to use their education for the service of the church, country, and humanity.
- That as far as practicable the students shall be trained to be *innovative and entrepreneurial* to enhance *socio-economic development*.
- That the university shall operationalise *local, regional and global needs* assessment as the basis for practical and multi-disciplinary outreach programmes in the local and regional communities.
- That the university shall inculcate in the student *ethical, moral, and intellectual values* that manifest in *courage, discipline, fair play, self-motivation, and respect for the dignity of an honest life*.

Currently, the university is organised into six faculties: Faculty of Science and Technology (FoST), School of Business and Economics (SoBE), Faculty of Development Studies (FoDs), Faculty of Health and Medical Science (FoHMS), Faculty of Education (FoE) and the Faculty of Law (FoL). There is also a graduate school that coordinates all graduate programmes from the faculties. These faculties are physically located on different campuses of the university in three different regions of Ghana. The ICT department that owns the MSIS programme resides in the Faculty of Science and Technology. This is in line with subsequent findings in Section 5.4 that in SSA, graduate IS programmes are mostly in emerging hybrid faculties.

Furthermore, the university is governed by a hierarchy of administrative structures. Academic departments are managed by heads of departments. A department may provide a number of academic programmes, independently or jointly, with other academic departments. Academic programmes consist of several related courses or modules which are managed by individual lecturers. Related departments are organised into faculties that are managed by deans. The deans report to the various campus academic committees which are headed by a vice president. The vice president reports to the university senate, who in the absence of the university council takes academic and administrative decisions. Moreover, the Senate is headed by the university president who reports to the university council. The university council is the highest decision-making body of the university with a membership composed of industry, the university community, alumni, and the church. The church's interest is highly represented by appointing the council chairman and other members. This academic structure is supported by other departments such as the library, registrar, finance, audit, and corporate planning and information systems.

5.3.2 Evolving an Undergraduate ICT programme in PUni

The ICT Department in the Faculty of Science and Technology of PUni presents a case of a hybrid department (sub-organisation) in an organisational field. The department has been in existence since the establishment of the private university in 2003. Most of the initial faculty of the ICT department was drafted from the computer science department of the Kwame Nkrumah University of Science and Technology (KNUST), a flagship university in technology programmes in Ghana. These initial computer science faculty helped to develop the first four-year undergraduate degree ICT curriculum. It could be observed that the KNUST computer science faculty imposed its norms and beliefs of what an ICT course should be on the ICT programme in PUCG and hence almost imitated the four-year

undergraduate computer science degree programme being run in KNUST. As commented by a lecturer in the department:

“Until recently, our ICT programme looked more of a contemporary computer science programme. We were teaching all the hard-core computer science courses like compiler design, computer architecture, operating systems, data structures and algorithms and these were mandatory for all students.”

Over time, several factors moved the original ICT curriculum from the “hard” computer science to a “softer” IS programme despite maintaining the name of the programme as ICT. According to a lecturer, and a former Head of Department:

“I recruited new lecturers to replace the mostly part-time lecturers from KNUST. These new lecturers were of diverse backgrounds such as electrical and electronic engineering, computer science, information systems and management information systems from different universities in different countries.”

The background of these new lecturers reflected in the next curriculum change with strong favour for management-oriented courses over more technical-oriented courses. For example, one lecturer, who was also recruited at that time, admitted that where he received his post-graduate training had a great influence on his curriculum decisions. Moreover, the ICT programme enrolment had started dwindling as compared to other programmes in PUCG such as the business administration programme. As recollected by the same lecturer:

“ICT student enrolment went low to the point that the ICT department almost became a cost centre being supported with funds from other departments. This brought pressure from

management to either downsize or find innovative ways of bringing the enrolment numbers up”

Eventually, some of the lecturers left the university and the department “caged” not to replace them. The courses taught by these lecturers were dropped and replaced with courses that could be taught by lecturers from other departments, especially from the business school without impairing the overarching objectives of the programme. By dropping some “hard” courses, and replacing them with “soft” management courses, there was a need to review admission requirements. The requirements to get certain grades in certain courses to qualify to be enrolled as an ICT student were reviewed to accommodate students of different backgrounds. As the Head of the department remarked:

“Now, students with a grade C pass in core maths without elective maths could qualify to read ICT. The department became open to students with science, business, arts and even visual arts background”.

The “hard” ICT programme then evolved into a soft IS-like ICT programme. Successive curriculum changes have maintained the current IS nature of the PUni ICT programme. Furthermore, some of the core courses specified in IS 2010 are present and persistent in the PUCG ICT programme. Despite being aware of the existence of the AIS, none of the lecturers was a member. Some of them were however members of a local IT professional association. Faculty members were therefore not aware and had not been influenced directly by any of the IS curriculum models. They have been more concerned with changing technologies and looking at what other universities are also offering. According to a lecturer:

“Our “programming I” course recommended the use of Q-basic language. When it was obvious it had become outdated and a lot more windows applications were in demand, we had no option but to switch to programming with visual basic. We have also introduced new

courses like telecommunication, mobile application, and cloud computing in response to changing technology”

All lecturers interviewed concede that the PUni did not have the time and money to go through a full cycle of searching for what courses are appropriate to include or exclude hence resorted to looking at what other “popular” universities are doing and replicating. This process, they felt, provided them with the agility to quickly revise their curriculum to meet the demands of various stakeholders.

5.3.3 Developing the graduate IS Curriculum in PUni

The ICT department set up a curriculum review committee made up of seven (7) members of staff. Three of the committee members had been heads of the department on rotation and have considerable experience in previous curriculum revisions. The other four have long-serving experience with the university and have witnessed the transformation of the original generalist BSc ICT programme into a BSc ICT programme with three different options: Business Information Systems, Software Engineering, and Networking. The team had been tasked to revise existing curricula or develop new ones and obtain approvals at all levels for the implementation of undergraduate and graduate programmes by the department. This section describes the events towards the development of a contextually relevant and industry responsive IS curriculum for PUni.

The first task was to select a name for the graduate programme. There were two schools of thought. The first was to maintain the ICT identity that had been used over the period for the undergraduate programme and to emphasise the “management” character to reflect the role

graduates from this programme are expected to play. On the other hand, was the proposal for the name “Information Systems”. Proponents of the IS name believed that would be more appealing to students from diverse backgrounds and hence a potential increase in enrolment. To finalise the naming, several months after the contents had been put together, the committee looked at the tracer study to understand the different roles graduates of PUni were performing in their various organisations. The results showed the graduates played diverse roles from purely technical and less technical to non-technical. A manager of such a variety of roles should go beyond just the management of the ICT infrastructure. Consequently, a Master of Science in Information Systems (MSIS) was selected as the name of the programme.

Second, to speed up approval for accreditation, the committee recommended that they follow the guidelines for the requirement in obtaining accreditation for the programme. This was very important to them as a member of the committee, who have had experience with accreditation, remarked:

“You can have a very good programme, but if it doesn’t follow what they [National Accreditation Board] want, the programme would surely be shot down. You must follow their guidelines religiously.”

The Accreditation guidelines were readily available from the website of the National Accreditation Board, now merged into the Ghana Tertiary Education Commission (NAB, 2020) as form A3. From careful observation, the names of the institution, the programme, and the academic level were requested. This is followed by a statement of support for the board (Council) of the applying institution. For private universities under mentoring, this is

followed by the name of the mentoring institution and proof from the mentor that the programme is affiliated. A statement of support from the appropriate mentor university is sufficient. For public universities, a statement of support showing proof of approval for funding by the National Council for Tertiary Education (NCTE) is required. Next is to clearly state the aims and objectives of the programme and how it aligns with the *mission and plans of the institution* and the *national demand for the programme*. The applicant must further provide the policies on minimum qualifications for admission into the programme, retention, and graduation. Another important requirement from NAB is *employability*. For example, the applicant must state possible places where graduates from the programme may be employed upon graduation. Whilst literature supports the linkage of curriculum innovations to employability, it is also, in practice, embedded into national policies and regulations. The next requirement by NAB is to demonstrate wide consultations, including consulting appropriate professionals, and supervisory bodies. The next stage is about the curriculum content. The applicant is expected to provide the various components of the curriculum indicating elective, core, research, practical training, or industrial attachment and semester-by-semester details of the programme indicating the appropriate credit hours. The applicant is also expected to provide details about individual courses such as course description, objective, topics, mode of delivery, and suggested materials. An assessment policy must also be developed and included. Again, the applicant is expected to demonstrate that the programme is sustainable by presenting student enrolment projections for the years ahead. Further, NAB requires an explicit indication of resource, staffing, and funding plans and linkages with other institutions for support. Finally, a clear learning outcome in terms of what knowledge and skills (competencies) a graduate of the programme will acquire must be specified. A checklist of these requirements was made and guided the curriculum committee's work. Of importance to this work is the development of the content of the

curriculum. The next sections focus on the activities that led to the development of an exemplary graduate IS curriculum.

Third, it was also important to consider an alumni tracer study that had been conducted by the department to understand the experiences of graduates of the undergraduate ICT programme. Between 2007 and 2020, PUni graduated about 455 students from different parts of SSA such as Nigeria, Equatorial Guinea, and Cameroun. Students were sent a Google form survey to their Alumni platform to answer simple questions that would enable the department to understand their expectations and employability after graduation, whether they are still pursuing computing-related jobs, their roles within the organisation, and what competencies they believed were critical to their role in the organisations.

A total of 310 responses were received. Out of this, 64.5% had obtained a postgraduate degree after completion whilst 35.5% had not. The industry where graduates were working includes education (teaching/management), health, banking, telecommunications, IT, hospitality, consulting, manufacturing, entrepreneur (self), agriculture, government, mining, logistics, and social security. About 85% of these graduates were still engaged in computing-related jobs, with IS roles such as Systems analyst, Network administrator, IT/IS manager, Project manager, Enterprise Architect, Data analyst, Consumer activations and Technical Support Officer, Facilitator, IT Technician, IT Educator, Customer service Officer, CEO, Marketer and Governance and Compliance Officer.

These basic findings provided insight to the committee and the researcher, into the nature of IS entry jobs, and possible employment destinations of graduates as required by NAB.

In addition, Table 5.7 provides qualitative data of a sample of the responses of the ICT graduates on what competencies they believed made them successful in their roles.

Table 5.7: Sample Graduate Perceptions of important IS competencies

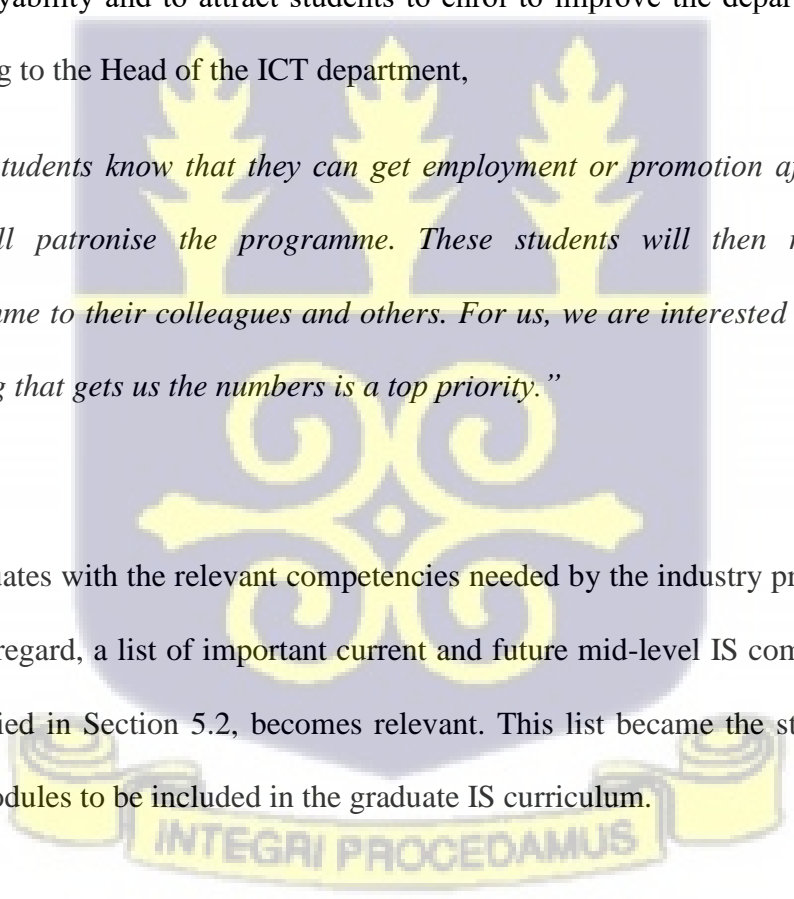
No	Suggested Competencies
1	Knowledge in-depth of the role, ability to adapt to new technologies, and ability to take independent decisions and implement them according to the mission and vision of the institution.
2	Technological knowledge, Computing Knowledge, Ability to self-learn, Positive can-do attitude, team player, ability to collaborate with other departments, it is a fast pace and growing company, have to be able to adapt to all the changes, ability to work fairly with dealing with clients and learning from mistakes, not dwelling on mistakes, move on, Basic Networking, Patience.
3	People skills, problem-solving techniques, ability to use IT systems, project management, conflict management, emergency planning, data gathering, data analysis, policies, and report writing.
4	Data collection and management, data analysis, software analysis design, working with less supervision, ability to train others, ability to adopt new technologies, Ability to adapt to change, and ability to undertake independent assessment and decisions.
5	Patience, Dedication, Knowledge, Enthusiasm.
6	Effective Communication, Good interpersonal relationships, Providing Motivation, Good knowledge of MS Office Suite (Excel), confidentiality, and meticulousness.
7	Project management, business analysis, agile approaches like Kanban, Scrum, IT operations management, SDLC.
8	Database management, data security, information system flow, and good communication.
9	Product knowledge, positive thinking, learning skills, confidence.
10	Troubleshooting skills, patience, result-oriented, good interpersonal relations, decent submissions, good researcher, giving of feedback, updating, adaptation to change, and data security.

Source: Author

From Table 5.7, three observations can be made. First, the competency characteristics consist of IS-specific competencies, individual foundation competencies, and little mention of a domain of practice competencies. Graduates also emphasised motives, traits, and self-concepts which they believe are critical in performing their roles successfully. Second, few

respondents emphasised specific technologies. This is in line with the findings from the Delphi studies (Chapter 6) that there is a lot of emphasis on competencies in IS concepts and models than specific technologies. Finally, the competency set of graduates is not tailored to a single career track as graduates seem to play multiple roles in their organisations. These findings from the graduate tracer studies served as critical inputs in deciding on bridge courses, and understanding the nature of the workforce, mid-level management IS professionals work with.

Fourth, responding to the needs of the industry was the most prioritised consideration, based on the recommendation of the curriculum committee. This was important to demonstrate graduate employability and to attract students to enrol to improve the department's balance sheet. According to the Head of the ICT department,



“Once students know that they can get employment or promotion after graduation, they will patronise the programme. These students will then recommend the programme to their colleagues and others. For us, we are interested in the numbers. Anything that gets us the numbers is a top priority.”

Providing graduates with the relevant competencies needed by the industry prepares them for the job. In this regard, a list of important current and future mid-level IS competencies, such as those identified in Section 5.2, becomes relevant. This list became the starting point for selecting the modules to be included in the graduate IS curriculum.

Fifth, it was important to also look at what other universities were offering in the country and at the regional level. This is important to make sure that a nationally and regionally accepted graduate IS programme is developed. As the Head of the ICT department puts it:

“Whilst we dare to be different, there must be certain characteristics that will make any professional identify our programme as an IS programme. So, you have to look at what others are doing so that when you say you are doing IS, everybody knows what to expect, apart from the courses that you add.”

In this regard, the study of graduate IS programme course offerings in SSA, presented in Section 5.4, became useful in responding to the committee’s expectations. From the study, dominant graduate IS programme course offerings were identified which is a critical template to guide the development of a new graduate programme.

Sixth, one strength of the information systems discipline is its interdisciplinary identity. To expose students to different domains of practice, the committee agreed to look at a collaboration with other successful departments. This strategy also helped in augmenting the portfolio of qualified staff to teach in the programme, which is a requirement by GTEC. According to a committee member:

“We do not have to look far to get qualified senior lecturers and professors on our programme for accreditation. Some qualified lecturers are already teaching graduate students in their departments and all we need to do is to engage them.”

The department, based on the tracer study of which industries are employing PUni graduates, identified the business school, education, health and medical science, and development faculties as candidate faculties for collaboration. The committee consulted with the various heads of departments of the specific departments it sought collaboration with. Due to internal competition, there was some initial apprehension from some departments. According to the head of the education department:

“I am looking at a situation where instead of prospective students looking at pursuing a general master in education, may prefer information systems education. This may affect our departmental intake.”

On the other hand, the head of the health department welcomed collaboration without hesitation. They saw it as an opportunity to advance their field into other disciplines and to respond to global technological trends.

“We don’t have any problem. Most of our undergraduate students become professional nurses and physician assistants and may not play any serious ICT roles. But we have the capacity in terms of qualified staff to support the proposed health aspects of your graduate programme.”

Similarly, the development department did not resist this proposed collaboration. Some faculty members had already published in the area of technology and development and saw this proposed collaboration as a logical consequence. Hence, a graduate IS programme, that provides students with domain competencies in Business, Development, Education, and Health was considered.

Seventh, it was important to understand what IS academics and professionals think of the MSIS programme. The views of the majority of IS academics on an IS curriculum are expressed in model curricula. As discussed in previous chapters, the ACM and the AIS jointly develop model IS curricula for both undergraduate and graduate IS programmes for guidance. The committee, therefore, decided to look at the most recent model, the MSIS 2016, for guidance. The MSIS 2016, unlike previous models that specified specific courses to be taught, specified a set of competencies all MSIS graduates should acquire. The details

have been presented in section 3.2. The MSIS 2016 served as a reference model to ensure that PUni's MSIS programme maintained a global identity whilst responding to contextual and industry demands. Even though none of the committee members was a member of the ACM or AIS but through interactions with the committee, they became aware of the role of the academy in the development of an IS curriculum. On the other hand, there is a weak linkage between the department and local professional bodies. Even though some faculty members were members of a national professional association, the influence of the association on academic programmes was yet to be seen. However, the curriculum was reviewed by some IS professionals in the industry.

Eighth, it was important to consider the direction of government policy concerning ICT development. The National ICT policy for Ghana finds its expression in the Ghana ICT for Accelerated Development (ICT4AD, 2003). Despite being criticised as lacking implementation strategy and clear monitoring mechanisms (Odongo, 2012), it provides an expectation of the ICT environment across periods. For example, between 2019 and 2022 (the endpoint) the expectation is that the government would have facilitated the process of sustainable economic development and growth towards improving national prosperity and global competitiveness through the use of ICTs. In achieving this goal, the government is expected to “promote the use of ICTs in education”. What is conspicuously missing is a focus on ICT education, as it is not enough to learn with ICTs but about ICTs. For example, The National ICT policy for Botswana emphasises the expectations from an ICT education (see Ayalew et al., 2012) which will develop the competencies required to execute many of the other ICT-related policy objectives. Nevertheless, according to the ICT4AD, government role, among the fourteen pillars of the ICT4AD, inspiring the development of this curriculum includes:

- Promoting ICTs in education – The deployment and exploitation of ICTs in education.
- Facilitating government administration and service delivery – Promoting electronic government and governance.
- Facilitating the development of the private sector.
- Developing an export-oriented ICT products and services industry.
- Deployment and spread of ICTs in the community.
- Promotion of national health.
- Rapid ICT and enabling physical infrastructure development.

These pillars indicate government focus and which industries are likely to benefit from government investments in the ICT sector. This may signal to curriculum developers the nature of jobs that could be readily available as a result of such government intervention. For example, there could be new opportunities for IS professionals in education, health and public service.

Finally, whilst some members of the curriculum committee raised issues of global megatrends or grand global agenda, it did not directly influence the development of the graduate IS curriculum in a private university in SSA. According to a member of the curriculum committee:

“Our main focus is on getting students. We are therefore interested in them being employed by the industry. That is how they get to recommend our programme to others to enrol. We, therefore, are not looking at satisfying any SDG or MDG or a particular developmental agenda. Moreover, accreditation doesn’t seriously insist on it.”

Moreover, the regulator is relaxed on requirements for a private university programme to respond to a global developmental agenda. The main reason, according to an official of GTEC is that:

“Private universities, by their nature, are not publicly funded. We are particular about relevance and how programmes respond to a national developmental agenda, especially for public universities. When we receive funding from international agencies, then it is expected that academic programmes become relevant to the interest of the funding agencies just as there must be justification for the use of public funds.”

To this point, the events leading to the design of a contextually relevant and industry-responsive graduate IS curriculum for a private university in SSA have been described. In the next subsection, how the selection of these courses is done is explained.

5.3.4 Selecting Appropriate Courses

Based on the considerations described in previous events, a list of requirements or design factors was considered:

- The need for an agile graduate IS curriculum that meets stakeholders’ demands.
- The need for the graduate IS curriculum to capture current and future mid-level IS competencies.
- The need for the graduate IS curriculum to have a local, regional and global IS identity.

Furthermore, the committee presented selected candidate courses or modules and a justification of how each course responded to one or more design factors. This mapping is presented in Table 5.8. Such proposed courses or modules, together with an appropriate pedagogy, provide the following competencies that are contextually relevant and industry responsive:

- **Individual foundation competencies** such as collaboration and teamwork, flexibility and adaptability, effective decision making, negotiation skills, leadership and independent problem-solving.
- **IS-specific competencies** such as digital entrepreneurship, enterprise architecture, data analytics and visualisation, IS project management, IS security and assurance, IS strategic management, IS infrastructure management, IS innovation, IS ethics, regulations and sustainability.
- **Domain of practice competencies** such as in education, health, development, agribusiness and business.

Table 5.8: Summary of IS Specific Courses and Corresponding Competency Offerings

IS Specific Course	IS Specific Competency
<i>Digital Entrepreneurship</i>	Ability to identify and exploit digital entrepreneurial opportunities
<i>IS Ethics, Impacts and Sustainability</i>	Ability to maintain compliance with legislation, regulations and standards and ensure sustainability.
<i>IS Project Management</i>	Ability to manage IS projects and programs and apply broadly used project management tools and techniques.
<i>IS Trends</i>	Ability to monitor technology trends and innovate by exploiting an emerging method or technology.
<i>IS Security Management</i>	Ability to manage and implement information systems security and risks.
<i>IS Strategy and Policy</i>	Ability to develop and implement IS/IT policies.
<i>Data Analytics</i>	Ability to select and use appropriate data analytics and visualisation methods and tools.

Source: Author

5.3.5 Implementation of the graduate IS curriculum in PUni

The intended contextualised graduate IS curriculum could be challenged from being implemented. This may largely be due to factors related to organisation resources. First of all, the existing infrastructure should be able to support the teaching and learning of the specified courses. According to the head of the department:

“Existing ICTs available should be able to support the teaching and learning of the proposed courses. The department is also making plans to acquire others that would be needed but are not presently available.”

These include the appropriate technologies for teaching courses such as IS project management, data analytics, enterprise architecture and systems and IS infrastructure management. The availability of this infrastructure will support the actualisation of the intended outcomes. Second, the availability of qualified faculty members to teach these courses will influence how the graduate IS curriculum is implemented. Private universities, as have been discussed already, lack the resources to attract qualified faculty. Again, according to the head of the department:

“We are mounting a graduate programme. This requires that we have a portfolio of experienced lecturers to handle the relevant courses. We will also need extra hands since existing lecturers are already engaged in the teaching of undergraduate courses.”

In addition, the GTEC has strict guidelines on the quality and quantity of academic staff for which approval could be made for a graduate programme. It is therefore important for the department to assess its staff strength and plan to fill the gaps if they exist. Finally, a contextualised graduate IS curriculum has been developed, but are there corresponding contextually relevant teaching and learning resources like textbooks to effectively implement

the curriculum? Into the millennium, Erwin and Blewett (1999) realising that existing IS textbooks, among other problems, provided inappropriate context and examples students could relate to, advocated the development of contextually relevant textbooks. Very little evidence exists as a response to this call in the literature despite an avalanche of regional-based research publications. This makes teaching and learning of a contextually sensitive curriculum with “foreign” textbooks and materials problematic. It is therefore important that the department prepares itself to develop contextually-sensitive textbooks to support the graduate IS programme.

5.4 The Nature of Graduate IS Programmes in SSA

The fourth research objective focuses on the need to explore the nature of graduate IS programme offerings in SSA. This section presents the results of the survey of graduate IS programmes in SSA. Specifically, this section focuses on the results of the nomenclature of graduate IS programmes, graduate IS programme types and IS course offerings in SSA.

In all, out of the 200 top universities surveyed, eleven (11) delivered their graduate IS programmes in French, Arabic or other languages either than English language. These were excluded for further processing. In addition, seventy-nine (79) universities did not offer any IS or computing-related programme at the graduate level. Again, forty-seven (47) graduate computer science (CS) programmes were identified and twenty-two (22) graduate IT or related computing programmes other than IS were identified. Furthermore, there were 11 MBA programmes with IS options, which did not fall under the umbrella of MSIS (Topi et al., 2017). Consequently, 55 graduate IS programmes were identified, with 12 being

delivered by dissertation only and 43 delivered through a combination of coursework and dissertation (See Appendices 1 and 2).

5.4.1 Graduate IS Programme Nomenclature in SSA

Out of the 55 graduate IS programmes identified in SSA, 22 unique names were identified. Information Systems and Information Technology are the dominant names for graduate IS programmes in SSA. A summary of the names of the graduate IS programmes offered in SSA is provided in Table 5.9

Table 5.9: Summary of Graduate IS Programme Names in SSA

No	IS Programme Name	Number of IS Programmes	Percentage of IS Programmes
1	Information Systems	15	27.27
2	Information Technology	9	16.36
3	ICT/IT Management	4	7.27
4	Information Systems and Technology	3	5.45
5	Computer and Information Systems	3	5.45
6	Management Information Systems	2	3.63
7	Information Systems Management	2	3.63
8	Business Information Systems	2	3.63
9	Computing	2	3.63
10	Software Project Management	1	1.82
11	Management of Information Technology	1	1.82
12	Information Management	1	1.82
13	Informatics	1	1.82
14	Health Information System	1	1.82
15	Geographical Information Systems	1	1.82
16	Digital Business	1	1.82
17	Data Analytics	1	1.82
18	ICT	1	1.82

19	Computer and Information Technology	1	1.82
20	Business Computing	1	1.82
21	IT and Law	1	1.82
22	Agric Data Analytics	1	1.82
	Total	55	100.00

Source: Author

As reported in the literature (see Brooks et al., 2016; Kevor et al., 2020; Pierson et al., 2008), there is no standard convention in the naming of IS programmes. Popular names of IS academic programmes are Information Systems, Information Technology (IT), ICT or IT Management, Information Systems and Technology. Some of the names have been motivated by specialised programmes depicting the domain of specialisation such as Business Computing, Business Information Systems, Health Information Systems and Geographical Information Systems.

5.4.2 Graduate IS Programmes Types in SSA

Based on the data collected, two broad categories of graduate IS programmes in SSA emerged. First is a category of IS programmes with modules that provide general competencies specified by the MSIS 2016 global IS competency model with no emphasis on a particular domain or specialised technology. This category of graduate IS programme has been labelled “Generalist”. This is in sharp contrast with observed graduate IS programmes that go beyond general competencies and focus on applications in specific domains or specific innovations. This category is labelled as “Specialists” graduate IS programmes. Further, the specialist graduate IS programmes were categorised as domain-driven or technology-driven. For example, from Appendix 1, Mbarara University of Science and technology, in Uganda, offers one generalist graduate IS programme (MSc Information Systems) and two specialist graduate IS programmes (MSc Health Information Technology and MSc Business Informatics). The two specialists IS programmes are domain-driven

emphasising the health and business domains. This is similar to the case of the Ghana Institute of Management and Public Administration’s generalist graduate MIS and a specialist graduate IT and Law programmes in its school of technology. In addition, Chinhoyi University of Technology in Zimbabwe offers a technology-driven graduate IS programme known as MSc Data Analytics. This programme focuses on IS competencies that equip graduates to play the specific role of a data analyst in an organisation. Interestingly, within the same Midlands State University in Zimbabwe, there exist a generalist Mcom Information Systems programme in a Business faculty and at the same time a domain-driven specialist MSc Agricultural informatics and Data Analytics programme in an Agriculture and Natural Environment faculty. Table 5.10 is a summary of the distribution of graduate IS programme types in SSA based on type.

Table 5.10: Distribution of IS Programme Types

IS programme Type		Number of Programmes	Percentage
Generalists		26	60.47
Specialists	Technology-driven	8	18.60
	Domain-driven	9	20.93
Total		43	100.00

Source: Author

5.4.3 General Course offerings in Graduate IS Programmes in SSA

Based on the detailed course structure for the surveyed graduate IS programmes, the study analysed the nature of course offerings based on undergraduate bridge courses, and graduate IS courses. In either case, their contribution to ISSC, IFC and DPC are determined based on a coding scheme. In all, 456 distinct courses or modules were obtained and analysed from the

38 universities that offered 43 graduate IS programmes by coursework in SSA (Appendix 1). Combining similar courses, a total of 50 (core and optional) courses or modules were identified and categorised and their popularity was measured based on their frequency of occurrence. The result are summarised in Table 5.11.

Table 5.11: Relative Popularity of Graduate IS Courses offered in SSA

Number	Course/Module	Percentage offerings
1	IS Management	7.25
2	Research Dissertation	6.74
3	Research Methodology	5.70
4	IS Strategy and Policy	5.18
5	IS Security and Auditing	5.18
6	IS Development and Acquisition	4.66
7	IS Project Management	4.66
8	Data Analytics	4.66
9	Enterprise Architectures	3.63
10	IS Foundations	3.63
11	Data Warehousing and Management	3.11
12	e-Business	3.11
13	Enterprise Systems	2.59
14	Data Communication and Networks	2.59
15	IS Trends	2.07
16	Organisational Behaviour and Management	2.07
17	e-Health	2.07
18	Advanced Database Systems	2.07
19	Knowledge Management	1.55
20	Digital Entrepreneurship	1.55
21	IT Infrastructure	1.55
22	Cloud Computing	1.55
23	Software Engineering	1.55
24	ICT For Development	1.55
25	Accounting and Financial Management for IT	1.55
26	Systems Thinking	1.55
27	Programming	1.55
28	Change Management	1.04
29	Legal and Social Implications of Informatics	1.04
30	Health Systems	1.04
31	Artificial Intelligence	1.04
32	Marketing Management	1.04
33	Mobile Computing	1.04
34	Risk Management	0.52

Number	Course/Module	Percentage offerings
35	Educational Technology	0.52
36	Financial Technologies	0.52
37	e-Government	0.52
38	e-Mining	0.52
39	Strategic Management	0.52
40	Computer Graphics	0.52
41	XML and Web Services	0.52
42	Geographic Information Systems	0.52
43	Business Finance	0.52
44	Public Policy and Administration	0.52
45	Negotiations, Contracts and Conflict Management	0.52
46	Critical Reading	0.52
46	Report Writing	0.52
48	Intercultural Management and Communication	0.52
49	Decision Making	0.52
50	Advanced Statistics	0.52
	Total	100.00

Source: Author

5.4.4 Core Course Offerings in Graduate IS Programmes in SSA

Graduate IS courses offered may be presented as core/mandatory or as an option/elective for students to select from. Table 5.12 presents a summary of courses that are core or mandatory to graduate IS programmes in SSA. The top 5 core courses or modules in graduate IS programmes include IS management, Research dissertation, Research methodology, IS strategy and policy and IS development and acquisition. Similarly, Yang (2012) identified Management of IS, Thesis, Programming, Decision support systems/models, and research methods as the top five most widely required core modules in graduate IS programmes in the US. Again, in the Apigian and Gambill (2014) study in the US, Database, Management of IS, Systems Analysis and Design, Project management and Data communications and network.

Table 5.12: A summary of Core Course Offerings in Graduate IS Programmes in SSA

Number	Course/module	percentage
1	IS Management	8.97
2	Research Dissertation	8.33
3	Research Methodology	7.05
4	IS Strategy and Policy	5.77
5	IS Development and Acquisition	5.77
6	IS Project Management	5.13
7	IS Security and Auditing	4.49
8	Enterprise Architectures	4.49
9	IS Foundations	4.49
10	Big Data Analytics	3.21
11	Data Warehousing and Management	3.21
12	Enterprise Systems	3.21
13	e-Business	2.56
14	Data Communication and Networks	2.56
15	Organisational Behaviour and Management	2.56
16	Advanced Database Systems	2.56
17	IS Trends	1.92
18	Knowledge Management	1.92
19	Digital Entrepreneurship	1.92
20	IT Infrastructure	1.92
21	Accounting and Financial Management for IT	1.92
22	Programming	1.92
23	e-Health	1.28
24	Software Engineering	1.28
25	ICT For Development	1.28
26	Systems Thinking	1.28
27	Health Systems	1.28
28	Cloud Computing	0.64
29	Change Management	0.64
30	Legal and Social Implications of Informatics	0.64
31	Artificial Intelligence	0.64
32	Marketing Management	0.64
33	Mobile Computing	0.64
34	Educational Technology	0.64
35	Critical Reading	0.64
36	Report Writing	0.64
37	Intercultural Management and Communication	0.64
38	Decision Making	0.64
39	Advanced Statistics	0.64
	Total	100.00

Source: Author

5.4.5 Option Course Offerings in Graduate IS Programmes in SSA

Other courses are also delivered as options or electives in graduate IS programmes in SSA. These are summarised in Table 5.13. The top 5 optional courses are Data Analytics, IS security and auditing, Cloud computing, e-Health and e-business. Careful observation reveals these optional courses are contemporary specialised or domain-specific programmes. For example, Data analytics is a relatively newer course which is receiving attention in the graduate IS curriculum.

Table 5.13: A Summary of Option Graduate IS Course Offerings in SSA

Number	Courses	Percentage Offerings
1	Data Analytics	10.81
2	IS Security and Auditing	8.11
3	Cloud Computing	5.41
4	e-Health	5.41
5	e-Business	5.41
6	IS Strategy and Policy	2.70
7	IS Project Management	2.70
8	Risk Management	2.70
9	Change Management	2.70
10	IS Trends	2.70
11	Software Engineering	2.70
12	Legal and Social Implications of Informatics	2.70
13	Data Communication and Networks	2.70
14	Data Warehousing and Management	2.70
15	ICT For Development	2.70
16	Financial Technologies	2.70
17	e-Government	2.70
18	e-Mining	2.70
19	Artificial Intelligence	2.70
20	Marketing Management	2.70
21	Strategic Management	2.70
22	Computer Graphics	2.70
23	Mobile Computing	2.70
24	XML and Web Services	2.70
25	Geographic Information Systems	2.70
26	Business Finance	2.70
27	Public Policy and Administration	2.70
28	Negotiations, Contracts and Conflict Management	2.70
29	Systems Thinking	2.70
	Total	100.00

Source: Author

5.5 Summary of Chapter

This chapter presented the results of this doctoral study. First, the result of the Delphi study of mid-level management information systems competencies required by organisations in Sub-Saharan Africa was presented. Second, this chapter presented a description of a case study of a graduate IS curriculum innovation in a private faith-based university in SSA. The chapter ended with a presentation of the results of the survey of graduate IS programmes in SSA.



CHAPTER SIX

ANALYSIS, DISCUSSIONS AND FINDINGS

6.1 Overview of Chapter

In the previous chapter, the results of the study were presented. This chapter presents an analysis and discussion of the results presented in the previous chapter. This is in response to the four research objectives. First, this chapter presents an analysis and discussion of mid-level management IS competencies required by organisations in SSA. Second, this chapter presents an analysis and discussion of the influence of institutional logic and agent actions on graduate IS curriculum innovation in SSA. Third, this chapter presents an analysis and discussion of graduate IS curriculum responsiveness in SSA. This chapter ends with an analysis and discussion of a survey of graduate IS programmes in SSA.

6.2 Mid-level Management IS Competencies Required by Organisations in SSA

Based on the results of the Delphi study in Section 5.2, this section analyses and discusses the nature of mid-level management IS competencies required by organisations in SSA. The analysis is guided by the global IS competency model.

6.2.1 Individual Foundation Competencies

First is a consideration of current mid-level management individual foundation competencies. Even though extant literature on IS competencies has not focused much on competencies of middle and senior-level IS managers, related studies at similar levels have yielded comparable results. For example, Keil et al. (2013) in a Delphi study to identify the most critical skills for managing IT projects, identified “leadership”, “ability to motivate team

members”, “verbal”, “written” and “listening” Communication skills, good “people” and “negotiation” skills as part of the top skills above technical skills. These are essentially individual foundational competencies. Again, in a study of what CIOs in US organisations believed were important competencies for middle IT managers, Kappelman et al. (2016) identified “collaboration with others”, “problem-solving”, “people management”, “oral communication”, “decision making”, “honesty/credibility” as part of the top 10 important competencies. Furthermore, the MSIS 2016 also suggested: “collaboration and teamwork”, “negotiation”, “leadership”, “written and verbal communication” and “problem-solving” as among key individual foundational competencies. This study confirmed similar competencies such as “ability to collaborate and work with teams”, “ability to effectively make decisions”, “ability to negotiate with internal and external stakeholders” and “ability to demonstrate leadership” from previous studies. However, this study identified the “ability to be flexible and adapt to change” as a new top 10 individual foundational competency that has not been reported by extant literature. Spencer and Spencer (1993) explains flexibility or adaptability as the ability to adapt to and work effectively with a variety of situation. For example, the fast-changing technological environment of the IS manager requires them to “understand and appreciate requirements of a situation change, and to change, or easily accept changes in one’s organisation or job requirements” (Spencer & Spencer, 1993, p. 84) and to adapt other competencies to accomplish the new expectations. Again, this study could not confirm “honesty/credibility” as an important competency. However, whilst this study found “communication skills”, “people (interpersonal) skills” and “problem-solving” competencies important, they did not make it in the top 10 competencies as identified in previous research.

Second, is a consideration of future mid-level management individual foundation competencies. Not many studies have looked at the nature of mid-level management IS

competencies in the future. This makes it difficult to compare with any previous study. However, it is possible to compare future competencies to current competencies to understand which competencies are relatively enduring. For example, Table 6.1 presents the top five current IFCs and compares them with the top five future IFCs. Table 6.1 reflects the different emphasis on current and future IFCs by the experts. For example, whilst a competency like “ability to be flexible and adapt to change” is second rated in the list of current IFCs, the same competency is first rated in the list of future IFCs. Similarly, whilst a competency like “ability to effectively make decisions” is on the list of current IFCs, it has been substituted with “ability to solve problems independently” on the list of future IFCs. This shows that some competencies are more enduring into the future than others.

Table 6.1: Comparison of Top Five Current and Future Mid-Level Management IFCs

No	Current IS Competencies	Future IS Competencies
1	Ability to collaborate and work with teams	Ability to be flexible and adapt to change
2	Ability to be flexible and adapt to change	Ability to collaborate and work with teams
3	Ability to effectively make decisions	Ability to negotiate with internal and external stakeholders
4	Ability to negotiate with internal and external stakeholders	Ability to demonstrate leadership skills
5	Ability to demonstrate leadership skills	Ability to solve problems independently

Source: Author

6.2.2 Information Systems Specific Competencies

Again, this section first presents current IS-specific competencies required by organisations in SSA. From Table 5.4, the top 10 competencies include IS-specific competencies such as the “ability to monitor technology trends and innovate by exploiting an emerging method or technology”, and “ability to manage IS projects and programs and Apply broadly used project management tools and techniques”, “ability to develop and implement IS/IT policies”, and

“ability to manage and implement information systems security and risks”. Since Keil et al. (2013) focused on the competencies of IT project managers, the IS-specific competencies they identified were mainly related to project management such as “scope management” and “project planning”. Without giving specific details, CIOs rated technical competencies among the top 10 competencies required from middle management IT professionals, in the US study by Kappelman et al. (2016). All the IS-specific competencies in the top 10 of this study were also identified in the MSIS 2016. Moreover, in this study, the “ability to monitor technology trends and innovate by exploiting an emerging method or technology” was identified as the top IS-specific competency required from middle management IS professionals. This is not unusual, due to the rapidly changing technology and its potential impact on the organisation and business processes. Again, the competencies in this category are mainly knowledge and skills on IS concepts, rather than particular technologies. A summary of a comparison of this study and previous studies is presented in Table 6.2. In Table 6.2, the detailed IS-specific competencies have been omitted to make it comparable to previous studies.

Table 6.2: A Summary of the Comparison of the Top 10 Competencies in this Study to Previous Studies

No	IS Competency	Keil et al. (2013)	Kappelman et al. (2016)	MSIS 2016
	Individual Foundational Competencies			
1	Ability to collaborate and work with Teams	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Ability to be flexible and adapt to change			
3	Ability to effectively make decisions	<input type="checkbox"/>	<input type="checkbox"/>	
4	Ability to negotiate with internal and external stakeholders	<input type="checkbox"/>		<input type="checkbox"/>
5	Ability to demonstrate leadership skills	<input type="checkbox"/>		<input type="checkbox"/>
6	Ability to demonstrate creativity			<input type="checkbox"/>
7	Ability to solve problems independently		<input type="checkbox"/>	<input type="checkbox"/>
8	Ability to think critically			<input type="checkbox"/>

9	Information Systems Specific Competencies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	Domain of Practice Competencies		<input type="checkbox"/>	<input type="checkbox"/>

Source: Authors

Again, the current IS-specific competencies are compared to future IS-specific competencies for mid-level management IS professionals in this study. This comparison is summarised in Table 6.3.

Table 6.3: Comparison of Top Five Current and Future Mid-Level Management ISSC

No	Current IS Specific Competencies	Future IS Specific Competencies
1	Ability to monitor technology trends and innovate by exploiting an emerging method or technology	Ability to identify and exploit digital entrepreneurial opportunities
2	Ability to manage IS projects and programs and apply broadly used project management tools and techniques	Ability to manage IS projects and programs and apply broadly used project management tools and techniques
3	Ability to develop and implement IS/IT policies	Ability to manage and implement information systems security and risks
4	Ability to manage and implement information systems security and risks	Ability to maintain compliance with legislation, regulations, and standards and ensure sustainability
5	Ability to identify and exploit digital entrepreneurial opportunities	Ability to select and use appropriate data analytics and visualisation methods

Source: Author

From Table 6.3, digital entrepreneurship, IS project management, IS security and risk management are the current competencies that are likely to endure into the future. Countries in SSA, like other developing economies, have high unemployment rates. It is therefore not surprising that industry experts in SSA would rate the “ability to identify and exploit digital entrepreneurial opportunities” very high in the future. Moreover, as organisations continue to

deploy new technologies, their successful implementation is a concern. Project management competencies are therefore likely to be in high demand currently and in the future. Furthermore, as organisations increasingly rely on various technologies to realise their benefits, concerns about information security, just like compliance with legislation, regulations, and standards, and ensuring sustainability increases. Hence competencies to deal with these concerns are likely to increase in the future. Moreover, the experts have confirmed the value of an organisation to analyse and visualise data as they adopt various technologies. Competency in this area is also likely to be important in the future. Again, it could be observed from Table 6.3, that these competencies are more focused on concepts and models than on particular instances of information and communications technologies.

6.2.3 Domain of Practice Competencies

This section discusses the value of domain of practice competencies, currently and in future, to middle-level management IS professionals. In this study, the “ability to demonstrate an understanding of the specific business or domain processes” was identified among the top 10 current IS competencies required from mid-level management IS managers. Whilst Keil et al. (2013) identified this competency as important, they were relatively less important than other types of competencies and described them as business domain skills. However, CIOs in the Kappelman et al. (2016) study rated functional area knowledge as the fifth most important competency required by mid-level IT managers. This and previous studies, therefore, confirm the MSIS 2016 classification of which specifies competencies in a domain of practice such as health, education, government, business, and law as a key category of graduate IS competencies.

On the other hand, whilst there was no mention of specific DPCs, from the results, a “demonstration of understanding of the specific business or domain processes” will still be relevant to mid-level management IS professionals in the future. This competency is highly rated in the future than in the present. Again, previous studies have not looked at the value of domain of practice competencies in the future.

6.2.4 Specialised IS Competencies

It is important to note that, the three specialised IS competencies such as “Ability to understand and apply Artificial Intelligence to specific domains for organisational benefit”, “Ability to leverage the benefits of Machine Learning to the organisation” and “Ability to leverage the benefits of blockchain technologies to the organisation”, though important were ranked low among the 5 least important competencies. This may be due to any of these reasons. First, most organisations in SSA may not have currently adopted information systems that depend on these technologies hence the experts did not rank it as currently important. Second, experts may be aware, from experience, that these specialised technologies may have shorter life spans and may be retired in due course or maybe easily outsourced. They would rather rank more relatively enduring competencies as more important than these.

Similar to the current IS competencies, this category of competencies was rated less important (not unimportant) in the future. This may be a result of the kaleidoscopic nature of information and communications technology. It presents high uncertainty that specific technologies today, may be less relevant tomorrow. In this study, competencies in leveraging

technologies such as AI, machine learning, IoT, and blockchain technologies to organisational benefit, though likely relevant in the future, were rated low by experts in SSA.

Based on the foregoing analysis and discussions, the following findings can be made:

Finding 1: In SSA, the hybrid role of mid-level management IS professionals requires individual foundation competencies, IS specific competencies and competencies in a domain of practise.

Finding 2: In SSA, organisations emphasise individual foundation skills than technology-specific skills for mid-level IS management positions.

6.3 Influence of Institutional Logics and Agent Actions on Graduate IS Curriculum Innovation in SSA

So far, a case description of how a graduate IS curriculum was developed for a private university in SSA has been presented in the previous chapter. In meeting the second research objective which espouses the need to explain how institutions influence graduate IS curricula innovation in SSA, this section discusses the institutional logics that shaped the development of the graduate IS curriculum regarding the research framework and existing literature.

Based on the pattern retroduction analysis approach (explained in Chapter 4), we compared the empirical data collected with candidate ideal institutional logic types described in Chapter 3 to confirm or eliminate the right logic. The following sections explain the analysis and which logic types were confirmed or disconfirmed by the empirical data.

6.3.1 The State Logic

From the case description, ICT departments were influenced by the state logic in their graduate IS curriculum decisions. This logic is related to national priorities that reflect public needs and the desires of higher education programmes and services. For example, in the development of the graduate IS curriculum, the ICT department’s attention was focused on national expectations. These national expectations were enshrined in government policies, regulatory documents and political statements by state officials. Mechanisms such as programme accreditation are used in monitoring and keeping actors focused on the state logic. Table 6.4 is an illustrative summary of qualitative evidence of the influence of state logic on the graduate IS curriculum.

Table 6.4: Qualitative Evidence of the Influence of The State Logic on Graduate IS Curricula

Focuses Attention On	Illustrative Quotation(s)	Relevant Sources
National Relevance A. Unemployment Reduction	<i>“Government is interested in ICT programmes that produce entrepreneurial graduates...”</i> <i>“Accreditation officials put emphasis on how your ICT programme teaches students to be employers rather than to be job seekers.”</i> <i>“From the accreditation guide, ICT departments are expected to state organisations where graduates are likely to be employed”</i>	GTEC Official Head, ICT Form 3A, GTEC
B. Other Socio-economic Challenges	<i>“Government expects that ICT and its related programmes graduates should be able to help solve the challenges in health, education and the environment”</i>	GTEC Official
Sustainability A. Steady enrolment	<i>“In filling NAB forms, you will need to provide about 5-year enrolment projections to demonstrate that there is market demand for the programme”</i>	Head, ICT
B. Financial	<i>“There must be clear sources of funding for the</i>	GTEC Official

Sustainability	<p><i>programme.”</i></p> <p><i>“If there is any doubt that the programme will suffer funding along the way, accreditation may not be granted for the programme.”</i></p>	Head, ICT
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Source: Author’s constructs

Based on this analysis, the following findings could be made:

Finding 3: In SSA, at the societal level, the state logic influences IS departments' graduate curriculum decisions in two ways. First, the state logic focuses the attention of the decision-makers on national relevance by considering which IS courses solve the reduction of unemployment and other socio-economic challenges. Second, the state logic focuses the attention of decision-makers on programme sustainability by considering which IS courses are likely to attract steady enrolment and funding to ensure financial sustainability.

6.3.2 The Market or Industry Logic

The market or industry logic, related to the concept of the university as a service provider focuses the attention of the ICT department on providing students with the relevant graduate IS competencies that meet students’ fulfilment or make them employable in the industry. In this case, the ICT department selects courses that, as far as possible, provide students with competencies which match the competencies required by the industry. Table 6.5 presents the qualitative evidence of the influence of the market or industry logic on graduate IS curriculum innovation.

Table 6.5: Qualitative Evidence of the Influence of the Market or Industry Logic on Graduate IS Curricula

Focuses Attention On	Illustrative Quote(s)	Source
Student Economic Needs A. Employability	<i>“IS graduates are interested in getting jobs after school. We must pay attention to what skills are in demand”</i>	Head, ICT
	<i>“At the end of the day, IS skills needed by organisations must be matched with what must be taught in our graduate programme”</i>	Lecturer, ICT
B. Professional development	<i>“Some past students call us and make enquiries about our graduate programme which they need for promotion”</i>	Department Officer

Source: Author’s construct

The following findings can be made based on the forgoing analysis:

Finding 4: The market or industry logic focuses IS departments' attention on student economic needs by focusing and selecting IS courses that deliver IS competencies needed by students to be employable in industry or for their professional development.

6.3.3 The Corporation Logic

The corporation logic privileges the view of the university, and for that matter the ICT department, as a business unit that must make a profit and expand in scale and scope. The corporation logic focuses the ICT department’s attention on cost-effectiveness and process improvement in the IS curriculum decision-making. This, for example, includes offering a graduate programme with an optimal number of courses that may not require extra resources

to implement. This leads to cost reduction or offering programmes that attract students and ultimately maximising revenues. Again, the corporation logic focuses ICT departments' attention on improving processes such as agility. Table 6.6 provides qualitative evidence that matches the corporation logic.

Table 6.6: Qualitative Evidence of the Influence of the Corporation Logic on Graduate IS Curricula

Focuses Attention On	Illustrative Quote(s)	Source
Cost-effectiveness A. Cost reduction	<i>“We [ICT department] will like to run this Masters programme without any additional cost since we are already seen as a cost centre”</i>	Chair, Curriculum committee
	<i>“As much as possible, we are including faculty from other departments to reduce our cost”</i>	Head, ICT
B. Revenue maximisation	<i>“Our programmes must attract enough students whose fees will pay up the accompanying expenditure”</i>	Vice President, Academic
Process Improvement C. Agility	<i>“The university is particular about speed of revising or developing a new ICT programme without compromising quality”</i>	Dean, FoST

Source: Author’s construct

Based on the foregoing analysis, the following findings are made:

Finding 5: Graduate IS curriculum innovation in SSA is influenced by corporate logic, which focuses the attention of decision-makers on cost-effectiveness and process improvement in the selection of graduate IS courses.

6.3.4 The Academic Logic

The academic logic privileges a community of scholars whose main mission is to produce scholarly knowledge and maintain its reputation among peers. Among academics, decisions are made by consensus and they are guaranteed full autonomy in the production and dissemination of knowledge. The academic logic is an instance of the professionalism logic at the societal level that has been enacted at the field level. Table 6.7 presents qualitative evidence of the influence of academic logic on graduate IS curriculum innovation in SSA.

Table 6.7: Qualitative Evidence of the Influence of the Academic Logic on Graduate IS Curricula

Focus Attention On	Illustrative Quote(s)	Source
Academic Autonomy A. Academic freedoms	<i>“Sometimes management expects more from us, like getting students to fill the classrooms. I don't see that as part of my job”</i>	Lecturer, ICT
	<i>“Sometimes we forget that ours is to focus on the knowledge in the field and not to prepare students for a vocation”</i>	Lecturer, ICT
B. Professional Advancement	<i>“The ICT department recognises the choices of faculty to conduct research and progress in any field within the discipline”</i>	Head, ICT
Collegialism C. Professional Authority	<i>“Even though we try to agree on courses by consensus, Professors and Senior lecturers mostly dominate the decision making”</i>	Lecturer, ICT

Source: Author's construct

From the foregoing analysis, the following findings can be made about the academic logic and its influence on graduate IS curriculum innovation in SSA.

Finding 6: In SSA, the academic logic focuses the IS department's attention on their academic autonomy by emphasising their academic freedoms to teach, research and pursue professional advancement without interference and whilst espousing collegialism recognises professional seniority in a graduate IS curriculum decision-making.

6.3.5 The IS Logic

The IS logic is enacted at the individual level and privileges the IS profession and IS discipline. It is related to the view of IS as a profession that bridges very technical ICT roles and non-technical ICT roles. As an academic discipline, IS focuses on the application of ICTs in different domains. Faculty members carry the IS logic to guide them in the IS curriculum decision-making. Qualitative evidence of the influence of the IS logic on graduate IS curriculum decisions are provided in Table 6.8. The IS logic focuses the attention of the ICT department on courses that are central to the IS discipline which delivers to students' competencies that are relevant to the IS profession in their curriculum decision-making. Again, the IS logic focuses the attention of the IS department on the nature of a graduate IS programme at the regional or global levels.

Table 6.8.: Qualitative Evidence of the Influence of the IS Logic on Graduate IS Curricula

Focuses Attention On	Illustrative Quote(s)	Source
IS Professional Identity A. IS function	<i>“For a graduate IS programme, we must look at</i>	Chair, Curriculum Committee

	<i>what roles these graduates are likely to play after graduation”</i>	
B. IS competencies	<i>“The competencies students would acquire from this graduate programme must reflect the IS profession”</i>	Head, ICT
IS Disciplinary Identity C. Nature of Discipline	<i>“People who see our Masters in ICT programme should know that it's more of IS than any computing programme”</i> <i>“A quick way to coming up with a programme is to look at similar programmes around the world”</i>	Lecturer, ICT Chair, Curriculum Committee

Source: Author’s constructs

The following finding can be made based on the analysis:

Finding 7: In SSA, the IS logic focuses the attention of actors on IS courses which advances the IS profession and the IS discipline at the local and global levels.

6.3.6 The Computer Science Logic

This privileges a view of computer science as the default discipline for all computing programmes. Computer science is arguably the most popular and oldest computing discipline in certain parts of SSA, including Ghana. This logic is carried by some members of faculty, some government experts from the regulator and some employers from the industry. The computer science logic focuses the attention of stakeholders on courses that are central to the computer science discipline and emphasises “hard” or “technical” computing competencies as required by computing-related disciplines. Qualitative evidence of the influences of computer science logic on graduate IS curriculum decisions in SSA is presented in Table 6.9.

Table 6.9: Qualitative Evidence of the Influence of the Computer Science Logic on Graduate IS Curricula

Second Order Constructs First Order Codes	Illustrative Quote(s)	Source
Computer Science Identity A. “Hard” Courses	<i>“An assessor from NAB who looked at our programme questioned why programming and some other technical courses were not included”</i>	Lecturer, ICT
	<i>“My MSc background was highly technical. Makes me see all other computing programmes in that manner”</i>	Lecturer, ICT
B. “Hard” Competencies	<i>“If you are familiar with job placements, you will see a requirement for computer science degrees and sometimes related degrees for all manner of computing jobs”</i>	Employer

Source: Author’s constructs

The following finding can be made based on the foregoing analysis:

Finding 8: In SSA, the computer science logic focuses the attention of actors to select “hard” computing courses and computing courses that deliver “hard” technical competencies to graduate IS students.

6.3.7 The Development Logic

The development logic is underpinned by the view of countries in SSA being in a developing region with their particular challenges. Specific expectations are centred around providing the relevant IS competencies that focus on dealing with developmental challenges. These

include, for example, how to meet sustainable development goals. The development logic, hence, focuses the attention of the ICT department on the selection of courses that delivers graduate competencies needed in solving problems that address one or more development goals globally or at the national level. Table 6.10 is a sample of qualitative evidence of the influence of the development logic on graduate IS competencies.

Table 6.10: Qualitative Evidence of the Influence of the Development Logic on Graduate IS Curricula

Second Order Constructs First Order Codes	Illustrative Quote(s)	Source
Development Goals A. Global Development Goals	<p><i>“As a developing country, we are concerned with how ICTs are used in meeting SDGs”</i></p> <p><i>“ICTs must help reduce global poverty, improve the quality of health and education and a sustainable environment. All these must find an expression in our graduate IS curriculum”</i></p> <p><i>“In deciding which courses to include, we ask ourselves also how ICTs can be applied by our graduates to meet the objectives of development agencies”</i></p>	Vice President, academic Head, ICT Chair, curriculum committee
B. Local Development Goals	<p><i>“Solving short to long term health, education, economic and other developmental challenges at the community and national level is key to this graduate IS programme”</i></p>	Head, ICT

Source: Author’s constructs

This analysis can be summarised in the following finding:

Finding 9: In SSA, the development logic influences graduate IS curriculum decisions by focusing the attention of IS departments on IS courses that provides competencies in achieving local, national and global developmental goals.

6.3.8 The Church Logic

The church logic is an instance of the religion logic. As already explained, PUni is a faith-based university, owned and governed by a Christian church. The church emphasises the need to underpin all academic programmes with Christian, moral and church values and practices. It was therefore expected that the church logic would focus the attention of the ICT department on graduate IS curriculum decisions that focus on the need to equip graduates with Christian, moral and church values. However, the qualitative evidence (Table 6.11) shows there was little or no influence of the church logic on graduate IS curriculum decision-making.

Table 6.11: Qualitative Evidence of the Influence of the Church Logic on Graduate IS Curricula

Second Order Constructs First Order Codes	Illustrative Quote(s)	Source
Competing Logics A. State logic	<i>“We have tried to include courses that promote the church doctrines and moral values but faced resistance from accreditation.”</i>	Dean, FoST
	<i>“We are in a democratic state and we do not endorse imposition of specific religion or doctrines on diverse students”</i>	Official, GTEC
B. Market logic	<i>“There are some competencies required by industry, but sometimes we do not have space to accommodate courses to cover them. Adding on courses on life values and church doctrines were virtually impossible”</i>	Head, ICT

Source: Author’s construct

Based on the foregoing analysis, the following finding can be made:

Finding 10: The church logic despite its existence is overridden by other competing logics diluting its influence on graduate IS curriculum innovation.

6.3.9 The Decolonisation Logic

The decolonisation logic is related to the belief that existing academic programmes and materials carry the interest of former colonial masters (western societies) and do not reflect the values and aspirations of SSA societies. The decolonisation logic is expected to focus the attention of ICT departments on courses and course contents that reflect the values and beliefs of SSA countries. Whilst this logic is prevalent in some southern African countries such as South Africa, Botswana and Tanzania, where the call to decolonise and Africanise IS education is very loud (Fomunyan & Teferra, 2017), it has been subdued by other logics such as the market logic in certain situations. In this case, for example, the decolonisation logic was not enacted in practice. Table 6.12 presents qualitative evidence to show that the decolonisation logic did not influence the development of the graduate IS curriculum.

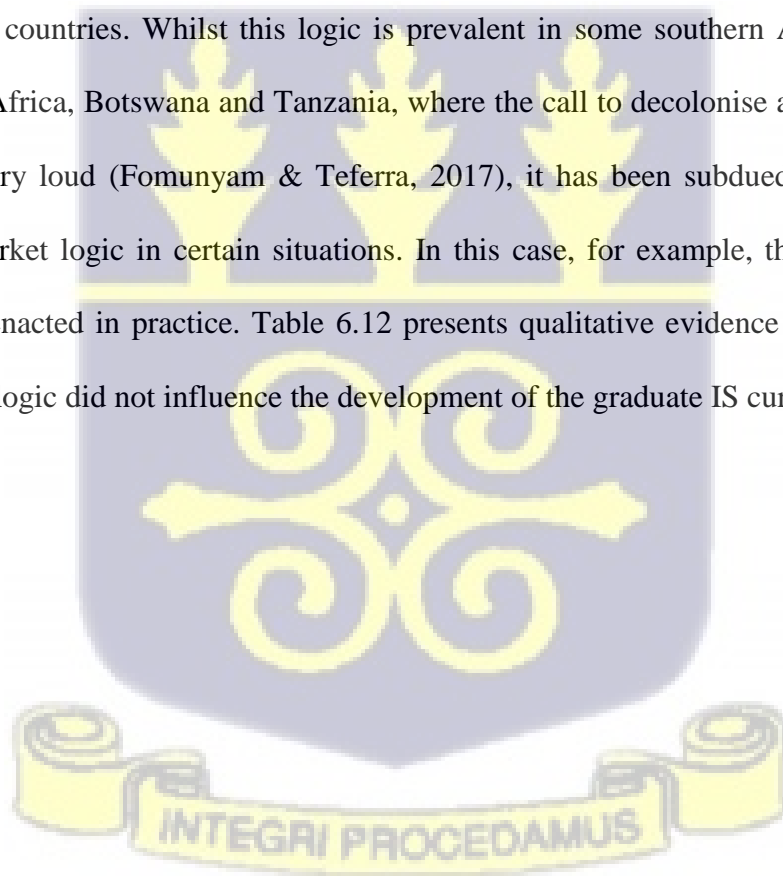


Table 6.12: Qualitative Evidence of the Influence of the Decolonisation Logic on Graduate IS Curricula

Second Order Constructs First Order Codes	Illustrative Quote(s)	Source
Superior Logics A. Market logic	<p><i>“Our major concentration is on industry needs. There has not been a concern from industry to pay attention to the value and cultural elements associated with the IS programme”</i></p> <p><i>“We recognise the need for appropriate content that students can easily relate to. The lack of it cannot however, drag us behind”</i></p> <p><i>“The books that NAB officials recommend to accompany this programme are foreign”</i></p>	<p>Head, ICT'</p> <p>Chair, Curriculum Committee</p> <p>Head, ICT</p>

Source: Author's construct

Based on the foregoing analysis, the following finding can be made:

Finding 11: In a faith-based private university in Ghana, the church logic and the decolonisation logic, though exist at the societal and organisational levels respectively, do not influence graduate IS curriculum innovation.

6.3.10 Institutional Complexity of a Graduate IS curriculum Innovation in SSA

From the analysis and discussions in the previous sections, about seven institutional logics at different levels were captured to have influenced the development of a graduate IS curriculum in SSA. This section analyses how the multiple institutional logics captured may be incompatible and contribute to institutional complexity.

A number of the institutional logics captured in this case, either complement or contradict each other. The institutional complexity matrix (Table 6.12) illustrates the complex relationships among the various institutional logics with “X” indicating incompatibility and “com” indicating compatibility.

Table 6.12: Institutional Complexity Matrix Showing Logic Incompatibilities

Logics	State	Market	Corporate	Academic	IS	Comp Sci.	Development	Church
State	-	com	com	X	com	com	com	X
Market	Com	-	com	X	com	com	X	X
Corporate	Com	com	-	X	com	com	X	X
Academic	X	X	X	-	com	com	com	com
IS	Com	com	com	com	-	X	com	X
Comp Sci	Com	com	com	com	X	-	com	X
Development	Com	X	X	com	com	com	-	com
Church	X	X	X	com	X	X	com	-

Source: Author

From Table 6.12, about eleven sources of institutional complexity arising from the incompatibilities of institutional logics could be observed. For example, whilst the state is interested in directing academic programmes toward a “graduate vocation” for all graduates, it is in contradiction with the academic logic that focuses learners’ attention on the pursuit of IS knowledge and not necessarily on jobs. Again, the state logic frowns on the inclusion of any modules that explicitly advance a particular religion or church doctrine, hence academic programme accreditors ensure such modules or content are not emphasised. This is in direct collision with the founding philosophy of most faith-based universities in Ghana.

In addition, the market logic that focuses the attention of IS departments on offering courses that prepare students for employment or industry is in contradiction with the academic logic that focuses IS departments' attention on the independent pursuit of academic knowledge and not necessarily preparing for job placements. In other words, whilst the industry expects IS graduates to obtain competencies directly relevant to their jobs, the academia may be

interested in the advancement of knowledge in the field that may not be directly or currently related to graduate employability. Again, the market logic conflicts with the development and church logics. In this case, a focus on industry competencies provides little room for IS competencies relevant to achieving developmental goals or pursuing graduate moral values.

Similarly, the corporate logic that focuses the university's attention on cost-effective profit-making decisions contradicts the academic, development and church logics. For example, the university sees the student as a "customer" and not just a learner who should be given value for their fees and that graduate IS programmes should meet the aspirations of these "customers". This is even more evident in a private university, that has no access to public funds, and must significantly rely on fees paid by these students to grow. However, academics view students as learners who should acquire competencies that are not necessarily motivated by students' employability needs. In the same way, the expectations of an IS curriculum to advance a developmental agenda at the local or global level or advance the religious and moral competence of graduates are incongruent with the corporate logic.

Moreover, the IS logic conflicts with the much older computer science logic particularly when these logics are carried by different faculty members with different backgrounds. At the same time, both logics compete with the church logic that focuses on adding modules relevant to advancing the church doctrine.

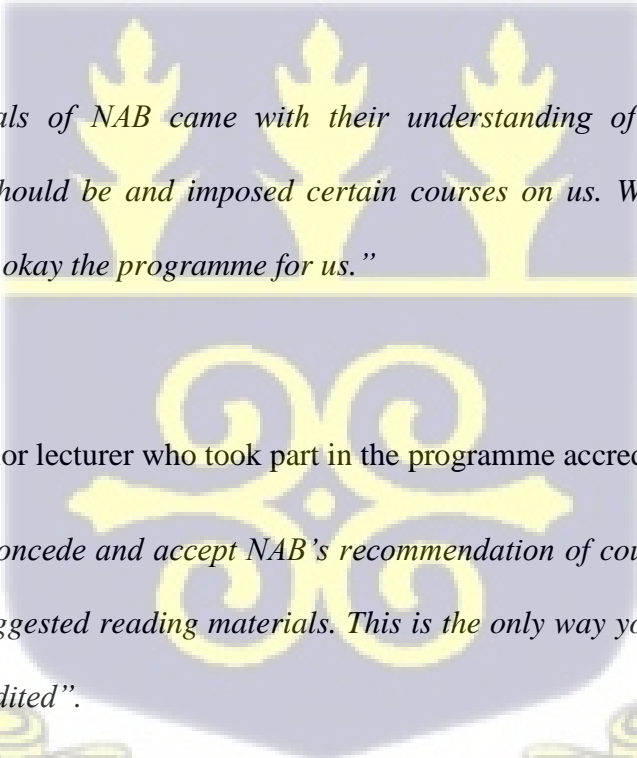
Based on the foregoing analysis, the following finding could be made:

Finding 12: The societal, field, university and individual level institutional logics contradict each other presenting an institutional complexity to graduate IS curriculum innovation in SSA.

6.3.11 Influence of Agent Actions on Graduate IS Curriculum Innovation in SSA

In the previous section, how multiple institutional logics contradict themselves to pose an institutional complexity has been discussed. This section discusses how an IS department enacts strategic responses to navigate this complexity to develop a contextually relevant graduate IS curriculum in SSA.

First of all, the IS department decided to accept all the suggestions from the national accreditation board when it is forcefully pushed down without room for negotiation. For example, according to the head of the ICT department of PUni:



“Some officials of NAB came with their understanding of what a graduate IS programme should be and imposed certain courses on us. We had to accept them grudgingly to okay the programme for us.”

In the words of a senior lecturer who took part in the programme accreditation process:

“We had to concede and accept NAB’s recommendation of courses and modules and sometimes suggested reading materials. This is the only way your programme can be quickly accredited”.

In addition, due to respect for academic seniority, sometimes juniors relinquish the logic they carry and accept the logic of their senior colleagues in making graduate IS curriculum decisions. For example, a lecturer who is also part of the curriculum committee recalls how after a long period of debate, on whether programming should be a mandatory module

for the graduate IS programme, conceded to a senior lecturer's position. In summary, IS departments may *acquiesce* to more powerful carriers of institutional logics.

Second, despite being a faith-based private university, the pressure from other institutional logics makes it difficult for the church logic to be manifested in the university practices. Not to lose the relevance of PUni being a faith-based university and also not to stand in the way of programme accreditation, the university separated programmes and activities targeted at the religious and moral growth of students from the regular academic curriculum. This is evident from a response from the Vice President:

“We have a strong chaplaincy and life values promotion centre that prepares modules that promotes the church doctrines, life and moral values. Whilst we are unable to include them in the regular curricula, we try to integrate them in related programmes or teach them as optional extra-curricular modules.”

This means the agent decoupled (Berente et al., 2019) some of its activities that make them acquire legitimacy from multiple stakeholders.

Third, sometimes it is difficult for one logic to be dominant or to eclipse the others. These logics can co-exist at the same time presenting a hybrid situation. For example, even though the IS logic contradicts the computer science logic, over time both logics co-exist in the IS department. According to the Head of the ICT department of PUni,

“For some time now, there are faculty members who see any computing programme as computer science and others who understand the nature of a typical IS programme. Our programme accommodates both views.”

Moreover, by nature, the graduate IS programme encompasses other disciplines with different logics. This interdisciplinary nature provides that, the different logics from the other departments or disciplines co-exist to sustain the IS programme. For example, at PUni, the graduate IS programme interfaces with different logics from the health, education, development and business disciplines. This means that hybridised (Heeks et al., 2020) graduate IS programmes are enacted as a response to multiple institutional interactions.

Fourth, it was also observed, that IS departments and actors sometimes drop their logics and follow the dominant or central logic. In this case, the central or dominant logic for a graduate IS programme in PUni was the market logic. This logic was carried and rationalised by different stakeholders in the IS curriculum innovation. Wherever there was a collision of any other logic with the market logic, the latter logic prevailed. For example, as much as IS academics would like to pursue and share knowledge independently, heads of department who wears both academic and corporate “hats” push graduate IS curriculum decisions with market logic. *According to the head of the ICT department: “Despite the resistance by lecturers to include some modules, we are always reminded that as a private university, the relevance of our programme depends on how well we prepare our students for industry.”*

Consequently, lecturers drop their strongly held academic logic for the dominant market logic resulting in the inclusion of graduate IS courses or modules that are relevant to the industry. With the foregoing discussion, the following findings could be made on the strategic responses enacted by actors in response to institutional complexity:

Finding 13: In the face of an institutional complexity in graduate IS curriculum innovation in SSA, IS departments enact strategic responses such as acquiescence,

de-coupling, hybridisation and pursuit of dominant logics to resolve contradictory logics.

6.4 Graduate IS Curriculum Responsiveness in SSA

In the previous section, an analysis of the case study that captured institutional logics and agent actions and their influence on graduate IS curriculum in SSA has been presented. This section responds to the third research objective which espouses the need to explain the consequences of institutional logic influence on graduate IS curriculum responsiveness. Based on the dimensions of curriculum responsiveness, the chapter analyses and discusses how a graduate IS curriculum is contextually responsive. From Figures 6.1, 6.2 and 6.3, six dimensions of IS curriculum responsiveness were identified. These are economic, disciplinary, pedagogical, cultural, *technological* and *disruptive* responsiveness.

First of all, because the faith-based private university is under-resourced, it was discovered that its overarching goal in the development of the graduate IS programme was to be economically responsive with little emphasis on social responsiveness. This expectation also coincided with the expectations of students. Consequently, two forms of economic responsiveness were identified. The first is related to the university's economic needs. This form manifests in the university's desire to attract students and increase enrolment of students, and also to be cost-effective in the running of the ICT department which was increasingly becoming a cost centre. The second form of economic responsiveness is related to the economic needs of the IS graduates. In this instance, IS graduates have expectations of being employed, getting promoted to a new role, having a guaranteed job or some industry competencies after graduation. According to Ponelis et al. (2012), students are more economically motivated even than the pursuit of knowledge in the choice of an academic

programme. Similarly, Ayalew et al. (2012) study of an undergraduate IS programme in a university in Botswana showed that, among other triggers, the IS department decided to review its curriculum because of complaints that its graduates were not being employed. An IS curriculum should therefore respond to these economic needs of the students.

The economic responsiveness of the graduate IS curriculum is a consequence of an “artefaction” or transmission of the market or industry logic. Consequently, the following findings can be made:

Finding 14: A graduate IS curriculum in SSA could be economically responsive in two ways. First by considering the university's economic needs such as increased IS student enrolment and cost-effectiveness. Second by considering the IS graduate's economic needs such as employability, industry competencies, job promotion and guaranteed jobs.

Second, the ICT department of PUni kept to the IS identity both locally and globally. These represent the two forms of the disciplinary responsiveness theoretical dimension. For the graduate IS curriculum to keep a local IS identity, there is the need to consider course offerings from successful graduate IS programmes. It is also important to respond to the expectation of the IS faculty. At the same time, to maintain the global or international identity of the graduate IS programme, there is the need for the curriculum developers to consider the expectations of the global IS competency models developed to guide graduate IS programmes. The MSIS 2016, which was adopted in this study, has been discussed in section 3.2. In a similar study of undergraduate computing programmes in four public universities in South Africa, Ponelis et al. (2012) discovered that whilst the programmes sought to be locally

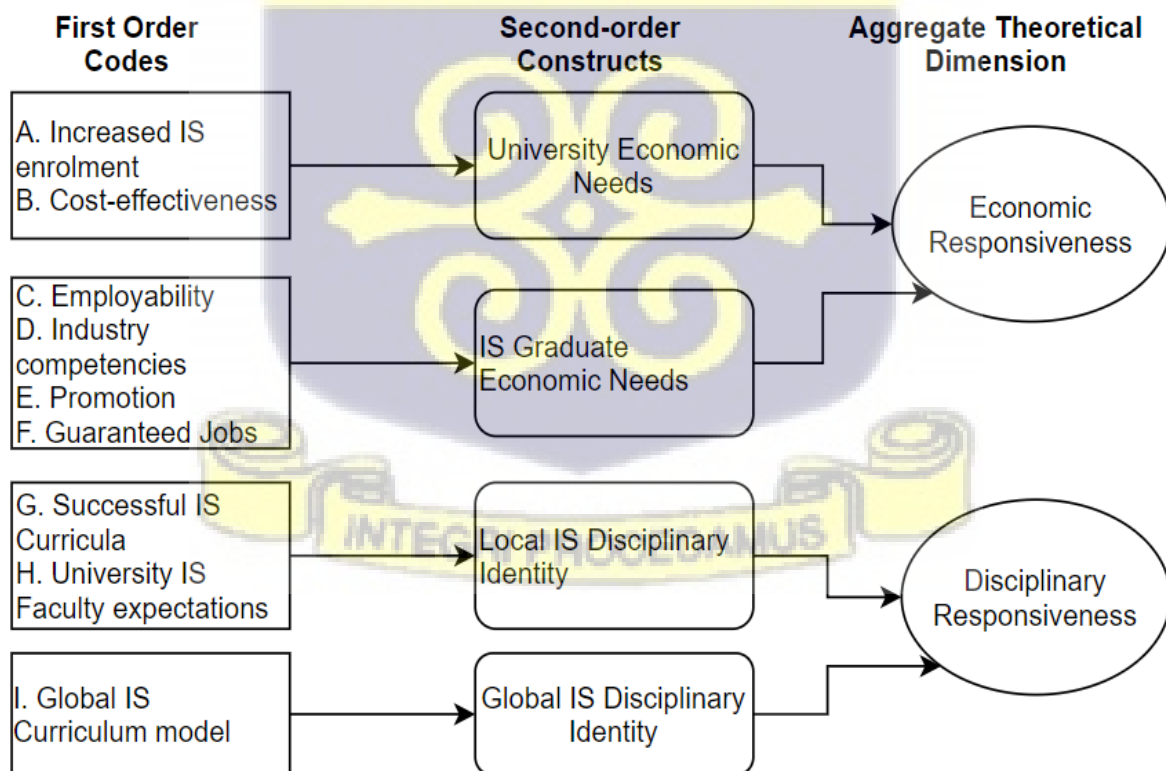
relevant, they also kept a global identity through the adaptation of model curricula. This is broadly in line with an emerging IS “glocalisation” pursuit (Xiao et al., 2013) in developing countries. Hence, based on the analysis and discussion, the following finding could be made:

Finding 15: In SSA, a graduate IS curriculum in SSA is expected to be disciplinary responsive by aligning with both a global and local IS disciplinary identity.

Similarly, disciplinary responsiveness is a consequence of the “artefaction” or transmission of the IS professional logic.

The structure of the data demonstrating economic and disciplinary responsiveness is shown in Figure 6.1.

Figure 6.1: Structure of Data related to the Economic and Disciplinary Responsiveness dimension



Source: Author

Third, the study uncovered two forms of pedagogical responsiveness, which is how the graduate IS curriculum responds to the learning needs of students. The first relates to the experiences prospective students are likely to bring to the graduate IS programme. These experiences are diverse, covering individual job-related experiences or previous academic backgrounds. For example, while some students will enrol with a strong computing background, others enrol with weak computing background but strong managerial background or competency in other domains of practice. It is important for graduate IS curricula to respond to these diverse backgrounds by, for example, introducing transition or bridge courses that level students' backgrounds and prepare them fully to understand other courses or modules. According to Topi et al. (2017), whilst prospective students are expected to have competencies in all IS competency areas from an appropriate undergraduate area, deficits could be filled with a bridge course. The second form of pedagogical responsiveness relates to learning resources that support the teaching and learning of IS at the graduate level. These resources may include an appropriate laboratory for practical modules, qualified academic staff to teach the relevant courses and appropriate contextualised textbooks and materials. For example, there has been a suggestion that universities in emerging economies lack the faculty to prepare students for undergraduate and graduate IS programmes (Negash et al., 2012). Other studies have alluded to the lack of, and inefficient use of resources such as computers, software and human resources (see Ayalew et al., 2012; Syler & Venkatesh, 2018) to support the teaching and learning of IS in SSA.

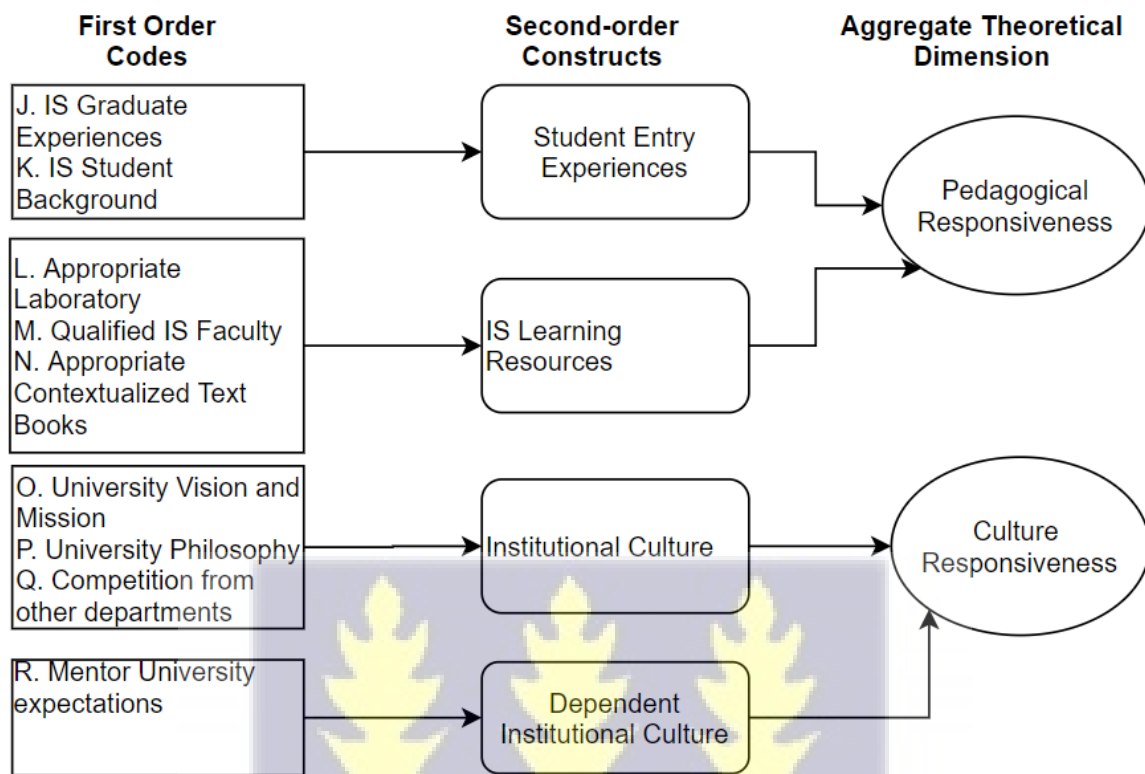
The structure of the data is provided in Figure 6.2. Based on the analysis, the underlying finding is summarised as:

Finding 16: In SSA, a graduate IS curriculum is pedagogically responsive by considering students' entry experiences and the IS learning resources available.

Again, from Figure 6.2, the fourth dimension this study uncovered is cultural responsiveness. This dimension, also, may present itself in two forms. The first is the institutional culture which captures formal and informal “ways of doing things” in the university. These may be expressed in vision and mission statements, the university’s philosophy and the level of competition from other departments. For example, at PUni, departments are encouraged to collaborate in developing programmes presenting a high expectation for interdisciplinary programmes which are approved by the university management. Again, the university emphasises entrepreneurship through teaching and learning and other non-curricular activities. This is comparable to the undergraduate IS of the University of Botswana study where expected graduate attributes and other performance indicators were enshrined in the strategic plans and other policy documents of the university which guide the curriculum change and teaching and learning (Ayalew et al., 2012). The second influence comes from how other institutions or organisations the university depends on “do their things”. They have been referred to here as a dependent institutional culture. These are, largely, influences arising from the expectations of mentor universities. In this study, for example, PUni depends on the University of Ghana for programme affiliation. This required PUni to conform to certain expectations of the mentor university. Similarly, PUni depends on the regulator, GTEC for programme accreditation. This also required PUni to conform to the expectations of GTEC. Consequently, these analyses and results lead to the next finding.

Finding 17: In SSA, a graduate IS curriculum is culturally responsive by considering its organisational culture and the culture of its dependent organisations.

Figure 6.2: Structure of Data related to the Pedagogical and Culture Responsiveness Dimensions



Source: Author

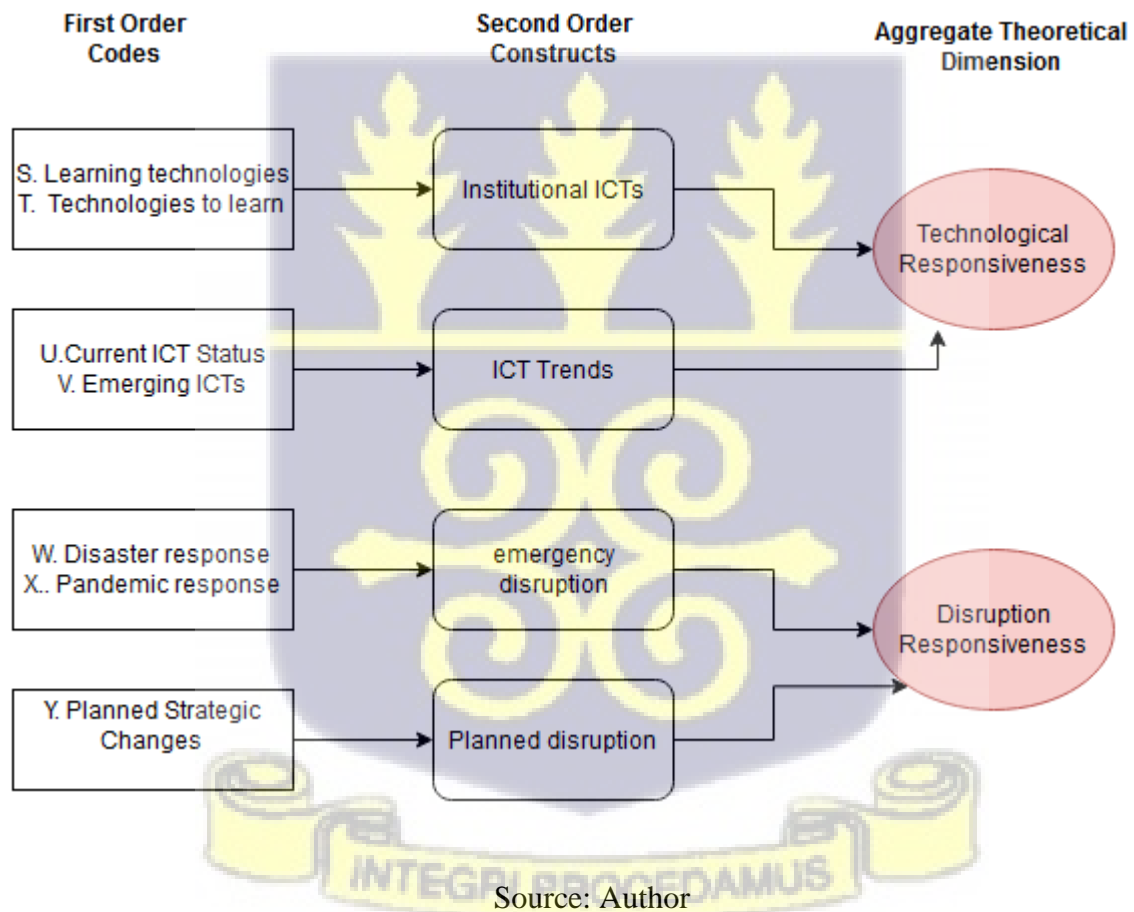
Furthermore, this study uncovered the technological responsiveness dimension which was not originally in the curriculum responsiveness theory. From Figure 6.3, which illustrates the data structure for the technological responsiveness dimension, two forms of technological responsiveness may exist. The first is related to organisational ICTs which encompasses a broad range of learning technologies and infrastructure and also specific technologies that may support the development of graduate technical skills. The other instance is not about learning with technologies but what technologies you must learn about. For example, in teaching a database management course that has a practical component, the department is faced with the choice of many database management systems available. The department, due

to resource and other constraints may, for example, opt for open source and free applications such as MySQL, or proprietary applications such as Microsoft SQL. This is the same not only for software but also for programming languages and infrastructure. For example, in a similar study of an undergraduate computing curriculum in a Nigerian university, using the design-reality gap model, whilst it was expected that adequate IT infrastructure exist to support teaching and learning, Dasuki et al. (2015) found, in reality, that there were challenges in terms of the quality and quantity of infrastructure supporting the implementation of the curriculum. IS curricula should respond to such institutional technological needs. The other form of technological responsiveness is related to general ICT trends at the global and local levels. IS curricula should respond to prevailing and emerging technologies. In this study, for example, current technologies being used by the industry were analysed to identify the prevailing state of ICTs. On the other hand, experts in the Delphi study provided indications of what technologies are relevant now and would be relevant to the industry in future. The results served as a critical input to the development of the graduate IS curriculum at PUni. Since ICTs change rapidly, IS curricula must respond to such rapid changes and therefore a course such as “Information Systems Trends” was seen as a “searchlight” course that would be updated periodically to capture the relevant prevailing and emerging ICTs. Moreover, a careful study of ICT policies of the country will provide insights into a government focus now and in the future. This need for an analysis of the state of the ICT at the global and national levels has been emphasised by Larsson and Boateng (2010) who suggests the need to identify the characteristics of the present situation in terms of the ICT readiness, availability, uptake and impact in the country or region served by the university. Such an exercise, and perhaps including an additional focus on emerging technologies, provides agility to the development of a graduate IS curriculum. Similarly, an analysis of national ICT policies to inform IS curriculum development has also been reported by previous literature (see Ayalew

et al., 2012; Larsson & Boateng, 2010; Ponelis et al., 2012). Consequently, the following finding is made:

Finding 18: In SSA, a graduate IS curriculum should be technologically responsive by considering organisational level ICTs for teaching and learning, and ICT trends such as current and emerging ICTs.

Figure 6.3: Structure of Data related to the Technological and Disruption Responsiveness Dimensions



Finally, the study uncovered *disruptive responsiveness* as a new dimension of curriculum responsiveness. From the study, as illustrated in Figure 6.3, two forms of disruptive

responsiveness were uncovered. The first is related to a response to a natural emergency that significantly alters teaching and learning. For example, amid COVID-19 emergencies, university education in most parts of SSA and developing countries including PUni became a challenge. At PUni, for example, there was the need to replace all or most face-to-face courses with e-learning. Whilst a technological response existed, not all courses were able to easily migrate to an online or mobile alternative. The nature of the courses was therefore important for its virtualisation. This view had earlier been espoused by Ansong et al. (2017) that the nature of the course or module, beyond other technological, organisational and environmental factors, determines how effective or successful such a virtualisation process becomes. The lesson here is that graduate IS curricula must plan and be responsive to such disruptions occasioned by natural emergencies. The second is a response to a disruption occasioned by an innovation. For example, planned changes in the university's strategic plan to implement distance learning through e-learning impacted the selection and design of courses for the graduate IS programme at PUni. Consequently, the following findings can be made:

Finding 19: In SSA, a graduate IS curriculum should be disruptively responsive by considering how the IS curriculum responds to disruptions occasioned by emergencies and those by planned innovations.

6.5 The Nature of Graduate IS programmes in SSA

The fourth research objective espouses the need to explore the nature of graduate IS programmes in SSA. This section presents an analysis and discussion of the nature of graduate IS programmes in SSA.

6.5.1 Graduate IS Programmes Characteristics in SSA

From the results summarised in Table 5.9, a number of observations can be made. There is no formal convention for naming graduate IS programmes. Brooks et al. (2016), who identified 38 unique names for graduate IS programmes in the US, found that the names sometimes followed the latest trends in technology. It is therefore not surprising to currently see a graduate IS programme named data analytics to emphasise new technological trends compared to IS decision science identified some 10 years ago (see Apigian & Gambill, 2010). In addition, the diversity in the naming of graduate IS programmes is a reflection of the multidisciplinary characteristics of the IS field, emphasising the different domain areas Information Systems serve. For example, there are names like Health Information Systems, Geographical Information Systems, Business Information Systems, Computing Information Systems and Information Technology and Law which emphasises the Health, Geographical, Business, Computing and Law domains respectively. Moreover, the top three graduates IS programmes names in SSA are IS, IT and ICT or IT Management. On the other hand, in the US study, the top three graduates accredited IS programme names were Information Systems, Management Information Systems and Computer Information Systems (Brooks et al., 2016, p. 71). An earlier study in the US by Apigian and Gambill (2014), identified IS as still the most popular name for graduate IS programmes, followed by Management Information Systems/Technology and Computer Information Systems. Also, the diversity seems wider in SSA (1 name for every 2.5 programmes) than in the US (1 name for every 6.6 programmes) (see Brooks et al., 2016, p. 72).

Consequently, the following finding can be made:

Finding 20: There is no convergence or standard in the naming of graduate IS programmes in SSA. Whilst Information Systems is the dominant name for graduate IS programmes in SSA, other names have been based on technological trends and/or the domains IS served.

Furthermore, the study was interested in the nature of the organisational forms hence the university type (public or private or hybrids) and sub-organisational forms like the faculty (Science, Business, etc) which houses the graduate IS programme analysed. A crosstab analysis was done to understand the nature of the graduate IS programmes across the different regions of Sub-Saharan Africa (Central, Eastern, Western and Southern). A summary of the crosstab analysis is presented in Table 6.13.

Table 6.13: A Crosstab Analysis of the Nature of Graduate IS Programmes in SSA

Region	University Ownership	IS Programme Type	Business	Computing and Informatics	Science	Science-Tech	Technology	Grand Total	
East	Private		1	14	1	3	2	21	
				2	1	1	1	5	
		Generalist		1	1	1	1	4	
	Specialist		1				1		
	Public			1	12		2	1	16
		Generalist		1	5		1	1	8
Specialist				7		1		8	
South	Public		8		5			13	
			8		5			13	
		Generalist	5		3			8	
		Specialist	3		2			5	
West	Private			7	2			9	
				2				2	
		Generalist		2				2	
	Public			5	2			7	
		Generalist			3	1		4	
		Specialist			2	1		3	
Grand Total			9	21	8	3	2	43	

Source: Author

Again, from Table 6.13, it is observed that almost half of the graduate IS programmes analysed are concentrated in the eastern part of SSA, with almost equal proportions of generalist and specialist graduate IS programmes in public universities. In addition, graduate IS programmes are more popular in public-funded universities than in private-funded universities. These foregoing observations could be explained by a general lack of resources for private universities in SSA. It is therefore not surprising, from Table 6.13, that private universities in SSA focus on generalist's graduate IS programmes due to their lack of resources (for example, specialised laboratories, qualified lecturers, appropriate textbooks, etc). Even for public universities in SSA, there seems to be a preference for generalists over specialists graduate IS programmes. According to Tedre et al. (2009), organisations in SSA, due to lack of resources do not employ IS graduates with specialised competencies hence IS academic programmes must be general to enable IS graduates to play varying roles in the organisation.

Unlike the UK and the US, where IS programmes are housed in the science faculty and the business schools respectively (see Bohler et al., 2020; Cummings & Janicki, 2020; Stefanidis et al., 2012), from Table 6.13, most graduate IS programmes in SSA, are housed in independent computing and informatics. This may be explained in two ways. First, graduate IS programmes are hybrid with each constituent having different logics (science, technology and domain) co-existing. This may lead to a number of contradictions arising when it is housed in a natural science faculty or the faculty of the domain area it serves. For example, should a graduate programme in health informatics be housed in a health faculty or a natural science faculty closer to a computer science department? For the avoidance of such a dilemma and its inherent contradictions, there has been an evolution of an independent

faculty, in SSA, that seems to house all computing and its related academic programmes (popularly called computing and informatics). Second, the generalist nature of most graduate IS programmes do not make it appropriate to be housed in a specialised faculty or school that focuses on a particular domain only or a very technical area of computing. Consequently, a hybrid faculty has evolved to accommodate various IS and other computing-related programmes.

Based on the foregoing analysis, the following findings can be made:

Findings 21: Graduate IS programmes in SSA are hybrid and are focused on providing either generalist or domain-driven specialist or technology-driven specialist competencies.

The next finding is related to the nature of the sub-organisational unit that houses and manages graduate IS programmes in SSA. This is also summarised as:

Findings 22: In SSA, there is an emergence of a hybrid faculty of computing and informatics that houses graduate IS programmes and other computing-related programmes though a few of the programmes are still housed in traditional business, science and technology departments.

6.5.2 The nature of graduate IS programme course offerings in SSA

This section analyses and discusses the nature of graduate course offerings in SSA. First, a comparative analysis of course offerings is presented. This is followed by a discussion of the contribution of courses to different competency categories specified by the global IS competency model.

From Table 5.11, the top five courses or modules offered in graduate IS programmes in SSA are IS management, Research dissertation, Research methodology, IS strategy and policy and IS security and auditing. This is quite different from the findings of Yang (2012) who identified Management of IS, Thesis, Programming, Decision support systems and Research methods as the top 5 courses or modules offered by graduate IS programmes in the US. In a later survey of graduate IS programmes in the US, by Apigian and Gambill (2014), programming was less emphasised with the top five courses being Databases, Management of IS, Systems Analysis and Design, Project Management and Data communications and networks. A summary of the comparison of top graduate IS courses in this study to previous studies in other regions is presented in Table 6.14.

Table 6.14: Summary of a Comparison of the Top 10 Popular Courses in this Study to Previous Studies

No	This study (SSA)	Yang (2012) (US)	Apigian and Gambill (2014) (US)
1	IS Management	Management of IS	Management of IS
2	Research Dissertation	Project/Thesis	-
3	Research Methodology	Research methods	-
4	IS Strategy and Policy	IS Strategy & Policy	-
5	IS Security & Audit	-	-
6	IS Development and Acquisition	Analysis, Modelling & Design	Systems Analysis and Design
7	IS Project Management	Project Management	Project Management
8	Data Analytics	-	-
9	Enterprise Architecture	Enterprise Models	-
10	IS Foundations	-	-

Source: Author

The result as compared to existing literature indicates that perhaps IS management has global recognition as a core course in graduate IS programmes. Whilst Apigian and Gambill (2014) excluded research methods and dissertations from their analysis, it is observed from the result

of this study and that of Yang (2012) that these courses are relevant to graduate IS programmes in SSA and the US. This is the same for the IS development and acquisition or systems analysis and design course.

Second, a number of courses contribute to IS-specific competencies as specified in the MSIS 2016. As compared to other IS competency areas, 126 (65.28%) of courses in graduate IS programmes in SSA contribute to IS-specific competencies (See Table 6.15, percentages approximated to two decimal places).

Table 6.15: Course Contributions to IS Competency Areas in SSA

Competency Area	Number of Courses	Percentage (2 d.p)
IS Specific	126	65.28
Domain of Practice	35	18.13
Individual Foundation	32	16.58
Total	193	99.99

Source: Author

This result is not too different from the study of undergraduate IS programmes in the UK, where 60% of courses surveyed contributed to IS-specific knowledge and skills (Stefanidis et al., 2012). Previous studies of graduate IS programmes did not however compare to any competency model. Table 6.16 presents a summary of IS courses contributing to ISSCs.

Table 6.16: Summary of Graduate IS Courses Contributing to ISSC in SSA

Number	Course	Number of Courses
1	IT Management	14
2	IS Strategy and Policy	10
3	IS Security and Auditing	10
4	IS Development and Acquisition	9
5	IS Project Management	9

Number	Course	Number of Courses
6	Big Data Analytics	9
7	Enterprise Architectures	7
8	IS Foundations	7
9	Data Warehousing and Management	6
10	Enterprise Systems	5
11	Data Communication and Networks	5
12	IS Trends	4
13	Organisational Behaviour and Management	4
14	Advanced Database Systems	4
15	Knowledge Management	3
16	Digital Entrepreneurship	3
17	IT Infrastructure	3
18	Cloud Computing	3
19	Software Engineering	3
20	Programming	3
21	Change Management	2
22	Legal and Social Implications of Informatics	2
23	Risk Management	1
	Total	126

Source: Author

In addition, some IS programme course offerings contribute to different domains of practice. From the Table 6.15, 18.3% of the courses in graduate IS programmes in SSA contribute to Domain of Practice competencies (DPC) compared to 24% in undergraduate IS programmes in the UK (Stefanidis et al., 2012). A summary of a list of courses in graduate IS programmes in SSA contributing to DPCs is presented in Table 6.17.

Table 6.17: Summary of Courses in Graduate IS Programmes in SSA Contributing to DPC

Number	Course	Number of Courses
1	e-Business	6
2	e-Health	4
3	ICT For Development	3
4	Accounting and Financial Management for IT	3
5	Health Systems	2

6	Artificial Intelligence	2
7	Marketing Management	2
8	Mobile Computing	2
9	Educational Technology	1
10	Financial Technologies	1
11	e-Government	1
12	e-Mining	1
13	Strategic Management	1
14	Computer Graphics	1
15	XML and Web Services	1
16	Geographic Information Systems	1
17	Business Finance	1
18	Public Policy and Administration	1
19	Negotiations, Contracts and Conflict Management	1
	Total	35

Source: Author

Whilst previous studies in the UK and the US (see Apigian & Gambill, 2014; Stefanidis et al., 2012; Yang, 2012) identified computing and business as the main domain areas being offered by IS programmes, this study identified other domain areas beyond the dominant business and computing domains. These domain areas include health, education, public policy, development, geography, government and mining. Some of these domains have been driven by local needs. For example, a university that serves a community of large mining companies introduced an IS course in mining. Again, the significance of ICT in socio-economic development in developing countries cannot be underestimated requiring the need to explore the development domain (Heeks, 2012; Pade-Khene, 2015). The various domains and distribution of courses are presented in Table 6.16.

Table 6.16: Distribution of Courses Contributing to DPCs in SSA

Domain of Practice	Percentage of Courses
Business	40
Computing	17.14
Health	17.14

Development	8.57
Public Policy	5.71
Education	2.86
Geography	2.86
Government	2.86
Mining	2.86

Source: Author

Furthermore, courses contributing to Individual Foundation Competencies (IFCs) represent 16.58% of courses offered in graduate IS programmes in SSA (Table 6.15, almost as much as DPCs. This is more than the contribution of courses to foundational knowledge and skills (less than 8%) found in the UK study of undergraduate IS programmes (Stefanidis et al., 2012). This may be because, whilst this study treats research methods and dissertation modules as contributing to IFCs, Stefanidis et al. (2012) did not map project work to any competency. The modules which contribute to individual foundational competencies include research dissertation, research methods, system thinking, critical reading, report writing, intercultural management and communication, decision making and advanced statistics. The courses in graduate IS programmes in SSA that contribute to IFCs have been summarised in Table 6.17. Again, the Yang (2012) and Apigian and Gambill (2014) studies, apart from research dissertations and research methods, largely focused on IS-specific courses.

Table 6.17: Summary of Courses in Graduate IS Programmes in SSA Contributing to IFC

Number	Course/modules	Number of courses
1	Research Dissertation	13
2	Research Methods	11
3	Systems Thinking	3
4	Critical Reading	1
5	Report Writing	1
6	Intercultural Management and Communication	1
7	Decision Making	1
8	Advanced Statistics	1

	Total	32
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Source: Author

Based on the foregoing analysis and discussions, the following finding is observed.

Finding 23: In SSA, graduate IS course offerings provide IS-specific, individual foundational competencies, and in domains of practise such as business, computing, health, education, public policy, development, geography, government and mining.

6.6 Summary of Chapter

In this chapter, the analysis and discussion and corresponding findings of the four research questions have been presented. First, it was found that the nature of mid-level management IS competencies required a hybrid of IS-specific, domain of practice and individual foundational competencies. Second, multiple and conflicting institutional logics presented an institutional complexity for graduate IS curriculum innovation in SSA. Information systems departments navigate this institutional complexity through actions such as acquiescence, decoupling, hybridisation and pursuit of dominant logics. Consequently, a contextually relevant and economically, disciplinary, pedagogically, culturally, technologically and disruptively responsive graduate IS curriculum is developed. In SSA, this graduate IS curriculum may be generalist or specialist in nature.



CHAPTER SEVEN

SUMMARY, CONCLUSION, CONTRIBUTIONS AND SUGGESTIONS FOR FUTURE RESEARCH

7.1 Overview of Chapter

In the previous chapter, analysis and discussions leading to appropriate findings were presented. In this concluding chapter of the thesis, a summary of the research findings for the research objectives is presented. The contributions of this study to research and practice and their implications are also discussed. Finally, suggestions for future research on IS curriculum innovations are also discussed.

7.2 Summary of Research

This thesis is organised into seven chapters. The first chapter provided the background to IS competencies and IS curriculum innovations. This background motivated the research gaps, research purpose, research objectives and research questions. The significance of the study was also presented. In Chapter two, a literature review of IS curriculum research was presented to identify the relevant research issues, methodologies and theoretical or conceptual approaches, and relevant research gaps which support the need to explore graduate IS curriculum innovations in SSA. The review revealed, among others, a general lack of theorisation in IS curriculum research and the need to develop a framework towards the development of a contextually relevant and industry-responsive graduate IS curriculum for SSA. Chapter three is a review of the model and theories that were adopted for the study. This study adopted the MSIS 2016 global competency model to guide the analysis of the

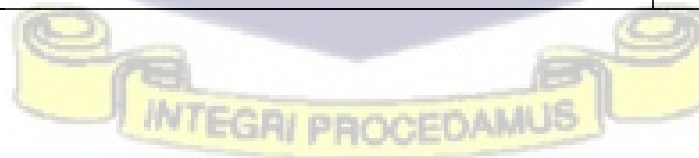
nature of mid-level management IS competencies and graduate IS programmes in SSA. Again, this study adopted the institutional logic perspective to explain the influence of institutional logics and agent actions on IS curriculum innovation in SSA. In addition, the curriculum responsiveness dimensions were adopted to understand the consequences of institutional logics on curriculum responsiveness. Based on the literature and from the data, two new dimensions, *technological and disruptive responsiveness*, emerged, particularly for academic programmes in computing which were empirically confirmed in this study. Consequently, a conceptual model to guide the study was presented. In Chapter four, the research methodology was presented. The philosophical assumptions underpinning the research were presented and a justification of why the critical realism philosophy was appropriate for this study was also presented. Further, the Mixed-Method Research approach was selected and the specific research design explaining the data collection and analysis for each research objective was explained. The results of the study were presented in Chapter five. In Chapter six, an analysis and discussion of the results were presented. Finally, Chapter seven concludes this PhD thesis by presenting a summary of the research activities, a summary of the key findings, a discussion of key research contributions and suggestions for future research.

7.3 Summary of Key Findings

In this section, a summary of the key findings in relation to the four research objectives is presented in Table 7.1. Based on these findings, an updated (post-study) conceptual framework is presented in Figure 7.1.

Table 7.1: Summary of Key Research Findings for the Research Objectives

Research Objectives	Key Findings	Gap Addressed	Key Contributions
<p><i>a. To explore the nature of mid-level management IS competencies required by organisations in Sub-Saharan Africa.</i></p>	<p>The nature of current and future mid-level management IS competencies relevant to Organisations in SSA</p> <p><i>Finding 1: In SSA, the hybrid role of mid-level management IS professionals requires individual foundation competencies, IS-specific competencies and competencies in a domain of practice.</i></p> <p><i>Finding 2: In SSA, organisations emphasise individual foundation skills than technology-specific skills for mid-level IS management positions.</i></p>	<p>These findings addressed the second research gap that suggested the need to explore mid-level management IS competencies relevant to organisations in regions other than US and UK (Cummings & Janicki, 2020; Kappelman et al., 2016).</p> <p>To explore the nature of mid-level management IS competencies required by organisations in SSA, a Delphi study was conducted with IS experts from different industries in SSA.</p>	<p>This study unearthed the hybrid nature of the mid-level management IS role in SSA.</p> <p>These findings are critical inputs to a contextually relevant graduate IS curriculum in SSA.</p>



<p><i>b. To explain how institutional logics influence graduate IS curriculum innovations in SSA.</i></p>	<p>Influence of Institutional logics on graduate IS curriculum innovation in SSA</p> <p><i>Finding 3: In SSA, at the societal level, the state logic influences IS departments' graduate curriculum decisions in two ways. First, the state logic focuses the attention of the decision-makers on national relevance by considering which IS courses solve the reduction of unemployment and other socio-economic challenges. Second, the state logic focuses the attention of decision-makers on programme sustainability by considering which IS courses are likely to attract steady enrolment and funding to ensure financial sustainability.</i></p> <p><i>Finding 4: The market or industry logic focuses IS departments' attention on student economic needs by focusing and selecting IS courses that deliver IS competencies needed by students to be employable in industry or for their professional development.</i></p> <p><i>Finding 5: Graduate IS curriculum innovation in SSA is influenced by corporate logic, which focuses the attention of decision-makers on cost-effectiveness and process improvement in the selection of graduate IS courses.</i></p> <p><i>Finding 6: In SSA, the academic logic focuses the IS department's attention on their academic autonomy by emphasising their academic freedoms to teach, research and pursue professional advancement without interference and whilst espousing collegialism recognises professional seniority in a graduate IS curriculum decision-making.</i></p> <p><i>Finding 7: In SSA, the IS logic focuses the attention of actors on IS courses</i></p>	<p>These findings addressed the lack of explanations of how institutions influence graduate IS curriculum innovation in SSA.</p> <p>These institutional logics which influence graduate IS curriculum innovation in SSA were captured from a qualitative case study of a graduate IS programme in a faith-based private university in SSA.</p>	<p>Two new Societal institutional logics in SSA were captured: the development and decolonisation logics.</p> <p>The institutional complexity matrix has been introduced to demonstrate the various contradictions that contribute to institutional complexity.</p> <p>The study uncovered strategic responses actors enact in response to institutional complexity in graduate IS curriculum innovation in SSA</p>
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	<p><i>which advances the IS profession and the IS discipline at the local and global levels.</i></p> <p><i>Finding 8: In SSA, the computer science logic focuses the attention of actors to select “hard” computing courses and computing courses that deliver “hard” technical competencies to graduate IS students.</i></p> <p><i>Finding 9: In SSA, the development logic influences graduate IS curriculum decisions by focusing the attention of IS departments on IS courses that provides competencies in achieving local, national and global developmental goals.</i></p> <p><i>Finding 10: In a faith-based private university in Ghana, the church logic and the decolonisation logic, though exist at the societal and organisational levels respectively, do not influence graduate IS curriculum innovation.</i></p> <p><i>Finding 11: In a faith-based private university in Ghana, the church logic and the decolonisation logic, though exist at the societal and organisational levels respectively, do not influence graduate IS curriculum innovation.</i></p> <p><i>Finding 12: The societal, field, university and individual level institutional logics contradict each other presenting an institutional complexity to graduate IS curriculum innovation in SSA.</i></p>		
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	<p><i>Finding 13: In the face of an institutional complexity in graduate IS curriculum innovation in SSA, IS departments enact strategic responses such as acquiescence, de-coupling, hybridisation and pursuit of dominant logics to resolve contradictory logics.</i></p>		
<p><i>c. To explain the consequences of institutional logic influences on graduate IS curriculum</i></p>	<p>Graduate IS curriculum Responsiveness in SSA</p> <p><i>Finding 14: A graduate IS curriculum in SSA could be economically responsive in two ways. First by considering the university's economic needs such as increased IS student enrolment and cost-effectiveness. Second by considering the IS graduate's economic needs such as employability, industry competencies, job promotion and guaranteed jobs.</i></p>	<p>These findings respond to the third research gap which suggested the need to explain the consequences of the influence of institutions on IS curriculum</p>	<p>This study of graduate IS curriculum contextualisation is perhaps the first in the SSA region and provides empirical insights into the</p>

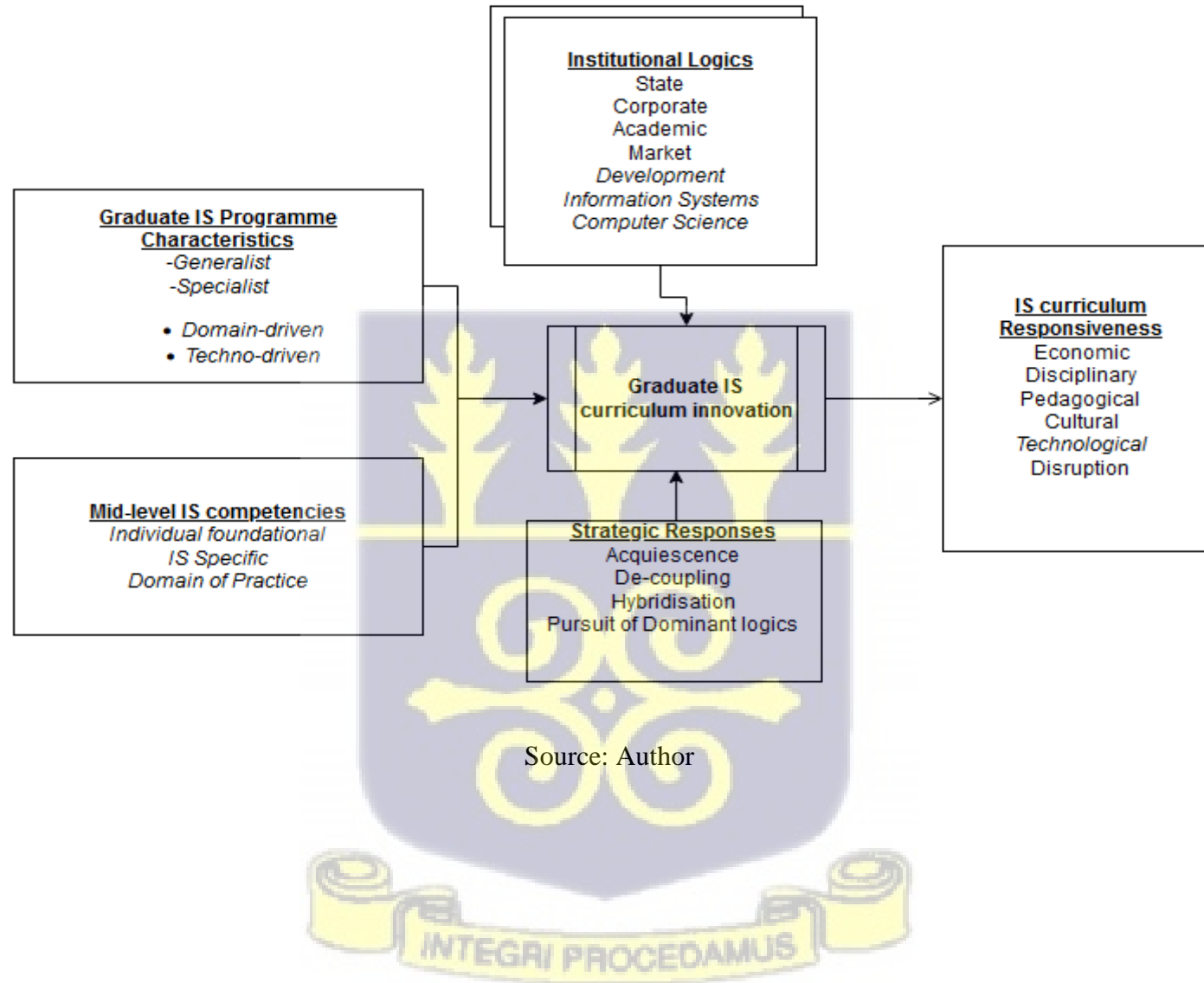
<p><i>responsiveness in Sub-Saharan Africa.</i></p>	<p><i>Finding 15: In SSA, a graduate IS curriculum in SSA is expected to be disciplinary responsive by aligning with both a global and local IS disciplinary identity.</i></p> <p><i>Finding 16: In SSA, a graduate IS curriculum is pedagogically responsive by considering students' entry experiences and the IS learning resources available.</i></p> <p><i>Finding 17: In SSA, a graduate IS curriculum is culturally responsive by considering its organisational culture and the culture of its dependent organisations</i></p> <p><i>Finding 18: In SSA, a graduate IS curriculum should be technologically responsive by considering organisational level ICTs for teaching and learning, and ICT trends such as current and emerging ICTs</i></p> <p><i>Finding 19: In SSA, a graduate IS curriculum should be disruptively responsive by considering how the IS curriculum responds to disruptions occasioned by emergencies and those by planned innovations.</i></p>	<p>responsiveness.</p>	<p>factors that shape a graduate IS curriculum innovation.</p> <p>The study uncovered <i>technological and disruption responsiveness</i> as new dimensions in the discussion of curriculum responsiveness. Existing dimensions include socio-economical, disciplinary, cultural and pedagogical (Moll, 2004).</p>
<p><i>d. To explore the nature of graduate IS</i></p>	<p>The nature of graduate IS programmes in SSA</p> <p><i>Finding 20: There is no convergence or standard in the naming of graduate IS programmes in SSA. Whilst Information Systems is the</i></p>	<p>These findings addressed the fourth research gap that espoused the need to</p>	

<p><i>programme offerings in Sub-Saharan Africa.</i></p>	<p><i>dominant name for graduate IS programmes in SSA, other names have been based on technological trends and/or the domains IS served.</i></p> <p><i>Finding 21: Graduate IS programmes in SSA are hybrid and are focused on providing either generalist or domain-driven specialist or technology-driven specialist competencies.</i></p> <p><i>Finding 22: In SSA, there is an emergence of a hybrid faculty of computing and informatics that houses graduate IS programmes and other computing related programmes, though a few of the programmes are still housed in traditional business, science and technology departments.</i></p> <p><i>Finding 23: In SSA, graduate IS course offerings provide IS-specific, individual foundational and competencies in domains of practice such as business, computing, health, education, public policy, development, geography, government and mining.</i></p>	<p>investigate the nature of graduate IS programme offerings in regions beyond US and UK (Apigian & Gambill, 2014; Bohler et al., 2020; Stefanidis et al., 2012; Yang, 2012).</p> <p>To understand the nature of graduate IS programme offerings in SSA, different characteristics were obtained through a direct web survey of graduate IS programmes in SSA.</p>	
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Source: Author



Figure 7.1: A Post-Study Conceptual Model for Graduate IS Curriculum Innovation in SSA



7.4 Research Contributions and Implications

The findings of this study make relevant contributions to research, practice and policy. In this section, the contributions this study makes are explained.

7.4.1 Contributions to Research

This study suggests that graduate IS curriculum innovation is a complex phenomenon consisting of several heterogeneous actors with varying, and conflicting expectations. These varying expectations, underpinned by different institutional logics, emerge from stakeholders and influence the IS curriculum to be contextually relevant and responsive. Based on the foregoing, this study makes a number of contributions to IS curriculum research.

First, this study empirically presents the nature of mid-level management IS competencies required by organisations in SSA. Earlier studies have focused on entry-level IS competencies (see Aasheim, Williams, et al., 2009; Aasheim & Shropshire, 2012; Benamati et al., 2010; Cegielski & Jones-Farmer, 2016; K. Jones et al., 2016). Moreover, these entry-level competencies had been elicited from the UK and US. Arguably, this study is the first to focus on mid-level management IS competencies, particularly from an SSA perspective. This study suggests that the hybrid nature of mid-level management IS positions in SSA requires an individual foundation, IS-specific competencies and competencies in a domain of practice.

The second contribution this study makes to research is to take a socio-technical view and emphasise the role of society in IS curriculum innovation. The existing dominant approach has been very technical and focused on competencies that are packaged as an IS curriculum. This study takes a socio-technical view and looks at the role of societal, field, organisational and individual factors in IS curriculum innovation. Such an all-in-one multi-level analysis of

IS curriculum innovation is silent in the literature. Moreover, this study is arguably the first to apply the institutional logics perspective to IS curriculum innovation. This is in the background that the IS curriculum innovation process is not just rational but a contestation of social structures, technology and the agency of stakeholders. Consequently, this study uncovered the *development* and *decolonisation* logics as non-western societal logics which potentially influence social behaviour in SSA.

Fourth, this study uncovered two new dimensions of curriculum responsiveness: One, is *technological responsiveness which is the ability to respond to prevailing and emerging technologies*. The other is *disruption responsiveness which is the ability to respond to disruptions due to emergencies or innovations*. Existing curriculum responsiveness dimensions had focused on socio-economic, discipline, pedagogical and culture.

Fifth, this study explored the nature of graduate IS academic programmes in SSA. Although similar to the studies by Yang (2012) and Apigian and Gambill (2014), this study was conducted in SSA, beyond the UK and US as suggested by Bohler et al. (2020) for undergraduate programmes. Very few studies of this nature exist at the graduate level, and arguably this is the first in SSA. The study provides a categorisation of graduate IS programmes to provide a better understanding of the nature of the IS discipline. The study explained the hybrid nature of graduate IS discipline and suggested that a graduate IS programme may be a generalist, domain-driven specialist or technology-driven specialist depending on the competencies the programme provides to graduates.

The sixth contribution to research is a systematic literature review of IS curriculum studies between 2008 and 2021. This was important to understand the state of IS curriculum research

and to map out gaps for future research. Until this study, the most recent review in the area was by Longenecker et al. (2013) who focused on undergraduate course offerings and to identify new and retired skills over a 50year period. A comprehensive review of the area needed to be conducted especially years after the work of Longenecker et al. (2013).

In terms of methodology, this study benefitted from the strength of the Delphi technique in identifying current, and forecasting future mid-level IS competencies required by organisations in SSA. Hitherto, the dominant method was a content analysis of job postings of IS positions. This approach had been criticised for exaggerating the need for technical competencies (Litecky et al., 2012) and focusing more on current competencies. With the nature of IS, there was the need for a method that could elicit, not only current competencies, future IS competencies to better understand the nature of IS competencies over a period. Whilst the Delphi technique had been used in identifying competencies in other jobs such as marketing (Yeoh, 2019), this study, arguably, is the first to use the Delphi technique to identify mid-level management IS competencies. In addition, the application of the Delphi technique in IS research in SSA has more room for contribution and this study gives new perspectives in applying it to IS curriculum and IS education in SSA.

7.4.2 Implications for Practice

The findings of this study provide three interesting implications for practice.

First, this study, one of the few, that looks at the nature of IS competencies for mid-level IS managers, has implications for hiring, internal promotions and training. Organisations in SSA may use the results (focusing on the important competencies) as a guide for competencies they should look out for from potential hires to fill mid-level IS management positions.

Similarly, such an understanding of mid-level IS management competencies may be used to determine promotions and prepare IS managers for mid-level management positions. According to Ho and Frampton (2010), competencies identified below the iceberg, though difficult to develop through education and training are essential to look out for during hiring. For example, in this study, a trait like “ability to be flexible and adapt to change” which is a lower iceberg competency, was identified to be important for mid-level IS managers. Such traits may not be easily observed through traditional interviews (Spencer & Spencer, 1993) and thus human resource departments or hiring panels should develop creative questioning or tests to unravel whether prospective employees possess these competencies. Again, awareness of these competencies, identified as important, is critical for acquisition through mentoring and role-playing programs.

Second, if IS departments are to remain relevant, the competencies students acquire from the classroom must adequately prepare them to meet industry demands (Topi et al., 2014). It is for this reason; that previous IS competency studies have gone ahead to recommend how IS curricula should be developed to meet the new competency demands by suggesting which particular courses should be taught. Most of these recommendations had been made for the undergraduate IS curriculum which prepares students for entry-level IS jobs. However, this study focused on the competencies of mid-level management IS professionals. Here, individual foundational competencies become more emphasised than IS-specific and domain competencies compared to entry-level IS competencies. According to Kappelman et al. (2016), obtaining an MBA or a master’s degree in IS may enhance learners’ preparedness to fill such mid-level management IS positions. Hence, this study may guide universities offering graduate IS programmes to provide course offerings that deliver or develops the competencies identified as highly important in this study. Though teachable IS competencies

may often be at the tip of the iceberg (Ho & Frampton, 2010), making learners aware of below-the-iceberg competencies and also enhancing their learnability through pedagogical strategies may best prepare them for mid-level management IS positions.

Third, this study categorised graduate IS programmes as a generalist, domain-driven specialists or technology-driven specialists. Such a categorisation is valuable in evaluating the appropriateness of course content and enhancing the legitimacy of the IS discipline. For example, a better understanding of the type of IS programme will reduce often misunderstanding among accreditation experts and faculty over what modules or courses should be included or excluded in a particular programme.

7.4.3 Implications for Policy

The findings in this study may also inform policy at both the institutional and the National levels. At the institutional level, private universities lacking resources may develop policies that encourage the development of innovative interdisciplinary graduate programmes leveraging on already existing resources within other departments. The range of domains IS may serve may offer interesting new graduate IS programmes that may be economically responsive.

At the national level, governments may reconsider their role in the funding of private universities, especially in SSA. Whilst there is government expectation that tertiary education should be socio-economically responsive, for example by reducing unemployment or meeting a particular national development goal, the private university, for example in trying to be cost-effective, may only implement graduate programmes that are economically responsive

by focusing on the university's economic needs and the IS graduate economic needs. The government may consider funding areas such as research in areas of interest to the government or giving tax incentives on ICTs meant to support tertiary education. Towards this, the new Ghana Tertiary Education Commission (GTEC) which is a merger of NAB and NCTE for example, may develop policy guidelines that enable private universities to obtain access to these critical resources whilst influencing their curricula to be socio-economically responsive.

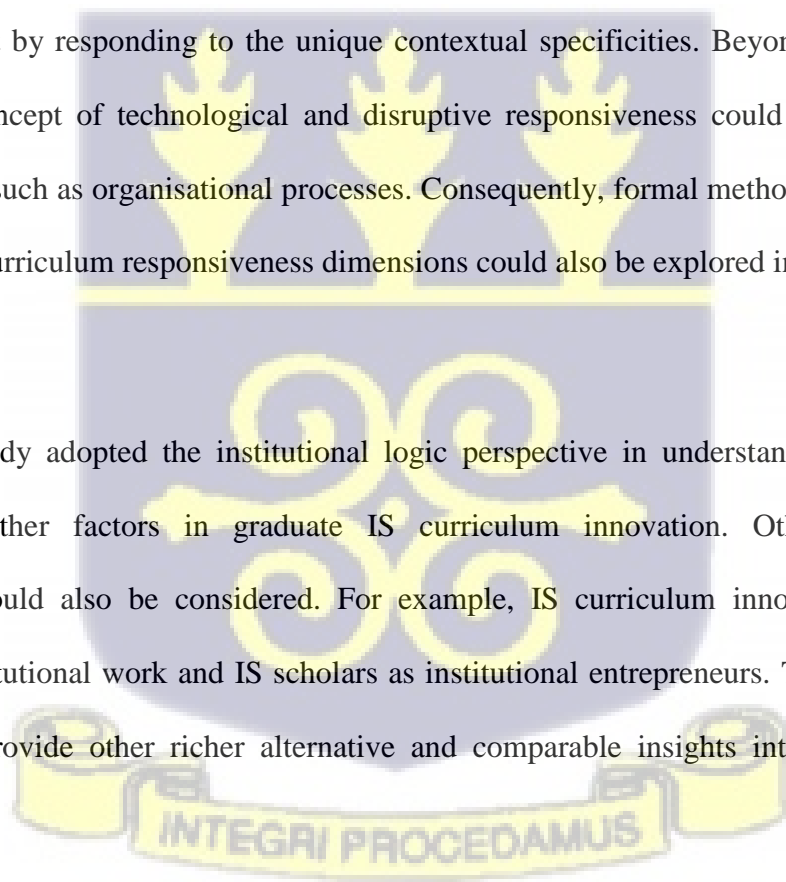
7.5 Suggestions for Future Research

It could be concluded from this study, that IS curriculum innovation is a complex phenomenon consisting of multiple stakeholders whose, sometimes conflicting expectations, together with a set of contextual factors, shape the outcome of the development of a new or the revision of an existing IS curriculum. Specifically, in this study, attention has been given to the development of a graduate IS curriculum in a faith-based private university in Ghana by considering some factors. Since the role of context is central to the development or revision of an IS curriculum, future studies may look at the same study in different private universities and different developing countries to compare experiences. Others may also consider public universities which are publicly funded and how the experiences in developing an IS curriculum may differ from private universities in SSA. Unique theorisations of how IS curriculum innovation responds to different contextual factors will advance a broader and deeper understanding of the area.

Again, the curriculum responsiveness perspective had been sparingly used in information systems curriculum research, and hence, there is an opportunity to discover new contextual

factors under the various dimensions of curriculum responsiveness or discover new dimensions. Others may also concentrate on each dimension and study how existing IS curricula respond to these dimensions. For example, in these times of a global pandemic, a researcher may look at how existing IS curricula in a particular country are technologically responsive by measuring different factors of technological responsiveness including those identified in this study. Furthermore, the need to make IS profession and IS curricula more attractive and friendly to women is of prime concern (gender responsiveness) (Neh & Meyer, 2016; Pretorius et al., 2015). Similar studies may apply to other dimensions such as socio-economical, gender, pedagogical, disciplinary, cultural and disruption responsiveness. The value of these studies is to ensure that IS programmes, in SSA for example, are globally and locally relevant by responding to the unique contextual specificities. Beyond IS curriculum studies, the concept of technological and disruptive responsiveness could be extended, to other domains such as organisational processes. Consequently, formal methods for evaluating each of these curriculum responsiveness dimensions could also be explored in future studies.

Lastly, this study adopted the institutional logic perspective in understanding the role of society and other factors in graduate IS curriculum innovation. Other institutional perspectives could also be considered. For example, IS curriculum innovation could be viewed as institutional work and IS scholars as institutional entrepreneurs. These alternative views could provide other richer alternative and comparable insights into IS curriculum innovation processes.



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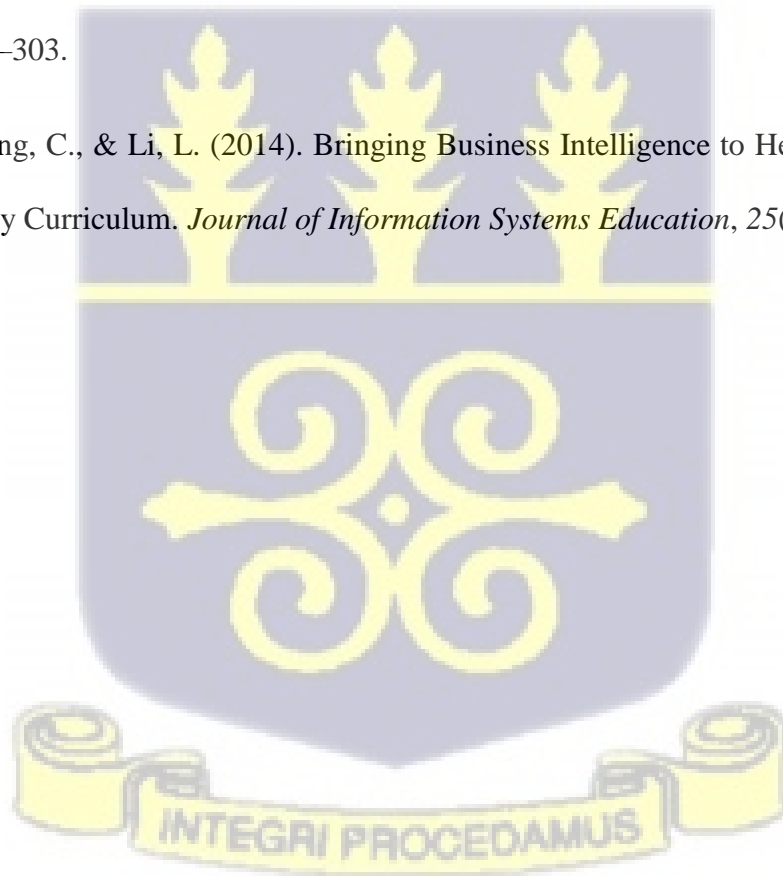
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APPENDICES

Appendix 1: List of Graduate IS Programmes by Coursework in SSA

No	University	Country	Programme
1	University of Cape town	South Africa	Mcom Information Systems
2	University of the Witwatersrand	South Africa	Mmgt Digital Business
3	University of Pretoria	South Africa	MIT ICT Management
4	University of KwaZulu Natal	South Africa	Mcom Information Systems and IT
5	University of the Western Cape	South Africa	Mcom Information Management
6	University of Nairobi	Kenya	MSc Information Technology Management
7	Moi University	Kenya	MSc Information Technology
8	Mbarara University of Science and Technology	Uganda	MSc Information Systems MSc Business Informatics MSc Health Information Technology
9	University of Botswana	Botswana	MSc Computer Information Systems
10	University of Ibadan	Nigeria	MSc Business Computing
11	North West University	South Africa	Mcom Information Systems
12	Makerere University	Uganda	MSc Information Systems
13	University of the Free State	South Africa	MSc Computer Information Systems
14	University of Dar Es Salam	Tanzania	MSc Information Systems Management MSc Health Information Systems
15	Obafemi Awolo University	Nigeria	MSc Information Systems
16	Federal University of Technology Akure	Nigeria	MSc Information Systems
17	University of Rwanda	Rwanda	MSc Information Systems
18	University of Namibia	Namibia	MSc Information Technology
19	Ladoke Akintola University of Technology	Nigeria	MSc Information Technology
20	Midland State University	Zimbabwe	Mcom Information Systems Management MSc Agric Informatics and Data Analytics
21	Maseno University	Kenya	MSc Information Systems
22	Strathmore University	Kenya	MSc Computer Information Systems
23	Chinhoyi University of Technology	Zimbabwe	MSc Data Analytics
24	University of Dodoma	Tanzania	MSc Information Technology
25	National University of Science & Technology	Zimbabwe	MSc Information Systems
26	Masinde Muliro University of Science & Technology	Kenya	MSc Information Technology
27	Open University of Tanzania	Tanzania	MSc Information Technology Management
28	Murang'a University of Technology	Kenya	MSc Computing and Information Technology
29	Mzumbe University	Tanzania	MSc Information Technology and Systems
30	American University of Nigeria	Nigeria	MSc Information Systems
31	African University of Science & Technology Abuja	Nigeria	MSc Management of Information Technology
32	United States International University	Kenya	MSc Information Systems and Technology
33	Uganda Martyrs University	Uganda	MSc Information Systems
34	Uganda Christian University	Uganda	MSc Information Technology

35	Ghana Institute of Management and Public Administration	Ghana	MSc Management Information Systems MSc IT and Law
36	State University of Zanzibar	Tanzania	MSc Information Technology
37	Ghana Telecom University College	Ghana	MSc Management Information Systems
38	University of Mauritius	Mauritius	MSc Software Project Management

Source: Author

Appendix 2: List of Graduate IS programmes by Dissertation only in SSA

No	University	Country	Programme
1	Stellenbosch University	South Africa	MSc Geo-Informatics
2	University of Johannesburg	South Africa	Mcom Information Technology Management
3	University of South Africa	South Africa	MSc Computing
4	Rhodes University	South Africa	MSc Information Systems
5	Tswane University of Technology	South Africa	MSc Computing
6	Nelson Mandela University	South Africa	MSc Information Technology
7	Cape Peninsula University of Technology	South Africa	MTech Business Info. Systems
8	University of Fort Hare	South Africa	Mcom Information Systems
9	University of Venda	South Africa	MSc Business Info. Systems
10	Durban University of Technology	South Africa	MSc ICT
11	Vaal University of Technology	South Africa	MSc Information Technology
12	Namibia University of Science and Technology	Namibia	MSc Informatics

Source: Author

Appendix 3: Graduate IS Programme Survey Protocol

University	Country	Source	IS Programme /Type	Type (MSc, Mcom, etc)	Structure (Course or Thesis)	Faculty	Department	Duration	Number of modules	Modules

Appendix 4: General Interview Guide

I. Head of ICT Department

Background Information

1. What is your academic background?
2. How long have you been Head of Department?
3. What are your experiences with Curriculum development or revision?

IS Curriculum Development Process and influencing factors

4. Kindly give me an overview of how a curriculum is developed or revised in your department
5. What are the motivations for developing the graduate Information Systems Curriculum?
6. What are the main factors or conditions which influenced the development of your graduate Information Systems Programme and give instances of these factors or conditions.

II. Curriculum Committee Chairman

1. For how long have you been involved in leading curriculum revision or development in the department?
2. What are the processes for developing the graduate Information Systems curriculum?
3. What conditions or factors influenced the development of the graduate Information Systems Curriculum?

4. How do you decide on which courses to retire or add to the graduate IS curriculum?

III. Dean of Faculty of Science and Technology

1. What are your experiences with curriculum approval at the faculty level?

2. What are your major considerations before approving a graduate programme at the faculty level?

IV. Vice President, Academic

1. What are the objectives of your graduate academic programmes?

2. What are your expectations from an IS graduate academic programme?

3. What are your considerations for approving the graduate academic programme at the Senate level?

V. Institution and Programme Accreditation Administrator

1. What are your expectations from a graduate IS programme to meet accreditation requirements?

2. Which factors are considered in preparing a graduate IS programme for accreditation?

VI. Faculty Members of the Curriculum Committee

1. What is your academic experience? For example, your MSc discipline area.

2. What are your general expectations of a graduate from a graduate IS programme?

3. What courses/modules are relevant to a graduate IS programme in SSA?
4. What factors did you consider in the suggestion of the courses in question 3?

VII. Heads of Other Departments

1. What does a joint or collaborated graduate IS programme between your department and the IS department mean to you?
2. What are your expectations for such a programme?

VIII. An official of the National Accreditation Board (NAB)

1. What do you generally expect from graduate IS programmes in Ghana?
2. Do you have templates or frameworks for determining the relevance or appropriateness of IS or other computing programmes?
3. What factors do you consider in approving a graduate IS programme?

IX. An official of the National Council for Tertiary Education (NCTE)

1. What is the role of the NCTE in the governance of Private Universities in Ghana?
2. What is the expectation of the NCTE for graduate programmes in universities in Ghana?
3. Does the NCTE demands specific expectations for specific graduate programmes or disciplines?
4. What factors (Socio-economic and others) influence the approval of academic programmes in Ghana?

Appendix 5: Question Guide for Focal Group Discussion of Students

1. Why are you taking a degree in ICT?
2. Will you like to take a graduate programme in Information Systems?
3. What will be your motivation in enrolling on a graduate IS programme?
4. What is the most important factor to consider in enrolling on a graduate IS Programme?

Appendix 6: IS Graduates Survey Questionnaire

1. What is the number of years since you graduated?
2. Have you had any postgraduate degree after completion? No/Yes
3. In which industry are you presently working?
Education Health Banking Telecommunications IT Hospitality Consulting Manufacturing
Entrepreneur (Self) Other_____.
4. What is your role in your organisation?
Systems Analyst Network Administrator IT/IS Manager Project Manager
Enterprise Architect Data Analyst Other: _____.
5. What Knowledge, Skills and Attitudes are required to make your job successful (List at most top 10)?

6. What new knowledge, skills and attitudes have you acquired on the job which you didn't acquire from your first degree (List at least 5)?

7. Are you still into IT/IS? No/Yes

8. If you have changed your field of work, what new field are you pursuing?

9. If you have changed your field, why did you change your field?

Appendix 7: The Inter-Institutional System

Elemental Categories	Institutional orders and corresponding societal level logics						
	State	Profession	Market	Corporation	Family	Religion	Community
Basis of Norms	Citizenship Membership	Association member	Self-interest	Firm employment	Household membership	Congregational membership	Group membership
Sources of Legitimacy	Democratic participation	Personal expertise	Share price	Market position	Unconditional loyalty	Sacredness in Society	Trust and Reciprocity
Sources of Authority	Bureaucratic Domination	Professional Association	Shareholder Activism	Top Management	Patriarchal domination	Priesthood Charisma	Community values and ideology
Sources of Identity	Social and economic class	Association with quality of craft/ Personal reputation	Faceless	Bureaucratic roles	Family reputation	Association with deities	Shared emotional connection
Basis of Attention	Status of interest group	Status in profession	Status in market	Status in hierarchy	Status in household	Relation to supernatural	Personal investment in group
Basis of Strategy	Increase community good	Increase personal reputation	Increase efficiency profit	Increase size and diversification	Increase family honour	Increase religious symbolism	Increase status and honour of members
Informal Control	Backroom politics	Celebrity professionals	Industry analysts	Organisational culture	Family politics	Worship of calling	Visibility of actions
Economic System	Welfare capitalism	Personal capitalism	Market capitalism	Managerial capitalism	Family capitalism	Occidental capitalism	Cooperative capitalism
Root Metaphor	State as distribution mechanism	Profession as relational network	Transaction	Corporation as hierarchy	Family as firm	Temple as Bank	Common boundary

Source: Thornton et al. (2012)

Appendix 8: Resulting Publications

Publication Type	Full Citation
Scholarly Book Chapters	<ol style="list-style-type: none"> 1. Kevor, M. O., & Boakye, E. K. (2022). Hitting the Moving Target: What Information Systems Competencies Are Required from Mid-Level Information Systems Managers by Organisations in Sub-Saharan Africa? In <i>Digital Innovations, Business and Society in Africa</i> (pp. 387-412). Springer, Cham. 2. Kevor, M.O. (2020). Information Systems Curriculum Research: A Survey of Evidence. In <i>Handbook of Research on Managing Information Systems in Developing Economies</i> (pp. 429-457). IGI Global.
Conference Papers	<ol style="list-style-type: none"> 3. Kevor, M. O., Boateng, R., Kolog, E. A., Owusu, A., & Afful-Dadzie, A. (2020, April). Preliminary Insights into the Nature of Graduate IS Programmes in Sub-Saharan Africa. In <i>Conference on e-Business, e-Services and e-Society</i> (pp. 545-556). Springer, Cham.
Journal Papers (Manuscript under preparation)	<p>Graduate IS curriculum innovations in Sub-Saharan Africa: A Curriculum Responsiveness Perspective. To be submitted to the <i>Journal of IS Education</i></p>

