NOBEL INTERNATIONAL BUSINESS SCHOOL

DOCTOR OF PHILOSOPHY IN BUSINESS ADMINISTRATION

ABSORPTIVE CAPACITY AND INNOVATION GENERATION IN HIGHER EDUCATION INSTITUTIONS: THE MEDIATING ROLE OF INTER-FUNCTIONAL COORDINATION

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(PHD 16 C 2005)

THIS THESIS IS SUBMITTED TO NOBEL INTERNATIONAL BUSINESS SCHOOL, IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DOCTOR OF PHILOSOPHY DEGREE IN BUSINESS ADMINISTRATION

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Declaration

I **Mercy Asaa Asiedu,** hereby declare that this dissertation is the product of original research conducted by me under the supervision of Dr. Hod Anyigba. I also declare that this dissertation has not been submitted to any other Institution for assessment, publication, or for any other purpose. Where the works of other people have been used, references have been duly cited. It is in this regard that I declare this work as originally mine. It is hereby presented in partial fulfilment of the requirements for the award of the Doctor of Philosophy Degree in Business Administration at the Nobel International Business School.

…… Date: ……

Mercy Asaa Asiedu

…… Date: ……

Dr. Hod Anyigba (Principal Supervisor)

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Dedication

I dedicate this work to my father, Mr. George Boampong Asiedu, who has been very supportive and proud of me committing to this doctoral project and has promised to stay alive and healthy to see its completion.

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Abstract

The purpose of this study was to, first, contextualize the absorptive capacity (ACAP) process for generating innovation in the Higher Education Institution (HEI) domain. Secondly, the study sought to theoretically broaden the knowledge-based view (KBV) research to take account of the three theoretical gaps – the conceptualization of ACAP dimensions specifically in HEIs; the organizational mechanism for ACAP in HEIs; and the governance mode for acquiring knowledge in HEIs - to build a more applicable theory of managing knowledge.

Employing the mixed method approach, purposive sampling technique was adopted to select respondents for both the qualitative and quantitative data collection. Ten (10) heads of departments and three hundred and eighty (380) lecturers were selected from twenty (20) HEIs in the Greater Accra region of Ghana. Qualitative data were analysed using the general inductive approach to derive the contextual meaning of ACAP and its dimensions in the HEI context. Subsequently, quantitative data were analysed using Partial Least Squares Structural Equation Model to test the hypotheses proposed for the study.

Empirical findings revealed three core dimensions of ACAP in HEIs as knowledge search, knowledge accumulation and process transformation. It was also revealed that inter-functional coordination (IFC) is an essential integration mechanism through which knowledge can be acquired, shared and transferred throughout the entire HEI community as it promotes a culture of teamwork for building strong relationships across faculties, departments and units.

The findings advise HEI managers that, for faculty to acquire and share new knowledge to help innovate new products, such as improved curricula, enhanced academic instruction and quality research output, differing functional departments and faculties need to set aside their individual functional interests and accept divergent views from varying perspectives in their quest for acquiring new knowledge for the university. HEIs must invest resources and efforts to build strong relationships that facilitate collaboration, trust and interactions among varying functions to enhance inter-functional knowledge sharing in academia in order to sustain a competitive advantage and continued relevance.

The study makes theoretical contributions to the KBV to facilitate building an applicable theory of managing knowledge in HEIs. It also contributes to practice as managers are advised to focus on redesigning HEIs as learning organizations in order to promote knowledge management capabilities.

Table of Contents

List of Tables

List of Figures

List of abbreviations

ACAP	-	Absorptive Capacity
AKA	-	Absorptive Knowledge Accumulation
AKS	-	Absorptive Knowledge Search
APT	-	Absorptive Process Transformation
BEL	-	Blended e-Learning
CA	-	Competitive Advantage
CU	-	Central University
CVI	-	Content Validity Index
DKP	-	Dubai Knowledge Park
DV	-	Dependent Variable
FD	-	Finance Directorate
FP	-	Firm Performance
GTUC	-	Ghana Technology University College
HEI	-	Higher Education Institution
HOD	-	Head of Department
HRD	-	Human Resource Directorate
IFC	-	Inter-functional Coordination
INNG	-	Innovation Generation
IP	-	Innovation Performance
IT	-	Information Technology
IV	-	Independent Variable
KA	-	Knowledge Acquisition
KC	-	Knowledge Collection
KD	-	Knowledge Donation
KBV	-	Knowledge Based View
KM	-	Knowledge Management
LO	-	Learning Organization
MO	-	Market Orientation
NAB	-	National Accreditation Board
NCTE	-	National Commission for Tertiary Education
NIBS	-	Nobel International Business School
ODL	-	Open Distance Learning
OL	-	Organizational Learning

OT	-	Organizational Theory
PACAP	-	Potential Absorptive Capacity
PLS-SEM	-	Partial Least Squares- Structural Equation Modelling
QAU	-	Quality Assurance Unit
R&D	-	Research and Development
RACAP	-	Realized Absorptive Capacity
RBV	-	Resource-Based View
SCT	-	Social Capital Theory

CHAPTER ONE

1.0 Introduction

1.1 Background to the study

Acquisition of knowledge is now seen as an impetus for organizational relevance, not only as a source of competitive advantage but also as a matter of survival in this fast-paced and competitive knowledge-based economy that is characterised by quick technological changes, shorter product life cycles and complex demands (McEvily & Chakravarthy, 2002; Lane, Koka, & Pathak, 2006; Alnafrah & Mouselli, 2019; Nham, Tran & Nguyen, 2020; Osobajo & Bjeirmi, 2020). The quest for achieving high performance is no longer contingent on the possession of tangible assets, but rather on the interplay of both tangible assets and organizational knowledge (Asiedu et al., 2020). Organizations are now desirous of investing in knowledge management processes as a practice (Choi et al., 2008) to unearth employee brainpower as this is considered a prerequisite for enhancing innovation performance (Wang et al., 2011; Asiedu et al., 2020; Butnariu, 2020; Fayyaz, Chaudhry, & Fiaz, 2021). It is therefore not surprising that the Dubai Knowledge Park was established in 2003.

The Dubai Knowledge Park (DKP) is a professional human resource management and learning hub for executive corporate training and learning (Knight & Morshidi, 2011), which aims at developing diverse talents as a foundation for a unique knowledge-based and innovative economy, that is suitable for this fast-growing, technological, competitive and globalised market of today. This underscores how important it is to acquire new knowledge as a key resource for organizational growth and success (Kogut & Zander, 1992; Grant, 1996; Alnafrah & Mouselli, 2019; Paudel, 2020), innovation (Cohen & Levinthal, 1990; March, 1991; Ahuja & Katila, 2001; Yang & Tsai, 2019; Butnariu, 2020; Hameed, Nisar, & Wu, 2021), competitive edge (Nonaka, 1994; Zahra & George, 2002; Lane, Koka, & Pathak, 2006; Liu, Dutta & Park, 2020; Osobajo & Bjeirmi, 2020) new capabilities (Cohen & Levinthal, 1990; Gavetti & Levinthal, 2000; Zahra & George, 2002; Nham, Tran, & Nguyen, 2020;) and performance (Lane, Koka, & Pathak, 2006; Huang et al., 2015; Choi & Park 2017; Kotabe et al., 2017) through effective knowledge management.

Knowledge management (KM) is crucial and needs to be prioritized not only in commercial organizations but also in institutions of higher learning to improve productivity and effectiveness (Kidwell et al., 2000; Rizduan et al., 2008; Fussy, 2018; Fullwood et al., 2019; Paudel, 2020; Ramjeavon & Rowley, 2020; Ibrahim & Ali, 2021). Higher education institutions (HEIs) are also in the knowledge business since their main activities are related to the creation, production and dissemination of knowledge in the form of teaching and learning, research, development of curricula and administration (Örtenblad & Koris, 2014; Santosh & Panda, 2016; Asiedu et al., 2020; Ibrahim & Ali, 2021;). They are also expected to share and transfer knowledge through these acts of teaching, learning, consultancy, training, and cross pollination through communication between research and industry, and above all, job creation (Fullwood *et al*., 2013; Fullwood & Rowley, 2017). As learning organizations, HEIs play a key role in this knowledge-based and digital world as they expand knowledge skills, build capacities, and enhance innovation (Ibrahim & Ali, 2021). However, the knowledge demands of higher education institutions are different from those of corporate and commercial organizations. Whilst HEIs' goal is to share scholarly knowledge to benefit their students and the society as a whole (Cronin, 2001; Rizduan et al., 2008; Ramjeavon & Rowley, 2020; Shina, 2020), the goal of corporate organizations is profitability and sustained competitive advantage (Cohen & Levinthal, 1990; Zahra & George, 2002; Liu, Dutta & Park, 2020; Marinho, Silva & Santos, 2020). An organization achieves a competitive advantage when it is able to create value for customers or clients better than its competitors, such that the customers or clients prefer that organization's products and services to those of the competitors. Creating better value for customers can be achieved by supplying products and services that are more beneficial, with lower prices and higher quality (Khaligh, Haghighi, Nazari, & Hosseini, 2020). Therefore, competitive advantage is conceptualized in direct relation to the customer's desired values (Evans, 2016) and is measured in terms of cost, quality, and competence (Ambe, 2010). Even now, more than ever, the emergence of new and competitive market players as well as new technologies and knowledge markets has made HEIs realize that managing knowledge is a vital competitive weapon for enhancing academic discourse in order to sustain their relevance in this knowledge economy, in the face of increased exposure to marketplace pressures, just like other businesses (Voolaid & Ehrlich, 2017; Paudel, 2020).

Even though it is expected that the HEI is a place where knowledge is freely shared among academics since they understand the importance of acquiring and sharing new

knowledge, the reverse seems to be the case as the culture in the university setting is more individualistic and self-serving (Tian et al., 2009; Ramjeavon & Rowley, 2020). The role of culture has been extensively explored in terms of it being a barrier or an enabler for the implementation of knowledge management practices in HEIs (Al Kurdy et al., 2020; Ramjeavon & Rowley, 2020). The culture and climate within the academic environment is that academics place a high premium on individual scholarly achievement rather than on the overall goal achievement of the knowledge-creating entity (Koppi et al., 1998; Seonghee & Boryung, 2008; Dokhtesmati, & Bousari, 2013). Most academics are rather driven by their self-preservation instincts as they see knowledge as something so valuable that it cannot be parted with so easily and freely (Carrol et al., 2003; Kim & Ju, 2008; Ridzuan et al. 2008; Fullwood et al., 2013; Goh & Sandhu, 2013). Most of them do not see how beneficial their collaborative scholarly efforts would rather improve their effectiveness while contributing to the generation of organizational capabilities for better performance (Kogut & Zander. 1996; Tian et al., 2009; Lane et al., 2006; Choi & Park 2017). Academics' lack of zeal to share knowledge amongst themselves is even deepened when they possess certain "specialized knowledge" or skills that others do not possess. This tendency to hoard knowledge, because of suspicion of other colleagues seems to be a natural human phenomenon (Davenport & Prusak, 1998). Although specialization offers efficiency advantage it also creates silos of specialized knowledge (Lessard & Zaheer, 1996). Therefore, it is fundamentally necessary for academics to successfully integrate faculties and departments in order to remain innovative without compromising the benefits of specialization (Lee & Kapoor, 2017).

The Absorptive Capacity (ACAP) concept has been widely researched especially in management in the last thirty years, precisely because external knowledge resources are seen to be essential (Matusik & Heeley, 2005; Camisón & Forés, 2010; Yu & Chen, 2020). Due to the richness of the ACAP concept, many scholars have attempted to extend it in the organization field, as the basic capability for learning, which is linked to achieving success in product innovation and superior organizational performance (Zahra & George, 2002; Lane et al., 2006; Lewin, Massini, & Peeters, 2011; Liu, Dutta & Park, 2020). While this concept indicates that organizations have diverse capabilities for absorbing and applying knowledge in innovation processes (Cohen & Levinthal. 1990; Esterby-smith, Graça, Antonacopoulou, 2008; Butnariu, 2020), its importance can be

seen in the multiple attempt by scholars to review, redefine and clarify ACAP (Zahra & George, 2002; Lane et al., 2006; Volberda, Foss, & Lyles, 2010; Yao & Chang, 2017; Song et al., 2018; Zou et al., 2018; Yang & Tsai, 2019). One distinct feature of all these ACAP theories is the fact that an organization's absorptive capacity builds upon prior knowledge of the organization or the totality of its individual members' absorptive capacities. This prior knowledge helps the organization to understand the usefulness of external new knowledge and be able to recombine it with the existing knowledge and transform them together to suit its purposes such as finding new ways to solve problems. Since an organization's ACAP depends on the absorptive capacities of the individual members (Lane *et al*. 2006; Wang & Wang, 2012), it is necessary that collaborative efforts are made to ensure a culture of inter-functional coordination to facilitate the diffusion of knowledge holistically. The knowledge of absorptive capacity process can never be complete unless we consider the intermediary role that inter-functional coordination plays in linking the dimensions of ACAP to the outcome variable.

Inter-functional coordination (IFC) is an integration mechanism that enhances the common goals in an organization. Integration refers to "the process of achieving unity of effort among the various subsystems [functional departments] in the accomplishment of the organization's tasks" (Lawrence & Lorsch, 1967, pp. 4). Inter-functional coordination therefore fosters better collaboration and communication to improve relationships between teams who possess different functional skills, experiences and knowledge (Narver & Slater, 1990; Auh & Menguc, 2005). Additionally, inter-functional coordination enhances the achievement of common goals in an organization when integrated functional units synergistically strive to attain holistic team success (Atuahene-Gima, 1996). Further, Inter-functional coordination eliminates functional or departmental barriers or boundaries as all functions come together in a cohesive manner to focus on the holistic goal of delivering value to customers (Wooldridge & Minsky, 2002) whilst fostering trust building, bonding and commitment among teams from different backgrounds. Studies have shown that a heightened inter-functional coordination aids in the reciprocal flow of information among functions, which is key to the development and implementation of innovative designs (Hitt, Hoskisson & Nixon, 1993). The successful flow of information and exchange of knowledge is necessary to carry out the innovative activities that will foster innovation performance. However, in order for this exchange to

be successful, the receiving departments must have the capacity to absorb the incoming knowledge (Troy et al., 2008).

Consequently, the general focus and motivation for the study is presented in two main ways. First, it fills a contextual gap by contextualizing the study of ACAP in the HEI domain. It therefore explores the contextual meaning of ACAP from the HEI perspective as previous research have focused mainly on practitioners within the industry of business organizations. Second, it seeks to broaden the knowledge-based view research by arguing that it is important to extend the view by filling the following three theoretical gaps:

1) Conceptualization of ACAP dimensions, specifically in HEIs. This is based on the assumption that the incoherence in the definition of ACAP by various authors is probably as a result of a weakness in the generalized knowledge-based view.
2) Introduction of organizational mechanisms for ACAP in HEIs. The study broadens the scope of absorptive capacity beyond its dimensions to include 'collaborative mechanism' through which knowledge can be holistically exploited. It then examines the intermediary role played by inter-functional coordination in the relationship between absorptive capacity and knowledge acquisition for innovation generation in higher education institutions.
3) Extension of the knowledge-based view, specifically, the 'governance mode' through which HEIs access external knowledge. To clarify, the study highlights both inter-faculty and intra-faculty relationships as key governance modes for sourcing external knowledge from internal sources within the HEI community, which have been least discussed in the ACAP literature. This will build a more applicable theory of managing knowledge in HEIs which are made up of differentiated faculties and departments with varying disciplines and specializations that are considered to be external to one another but are situated within the same internal space. HEIs can achieve internal and external sources of social capital through the collaboration of different faculties and functional units (Tsai & Ghoshal, 1998; Auh & Menguc, 2005). In consonance with inter-functional coordination, both inter-faculty and intra-faculty relationships are key governance modes for sourcing external knowledge that can be used to enhance the goals in academia as they foster cohesiveness through the improvement of relationships between people with varying functional skills, thereby, enhancing the building of trust and commitment.

1.2 Problem statement

It has been noted that the management of knowledge is crucial, not only in commercial organizations but also in higher education institutions (Ibrahim & Ali, 2021; Fullwood et al., 2019; Fussy, 2018; Kidwell et al., 2000; Paudel, 2020; Ramjeavon & Rowley, 2020; Rizduan et al., 2008). However, a careful review of previous literature reveals that a dominance of these studies have explored ACAP only in the organizational field (Chen et al., 2009; Cohen & Levinthal, 1990; Gavetti & Levinthal, 2000; Grant, 1996; Jansen et al., 2005; Kogut & Zander, 1992; Lane et al., 2001; Lane & Lubatkin, 1998; Liao et al., 2003; Lichtenthaler, 2009; Minbaeva et al., 2003; Nonaka, 1994; Nonaka, Toyama, & Nagata, 2002; Szulanski, 1996; Tsai, 2001; Yang & Tsai, 2019; Yao & Chang, 2017; Zahra & George, 2002). Moreover, we see how research on using the absorptive capacity of academics to explore the transfer of knowledge within HEIs has been consistently limited (Cronin, 2001; Ramjeavon & Rowley, 2020; Rizduan et al, 2008; Shina, 2020). Although there are few studies on knowledge sharing in the higher education context, these studies focus primarily on findings from Malaysia (Al-Kurdi et al., 2018; Goh & Sandhu, 2013; Tan, 2016), Mauritius (Ramjeawon & Rowley, 2020; Veer, Ramjeawon & Rowley, 2017) and the United Kingdom (Fullwood et al., 2013; Fullwood et al., 2019). Further, because of cultural differences these few studies cannot be generalised to all higher education institutions in different study contexts, especially for studies conducted in an emerging country context.

The university is expected to be a place where knowledge is freely shared among academics who are supposed to appreciate better the importance of knowledge acquisition, sharing and transfer. However, it has been noted that they rather focus more on their individual scholarly achievement than on the overall goal achievement of the knowledge creating institution (Fullwood, Rowley & Delbridge, 2013; Ridzuan et al. 2008; Seonghee, 2008). White and Weathersby (2005, pp. 294) assert that “academic life often fosters autonomy, competition, critical judgment, intellectual scepticism, power distance and self-interest. In practice, a surprising number of values of academic life are antithetical to the values and ethos of a learning organization community”. Most academics are driven by their self-preservation instincts as they see knowledge as something so valuable that it cannot be parted with so easily and freely (Ridzuan et al. 2008; Fullwood et al., 2013; Seonghee, 2008). This apathy on the part of academics to

share knowledge amongst themselves is even more prevalent when they possess certain specialized skills, and important unique knowledge that others do not possess. Because of differentiated academic disciplines (Dill, 1999) they fail to see how beneficial their collaborative scholarly efforts will improve their effectiveness while contributing to the generation of organizational capabilities for better performance (Choi & Park 2017; Gavetti & Levinthal, 2000; Huang et al. 2015; Kogut & Zander. 1996). Within the higher education context, institutions are supposed to apply the absorptive capacity process in order to improve their courses, degrees and research output (Fullwood et al., 2019; Ramjeawon & Rowley, 2020; Rizduan et al., 2008). Since their core activities are related to teaching and learning, higher education institutions should be an ideal place for knowledge creation and therefore, the best place to practice knowledge management (Avdjieva & Wilson, 2002; Cronin 2001), especially now that new knowledge markets and new market players keep emerging, making the terrain highly competitive (Voolaid & Ehrlich, 2017).

This study therefore seeks to address this problem by contextualizing the concept of ACAP in the higher education institution domain as has been advocated by some scholars (Fullwood, Rowley & Delbridge, 2013; Mohammed & Anad, 2014; Sohail & Daud, 2009). This study explores the contextual meaning of ACAP within the HEI sector to see if there are any differences in meaning, as previous research focuses mainly on industry practice. Moreover, research underscores the need to establish the institutional and cultural differences between HEIs and industry practitioners (Bansal et al, 2012; Bartunek & Rynes, 2014; Barroca et al., 2018). HEIs and businesses differ in their approach to generating and managing knowledge due to the varying motivations and rationales for using research (Bruneel et al., 2016; Starkey & Madan, 2001). This will facilitate theory development and theory refinements as we use the absorptive capacity lens to explore knowledge sharing and transfer in the HEI perspective.

Second, despite the fact that ACAP is an influential framework for studying organizational innovation, an analysis of the literature reveals that there is ambiguity in the conceptualization of its dimensions (Zahra & George, 2002; Lane et al., 2006; Volberda et al. 2010; Song et al., 2018). Although this construct is extensively used, there is no unifying definition for ACAP and its role is still ambiguous, confusing and incoherent. While Cohen and Levinthal's (1990) definition propose three dimensions of

recognition, assimilation and exploitation through a "capability perspective", Zahra and George (2002) compound this conceptual dilemma. They segregate the concept into a dual scope of organizational routines and processes for firms - "Potential absorptive capacity" (PACAP), and "realized absorptive capacity" (RACAP). PACAP has two components of acquisition and assimilation and RACAP also has two components of transformation and exploitation of knowledge, through a "dynamic capability perspective". RACAP is however, criticized to be tautological with ACAP outcomes (Liao, Welsch & Stoica, 2003). Further, these four components are sharply criticized and extended to include another dimension of "recognition" (Todorova & Durisin, 2007), which already exists in Cohen and Levinthal's (1990) definition, underscoring how important it is to recognize the value of external knowledge. To further compound the incoherence in a unifying definition, Lane et al. (2006) also propose a three-process dimension of learning known as exploratory, transformative and exploitative learning of ACAP. Other scholars have clearly stayed away from defining the concept, while proposing various dimensions and perspectives (Lane and Lubatkin, 1998; Lane, Salk, & Lyles, 2001; Liao et al., 2003; Matusik & Heeley, 2005; Camison & Fores, 2009; Reus et al., 2009; Volberda, Foss, and Lyles, 2010; Carlo et al., 2012; Song et al., 2018). ACAP is therefore referred to as an umbrella concept (Lewin et al., 2011).

The lack of consensus over the characteristics of knowledge has made it difficult for the knowledge-based view to develop into an integrated unifying theory. The study argues that this incoherence is as a result of a weakness in the KBV which continues to be problematic and does not provide much guidance to practitioners (Patterson & Ambrosini, 2015). Whilst exploring the contextual meaning of ACAP within the HEI sector to ascertain any differences in meaning, research has established institutional and cultural differences between HEIs and industry practitioners (Bansal et al., 2012; Bartunek & Rynes, 2014; Barroca et al., 2018). This study seeks to empirically examine the conceptualization of dimensions of ACAP in an attempt to bring coherence and clarity to the ACAP construct specifically in the HEI domain. This process is necessary in the HEI because there is a need to bring out a clear understanding of the terminologies that are used to represent the dimensions of ACAP in academia in such a way that there are no ambiguities regarding their interpretations.

Third, much as scholars have distilled the concept of ACAP to discern its various dimensions, there still remains a gap to be filled. In spite of the fact that absorptive capacity has been generally accepted and recognized as a crucial antecedent of innovation generation, only few studies have actually focused on the in-depth reasons why and under what circumstances or conditions absorptive capacity is able to affect innovation. For this reason, organizational mechanisms of ACAP, representing a gap in the literature, have been consistently overlooked in the literature (Barakat, 2021; Jansen, Bosch, & Volberda, 2005; Lane, Koka, & Pathak, 2002; Song et al., 2018; Volberda et al. 2010), despite the fact that Cohen and Levinthal emphasize the need for such organizational mechanisms for the ACAP process by stating that: 'absorptive capacity is intangible and its benefits are indirect' (Cohen & Levinthal, 1990, pp 149). Once the literature establishes that ACAP's benefits for innovation is an indirect relationship (Cohen & Levinthal, 1990; Song et al., 2018; Volberda et al., 2010), there must be a mediation effect. However, the mechanisms through which external knowledge is acquired by organizations for innovative purposes remain under-investigated (Barakat, 2021; Laursen & Salter, 2006; Nguyen et al., 2018; Song et al., 2018; Tsai & Hsu, 2014; Volberda et al., 2010). An organization's ACAP cannot be enhanced if the mechanism through which new external knowledge can be exploited is not specified. As such, it is worth considering the particular organizational mechanism which is associated with capabilities for socialization as well as capabilities for coordination (Jansen, Bosch, & Volberda, 2005; Volberda et al., 2010; Zou, Ertug, & George, 2018). Given the fact that knowledge resides in the individual (Grant 1996) and needs to be shared or transferred through an enabling mechanism (Fernhaber & Patel, 2012; Song et al., 2018), an organization cannot create a shared vision and identity without enhancing communication, trust and coordination (Yang at al., 2019). The acquisition of new knowledge cannot automatically translate into value addition for a competitive edge unless some strategic activities and processes are put in place. Invariably, it is a daunting task to achieve a successful collaboration without carefully planning and nurturing the implementation of some processes, structures and routines for knowledge sharing. It is therefore important to fully understand how and what will make this collaboration become a success (Rajalo and Vadi, 2017).

Accordingly, this study argues that the knowledge of ACAP can never be complete without Inter-functional coordination as an organizational integration mechanism through which external knowledge can be acquired and exploited in the ACAP process for the generation of innovation in HEIs. This is necessary to advance both theory and

practice, because it is fundamentally important to know how and why an effect occurs in order to understand any phenomenon. Consequently, there is a need to examine the mediating effects of inter-functional coordination on the relationship between ACAP and knowledge acquisition in order to generate innovations in HEIs. As a mediator, inter-functional coordination will play the role of revealing the true relationship between the independent and dependent variables (Hair et al., 2017). This mediation is important because inter-functional coordination will serve as a conduit through which identified knowledge can be acquired holistically and exploited for the desired innovative results in the HEI space.

Fourth, the ACAP theoretical literature, emanating from the knowledge-based view (KBV), has highlighted the characteristics of external knowledge by identifying three key contingent factors of external knowledge as the knowledge type, the source of knowledge and the governance mode (Sears & Hoetker, 2014; Volberda et al., 2010; Xiong & Bharadwaj, 2011). With regards to governance mode, we see a dominance of prior studies focusing on international R&D alliances, mergers & acquisitions (M&As), informal networks and market transactions as key governance modes for external knowledge acquisition in agreement based R&D collaborations, specifically among business organizations (Choi & Contractor, 2015; Fortwengel, 2017; Gulati & Nickerson, 2008), with little or no attention given to how governance modes manifest in different organizational contexts such as Higher Education Institutions.

This study, therefore, focuses on the governance mode for external knowledge in local alliances in HEIs which has received very little attention from researchers. Governance mode refers to the structural framework that shows how the knowledge receiver is connected to the knowledge donator. We highlight both inter-faculty and intra-faculty relationships as key governance modes for sourcing external knowledge within the internal HEI community (and not necessarily from international partners in the external environment) which have been least discussed in the ACAP literature. To the best of our knowledge, this is the first study to incorporate inter-faculty and intra-faculty relationships in a single study that reveals the application of governance mode in an HEI context – which is an extension of the KBV theory. The academic environment is a vast community made up of differentiated faculties, departments and units with varying disciplines and specializations that are considered to be external to one another even

though they are situated within the same internal space (in most cases) and expected to collaborate to achieve holistic institutional goals.

1.3 Research aim and objectives

The aim of this study was first, to contextualize the absorptive capacity (ACAP) process for generating innovation in the Higher Education Institution (HEI) domain, and second, to theoretically broaden the knowledge-based view (KBV) research to take account of the three theoretical gaps – the conceptualization of ACAP dimensions specifically in HEIs; the organizational mechanism for ACAP in HEIs; and the governance mode for acquiring knowledge in HEIs - to build a more applicable theory of managing knowledge.

The study sought, as specific research objectives:

1. To explore the contextual meaning of Absorptive Capacity (ACAP) in HEIs.
2. To examine the relationship between ACAP dimensions and Knowledge Acquisition in HEIs.
3. To examine the relationship between Knowledge Acquisition and Innovation Generation in HEIs.
4. To determine the extent of mediating effects of Inter-functional coordination in the relationship between the ACAP dimensions and Knowledge Acquisition in HEIs.

1.4 Research questions

1. What constitutes Absorptive Capacity (ACAP) in Higher Education Institutions (HEIs)?
2. What is the relationship between ACAP dimensions and Knowledge Acquisition in HEIs?
3. What is the relationship between Knowledge Acquisition and Innovation Generation in HEIs?
4. To what extent does Inter-functional coordination mediate the relationship between ACAP dimensions and Knowledge Acquisition in HEIs?

1.5 Philosophical underpinnings of the study

This study is underpinned by the pragmatism paradigm, which offers the fundamental philosophical framework for mixed-method research leading to a better understanding of social realities (Wahyuni, 2012). Mixed methods research is a methodology that involves collecting, analysing and integrating quantitative (e.g., experiments, surveys) and qualitative (e.g., focus groups, interviews) research (Creswell & Plano-Clark, 2011). The mixed methods type of research approach is employed here because it is ideal for situations where there is a need to incorporate both exploratory and confirmatory elements with regards to the research questions and objectives of the study (Teddlie & Tashakkori 2009). The researcher wanted to synthesize differences in opinion and perception of the sampled participants (faculty staff of HEIs) on the phenomenon (contextual meaning of Absorptive capacity in HEIs) under investigation (Tashakkori & Creswell 2007; Teddlie & Tashakkori, 2009), and achieve effective investigation and results of an unknown aspect of the phenomenon (Moran-Ellis et al., 2006; Teddlie & Tashakkori, 2009). The research gap of contextualizing absorptive capacity in the HEI domain suggested the need to clearly understand what constitutes absorptive capacity in the HEI context. This qualitative component of this study helped to gather in-depth information that helped to clarify some inconsistencies in the dimensionality of ACAP. The overriding reason for using a mixed method approach is a situation where neither qualitative nor quantitative method alone is able to answer the research question. All these issues were taken into consideration for this study by developing a Gantt chart with frequent updates of relevant timelines and corresponding tasks.

1.6 Contributions of the study

This study extends prior research on absorptive capacity in the following ways. First, it identifies an apparent knowledge gap (Miles, 2017) in the prior ACAP research concerning the application of ACAP in the higher education institution domain and therefore makes a contextual contribution to the ACAP literature from this different perspective. The higher education industry is essentially in the knowledge business, since the main component of its core business is in line with the creation and dissemination of knowledge (Asiedu et al., 2020; Ibrahim & Ali, 2021; Örtenblad and Koris, 2014; Santosh & Panda, 2016). Exploring the contextual meaning of ACAP within the HEI domain to ascertain what actually constitutes its dimensions or components in this context is

therefore warranted. This is necessary because ACAP studies have often paid more attention to commercial organizations, whilst ignoring knowledge domains like the universities (Cronin, 2001; Ramjeavon & Rowley, 2020; Rizduan et al., 2008; Shina, 2020).

Second, there seems to be an empirical gap (Miles, 2017) in prior research on ACAP studies as there has not been any rigorous empirical research on the application of the ACAP process in the HEI domain. Moreover, the unexplored contextual meaning of ACAP, specifically in the HEI domain, appears to be very important and worthy of investigation as it is a knowledge intensive domain (Paudel, 2020). Further, no study has, to date, attempted to empirically evaluate what constitutes absorptive capacity and its dimensions or components, as far as the HEI is concerned (Ramjeavon & Rowley, 2020).

Third, the study identifies three apparent theoretical gaps (Miles, 2017) in the earlier studies concerning:

(a) Conceptualization of ACAP dimensions specifically in HEIs. This process is necessary because there is a need to bring out a clear understanding of the terminologies (Sequeira, 2014) that are used to represent the dimensions of ACAP in academia in such a way that there are no ambiguities regarding their interpretations or even their measurements in the research (Sequeira, 2014). The study therefore empirically examines the conceptualization of dimensions of ACAP in order to bring coherence and clarity to the ACAP construct specifically in the HEI domain. This will help to broaden the knowledge-based view in terms of the creation of new knowledge or the addition of new knowledge to existing knowledge specifically in the HEI domain.

(b) Organizational mechanism for ACAP in HEIs. This study focuses on the coordination mechanism which brings together variable sources of expertise and enhances lateral interactions between differing functional knowledge holders (Jansen et al., 2005). By focusing on the coordination mechanism that is consistent with cross-functional interface we introduce the "inter-functional coordination" (IFC) mechanism and highlight the significant intermediary role it plays in leveraging the influence of acquiring new knowledge for innovation generation. The findings will accordingly demonstrate that inter-functional

coordination is an essential institutional mechanism that facilitates and promotes a culture of teamwork and collaboration in higher education institutions for acquiring, sharing and transferring knowledge throughout the entire institution. It will further demonstrate how inter-functional coordination can help to build strong relationships across faculties and departments to promote knowledge acquisition and transfer for the achievement of the shared institutional goals in higher education. By so doing, the study will also contribute to the inter-functional coordination literature by explaining the mediating role of this mechanism in the ACAP process within the context of the higher education institutions. It will also demonstrate the complex relationship between the ACAP dimensions, inter-functional coordination and knowledge acquisition for innovation generation. This will increase the precision of the theoretical fact of the ACAP effect on innovation (Cohen & Levinthal, 1990; Yang & Tsai, 2019) by identifying the underlying mechanism that better explains the ACAP-innovation link; and

(c) Governance mode for knowledge acquisition in HEIs, which need to be embraced in the knowledge-based view. The study further highlights both inter-faculty and intra-faculty relationships (Choi & Contractor, 2015) as key governance modes for sourcing external knowledge within the HEI community, which have been least discussed in the ACAP literature. Even though HEIs may also have international partners, this study focuses on the local connections among differentiated faculties and departments within the academic community. Governance modes in this instance are likely to offer opportunities for richer interactions (Gulati & Nickerson, 2008) and superior access to external knowledge sources, i.e., faculty-to-faculty arrangements which in turn increase knowledge flows although such interactions are not likely to incur much coordination costs (Choi & Contractor, 2015) since all the parties have common institutional goals. This brings an extension to the KBV theory as we incorporate inter-faculty and intra-faculty relationships in a single study that reveals the application of governance mode in an HEI context. This will facilitate building an applicable theory of managing knowledge in HEIs. As mentioned earlier, HEIs are made up of differentiated faculties and departments with varying disciplines and specializations, but they are situated within the same internal space even

though they may be seen as external on one another. These theoretical developments are warranted to create a comprehensive framework for understanding the process of how newly acquired knowledge and prior knowledge can be integrated to generate value added products and services.

Fourth the study also fills a practical knowledge gap (Miles, 2017) as the findings and recommendations will inform managers of HEIs to focus on redesigning them as learning organizations that support the development and involvement of all members of the university community in line with the shared goals of improving curricula, programs and research output (Asiedu et al., 2020). It will also inform managers to include strategic learning opportunities and collaborative knowledge sharing activities in their staff development agenda as an investment to promote a culture of information sharing and above all, institute reward initiatives to develop the absorptive capacities of individuals and teams who help to promote the innovative drive of the university (Yang & Tsai, 2019). These efforts will help to promote the building of knowledge management capabilities.

Finally, the study's findings will hopefully affirm social capital theory's ability to explain how coordination facilitates inter-functional knowledge sharing across faculties and departments of universities as it eliminates functional or departmental boundaries and barriers. In so doing, it will theoretically broaden the knowledge-based perspective as it significantly connects the inter-functional coordination mechanism to inter-faculty and intra-faculty governance modes of knowledge acquisition and sharing in academia. From the lens of social capital theory, there is a lot of goodwill available to individuals or groups that are generated through collaborative social relationships. The study will therefore serve as a basis for future research on the role of other contextual factors on innovation generation in HEIs.

1.7 Significance of the study

The study theoretically advances the knowledge-based view (KBV) research by empirically evaluating the conceptualization of dimensions of ACAP in order to bring coherence and clarity to the ACAP construct (Song et al., 2018) specifically in the HEI

domain. It also identifies inter-functional coordination as a key factor that explains how and under what conditions ACAP affects innovation generation (Yang & Tsai, 2019) in HEIs. It will empirically prove that this organizational mechanism (inter-functional coordination) will serve as a catalyst through which absorptive capacity can enhance the knowledge management capabilities of higher education institutions in their innovative generation agenda. The study will further highlight both inter-faculty and intra-faculty relationships (Choi & Contractor, 2015) as key governance modes for sourcing external knowledge within the HEI community. The literature on higher education has already demonstrated the lack of knowledge sharing in universities due to the fact that academics consider themselves as creators of knowledge for their individual professions, which creates an individualistic and competitive culture, instead. This lack of zeal for academics to acquire and share knowledge amongst themselves is even deepened when they possess certain specialized skills, and important unique knowledge that others do not possess. However, this study theoretically broadens the knowledge-based perspective as it significantly connects the inter-functional coordination mechanism to inter-faculty and intra-faculty governance modes of knowledge acquisition and sharing in academia. It presents inter-functional coordination as an integration mechanism that is able to develop and maintain excellent relations among work mates in order to ensure a harmonious and trustworthy atmosphere in universities. This buttresses the idea already underscored by scholars that internal organizational communication and collaboration are very essential for effective performance and productivity.

The study also underscores the view that new external knowledge brings elements of novelty and diversity as compared to the prior knowledge already available in the university storehouse. This will offer a rich template for understanding the ability to create value from ACAP to help both future researchers and academics in higher education institutions in the field to understand the need to be knowledge and innovation driven in this fast-paced, competitive and technologically globalised market of today. Information gathered in this study will be insightful to many academics who do not realize the need for scholarly collaboration among faculty members to enhance their effectiveness. Finally, findings will recommend to managers of HEIs that ACAP should be developed through a strong inter-functional coordination mechanism as a key governance mode towards acquiring and converting new knowledge into enhanced products and services.

1.8 Definition of key terms

Absorptive Capacity

The innovative capabilities of any establishment depend on its ability to recognize how valuable new external information is, its ability to assimilate it and apply it in addition to its existing internal knowledge (Cohen & Levinthal, 1990). This, according to Cohen and Levinthal (1990), becomes that establishment's absorptive capacity (ACAP). ACAP is closely related to knowledge management as well as organizational learning (Gao, Yeoh, Wong, & Scheepers, 2017). The absorptive capacity theory is therefore relevant for understanding the acquisition and assimilation of knowledge and it holds a direct importance to innovation (Ahuja & Katila, 2001; Butnariu, 2020; March, 1991; Esterby-smith, Graça, Antonacopoulou, 2008). From the theory of absorptive capacity, Cohen & Levinthal (1990) and Zahra & George (2002) propose that an organization's strength of absorptive capacity is dependent on its prior knowledge and diversity. This prior knowledge helps the organization to understand the usefulness of new external knowledge and be able to recombine it with the existing knowledge and transform them together to suit its purposes such as finding new ways to solve problems. This is the reason why absorptive capacity positively impacts essential organizational outcomes like innovation.

Core functions of Absorptive Capacity

External knowledge which is deemed valuable is identified after great efforts at searching and scanning the environment (Cohen & Levinthal, 1990; Lane & Lubatkin, 1998; Song et al., 2018). This core function is known as ***Knowledge Search*** in the HEI domain. Here, investments are made by the institution to build knowledge by identifying and acquiring external knowledge deemed valuable and accessible. This is usually achieved through dedicated efforts of proactive search. Second, the institution stocks up and accumulates knowledge continuously in order to understand and transform external knowledge for use internally (Carlo et al., 2012; Matusik & Heeley, 2005; Song et al., 2018). This core function is known as ***Knowledge Accumulation*** in the HEI domain. Third, the organization puts in place its own internal procedures and processes to enable the sharing and diffusion of external knowledge internally (Cohen & Levinthal, 1990; Liao et al., 2003; Matusik & Heeley, 2005; Reus et al., 2009; Song et al., 2018). This core function is known as ***Transformation*** in the HEI domain. These three functions come together to activate the absorptive capacity process within the university space.

Knowledge Acquisition

Knowledge Acquisition (KA) simply refers to the activities that an organization engages in to facilitate the identification and acquisition of new scientific, general, organizational or technological knowledge that is essential for its operations (Cohen & Levinthal, 1990; Lane et al., 2006; Lane & Lubatkin, 1998; Paudel, 2020; Todorova & Durisin, 2007; Zahra & George, 2002). Members of an organization are required to recognize how valuable new external knowledge is, acquire it, and incorporate it into the organization's existing knowledge stock (Cohen & Levinthal, 1990). Acquisition is determined by how fast and intense an organization's efforts are to identify and finally get knowledge (Zahra & George 2002, p. 189). The major components that facilitate acquisition are therefore prior knowledge and investments, speed, intensity and focus. This potential for knowledge acquisition is a strength for organizations which manage to access and absorb valuable knowledge by having a relationship with other firms through social interaction (Chen & Huang, 2009). Adapting to skills and capabilities from partner firms through knowledge transfer can enhance their innovative activities to create competitive success (Dyer & Nobeoka, 2000; Osobajo & Bjeirmi, 2020). Knowledge acquisition therefore plays a key role in knowledge search, social networking and the quality and speed of learning.

Two types of knowledge which can be acquired are tacit knowledge and explicit knowledge (Nonaka, 1994; Nonaka & Takeuchi, 1995). Tacit knowledge refers to knowledge that is invisible, hard to document, visualize or share with others because it resides in an individual's mental faculty. It is shared through common experiential encounters in routine practices and actions (Nonaka & Konno, 1998; Paudel, 2020). It is therefore an essential ingredient for gaining a competitive advantage because it is hard for competitors to copy. It is also the reason some organizations are able to churn out more innovative products than others. Organizations that want a competitive advantage and sustain it must therefore try to enhance their tacit knowledge acquisition (Nonaka, Toyama, 2002), by creating and sharing through direct and personal interaction, as it is rooted in people's intellectual capabilities. Explicit knowledge, however, is visible, easy to codify and articulate, and can be made easily available and shared to organizations and their members through conceptual symbols, images and language in a systematic way (Nonaka & Konno, 1998). Since it is easily documented and readable, it can be handed down even to future employees.

Innovation Generation

Innovation is a process which involves developing, generating, and adopting new methods, ideas, policies and programs for the achievement of organizational goal (Ahuja & Katila, 2001; Butnariu, 2020; Cohen & Levinthal, 1990; Nisar, & Wu, 2021; Yang & Tsai, 2019). It is seen to be a dominant factor for consolidating global competitiveness (Butnariu, 2020; Feldman et al., 2019; Liu, Dutta & Park, 2020) and can therefore be a key ingredient for achieving profitability, even in the higher education domain (McClure, 2016). Again, "Innovation is a key factor in the knowledge-based economy and is positively related to superior performance" (Butnariu, 2020, pp 305). The term "innovation" continues to remain a key concept in extant literature and has gained the attention of researchers for over 70 years since the classic work of Schumpeter (1934), which defines innovation in many different ways, such as new products, new methods, new procedures, new markets, new structures or new combination of resources within an organization. Schumpeter (1934) further proposes three main kinds of activities for innovativeness, which are invention, innovation and imitation. Invention refers to an act of creation where ideas are developed. Innovation refers to how the inventions are commercialized for the purpose of benefits and finally, imitation refers to the way other similar organizations adopt these innovations in order to appropriate value for competitiveness.

Accordingly, Innovation Generation (INNG) refers to using new external knowledge in the development of new products and the improvement of old products and services as a commercial output of absorptive capacity (Cohen & Levinthal, 1990; Lane et al., 2006; Nisar, & Wu, 2021). This implies that innovation generation represents the effect of absorptive capacity in creating value for an organization. When an organization is able to successfully internalize the external knowledge acquired into its operations, this naturally spurs innovation to improve organizational performance (Ahuja & Katila, 2001; Butnariu, 2020; Kogut & Zander, 1992; McClure, 2016). That is why innovation is largely seen as very essential in the growth and success of any business and very critical to survival and sustainability. This further implies that innovation has to be a continual or ongoing activity in an organization since economic and social prosperity can generally be achieved through an innovative economy.

Inter-functional Coordination

Inter-functional coordination (IFC) is considered as a fundamental requirement for human activity in organizations and refers to how labour is divided into different tasks and how these tasks are coordinated for accomplishment in organisations (Mintzberg 1979). Inter-functional coordination therefore refers to the integration and collaboration of differing functional departments of an organization to enhance communication and information flow so as to attain organizational goals (Auh & Menguc, 2005; Narver & Slater, 1990; Hübnerová, Tomášková, & Bednář, 2020; Kanovska & Tomaskova, 2012). This means that different functional units are able to embrace differing views and work with such varying perspectives for the good of the whole organization. Inter-functional coordination enhances the achievement of common goals in an organization when integrated functional units synergistically strive to attain holistic team success (Atuahene-Gima, 1996). Research has revealed that when the organizational culture exhibits an appreciable level of inter-departmental teamwork within the organization, its goals are easily executed and achieved (Atuahene-Gima, 1996, 2005). This therefore presupposes that organizations can achieve internal sources of social capital through the collaboration of different functional units (Auh & Menguc, 2005; Tsai & Ghoshal, 1998). Inter-functional coordination is, thus, a structural mechanism that can be used to enhance the goals of an organization as it fosters cohesiveness through the improvement of relationships between people with varying functional skills, thereby, enhancing the building of trust and commitment. Inter-functional coordination further eliminates functional or departmental boundaries as all functions come together to focus on the holistic goal of delivering value to customers (Wooldridge & Minsky, 2002). Finally, inter-functional coordination is a very important component of market orientation (MO). The main focus of market orientation is on external and internal elements and activities that lead to improved performance. The first definition of inter-functional coordination in relation to market orientation is proposed by Narver and Slater (1990) who posit that inter-functional coordination is aimed at coordinating the use of organisational resources for the creation of improved value for target customers in the holistic purchasing process. Additionally, Jaworski and Kohli (1993) stress the necessity to have perfect coordination of all the departments.

1.9 Delimitations of the study

The scope of this dissertation was delimited to the higher education institution industry in Ghana. This dissertation examined knowledge intensive universities that tend to be innovative in a bid to gain a sustainable competitive advantage (Ahuja & Katila, 2001; Cohen & Levinthal, 1990; Huang et al., 2008) and also possess a research and development (R&D) department, indicating a high responsibility for constant knowledge-creation (Lane & Lubatkin, 1998; Lane et al., 2001). Data was collected from faculty staff of both private and public universities only in Accra, Ghana. Thus, the findings of this dissertation may not represent accurately the absorptive capacity management practices of universities in Ghana as a whole. In order to explore the contextual meaning of ACAP in HEIs, this study initially gathered qualitative data from interviewing ten (10) Heads of departments in the business faculties of selected universities to gain in-depth insight of the construct. The statistical methodology used for testing the quantitative data was the Structural Equation Model that examined the modified model proposed by Song et al. (2018), together with the paths linking the components of absorptive capacity to knowledge acquisition and innovation generation through the intermediary role of an organizational mechanism known as inter-functional coordination.

1.10 Organization of the study

This study is structured into five (5) main chapters.

Chapter one (1) provides a general introduction to the study. The chapter is made up of the background to the study, the statement of the problem**,** the research questions**,** the research objectives, the contributions of the study, the significance of the study, definitions of key terms, the delimitations of the study and the organization of the study.

Chapter two (2) provides an overview of the theoretical background of this study, the main theoretical foundations that underpins this research and literature reviews on the three (3) main research domains of the study: Absorptive Capacity research and the organizational mechanism, Inter-functional coordination in the context of the Higher Education Institution (HEI) domain in terms of knowledge acquisition and sharing and the generation of new ideas among academics. The chapter also provides the methodology for selecting relevant and influential academic publications, journals and scholarly seminal works published in the three research domains and citation analyses of

the selected relevant papers. The chapter further presents the research model guiding the study and research hypotheses.

Chapter three (3) presents a description of the design of the study and the methodology used in carrying out the research. Specifically, it outlines the research philosophy, research approach, research strategy, methods of data collection, study population, sampling procedure and technique, sample size determination, data collection procedure, data analysis procedure, pre-test or expert opinion on research instrument, measures and validation and the ethical foundation of the research. This study employed the exploratory sequential mixed methods design.

Chapter four (4) presents the study's findings of both the qualitative and quantitative analyses, results and their interpretations. Thus, the chapter provides an understanding of how faculty members view and understand ACAP and how it impacts innovation generation in the university and its implications. It further presents the significance of the hypotheses tested and their implications for practice, theory and policy. Chapter five (5) presents the summary of outcomes from the qualitative and quantitative studies one (1) and two (2) respectively, as well as the limitations, conclusions and recommendations of the study and suggestions for future research.

CHAPTER TWO

2.0 Literature review

Overview

This chapter provides readers with an overview of a broad review of literature and the theoretical background of this study. The study reviews relevant and influential academic publications, journals, and scholarly seminal works published in the particular research domains covered: *Absorptive Capacity research* and an organizational enabler mechanism - *Inter-functional coordination* in the context of the *Higher Education Institution (HEI)*. The literature review also includes the research model that guided the study and the hypotheses that were proposed for testing.

2.1 Theoretical background

The grand philosophical theory that underpins this study is the knowledge-based view (KBV), which is an extension of the resource-based view (RBV). Being one of the most recent theories of an organization, the KBV states that knowledge is a source of competitive advantage (Kogut & Zander, 1996; Grant, 1996; Nahapiet & Ghoshal, 1998; Nonaka, 1990, 1994; Nonaka & Takeuchi, 1995) for an organization since new knowledge and skills facilitate the ability to innovate new services or products whilst effectively improving existing ones (Nonaka et al., 2000). Knowledge acquisition through external sources is, therefore, currently an innovation trend, as knowledge creation has now become the reason for existence (Nonaka et al., 2000) for every organization because it has become its only meaningful resource (Drucker, 1993) in this "knowledge society" which is characterized by so much competition internationally.

Additionally, the theory of organizational knowledge creation (Nonaka, 1994; Nonaka & Takeuchi, 1995; Nonaka et al., 2006; von Krogh et al., 2000) and the social capital theory (SCT) (Bourdieu, 1986; Coleman, 1986; Putnam, 1993) are relevant theories which are outlined in this chapter. Again, aspects relating to inter-functional coordination are defined, analysed and discussed in line with the research objectives. Further, the relationships of ACAP dimensions to Knowledge Acquisition and Innovation Generation are explained to give a good background to the concepts of the variables that are used in the research model. This chapter closes with the development of hypotheses to discuss

the relevance of ACAP in the higher educational sector and the effects of inter-functional coordination to complete the ACAP research.

2.2 The Knowledge-based view

The knowledge-based view (KBV) which is one of the most recent theories of an organization, views knowledge as the most important strategic resource of the organization (Kogut & Zander, 1996; Grant, 1996; Nahapiet & Ghoshal, 1998; Nonaka, 1990, 1994). KBV is largely seen as a recent extension of the resource-based view (RBV) of the organization (Grant, 1996; Hoskisson et al., 1999; Bontis, 2004; Balogun & Jenkins, 2003) as it draws much reference from the classical theories of management like the organizational theory (OT) and the resource-based view (RBV) of the firm. There is, in fact, a fundamental assumption that the KBV actually stemmed from the RBV (Curado, & Bontis, 2006). This extension is seen to be appropriate for the current economic context (Drucker, 1993; Grant, 2002; Mathews, 2003) in which intangible assets are highly valued and viewed as critical intellectual capital assets (Bontis et al., 2002; Barney, 2001; Hitt et al., 2001; Grant, 2002; Mathews, 2003; Bontis, 2004). For knowledge to be seen as a resource establishes the theoretical link between the RBV and the KBV. The RBV does not seem to give much recognition to the KBV as the former simply categorizes knowledge as one of the simple resources of the organization. The KBV, however, expounds on the strategic importance and distinctive features of different kinds of knowledge that help to achieve a competitive advantage (CA) because of the appreciable value of knowledge, as opposed to other resources of the organization which have the tendency to depreciate (Curado, & Bontis, 2006). Tacit knowledge and explicit knowledge are two types of knowledge that organisations can acquire to facilitate their relevance in the competitive markets (Nonaka, 1994). Tacit knowledge is so dynamic and intangible that it requires an idiosyncratic approach for organizational learning and employee dependency in learning (Andreu, Baiget, & Canals, 2008; Curado, & Bontis, 2006), Acquiring tacit knowledge by employees within the organization is contingent on their ability to share skills and their zeal to search for knowledge beyond their boundaries. Explicit knowledge highlights industry trends that are generally practiced by rival organizations in response to market demands. It is worthy to note that all activities and factors of production in the value chain require the application of knowledge. Knowledge is, therefore, a strategic resource that adds value to business data, systems operations and

information processes and change management. KBV proposes that diverse knowledge structures must be established across all the hierarchies of an organization in order to gain and sustain a knowledge based competitive edge. This is due to the fact that knowledge resources are usually difficult to transmit and imitate in socially complex situations. Acquisition and transfer of knowledge must be continuous as a result of the ever-changing conditions of current global markets, deregulations and technological advancements.

In contextualizing the ACAP process in the HEI domain, there is a need to broaden the scope of KBV by urging research in three directions. First there is a need to empirically conceptualize the ACAP dimensions in HEIs to bring out a clear understanding of the terminologies that are used to represent the dimensions in such a way that there is clarity and coherence in their interpretations in the research. Second, we introduce organizational mechanisms for ACAP in HEIs by proposing "inter-functional coordination" (IFC) as a mechanism which plays a significant role in the ACAP process as it facilitates and promotes a culture of teamwork and collaboration in HEIs for acquiring, sharing and transferring knowledge throughout the entire institution. It also facilitates the building of strong relationships across faculties and departments to promote knowledge acquisition and transfer for the achievement of the shared institutional goals in higher education. Third, we highlight both inter-faculty and intra-faculty relationships as key governance modes for sourcing external knowledge within the HEI community by focusing on the local connections among differentiated disciplines that can offer opportunities for richer interactions and superior access to external knowledge sources. These theoretical developments can create a comprehensive framework for understanding the process of how newly acquired knowledge and prior knowledge can be integrated to generate value added products and services. The three concepts are extensively reviewed under conceptual overview.

2.2.1 Technological Perspective of the KBV

The business world today has changed and now involves several technology components such as blended e-learning (BEL) and open distance learning (ODL) for easy accessibility, availability and quality sharing of knowledge beyond geographical boundaries (Abass et al., 2021). As such, having a mastery of science and technology

knowledge have now become the keys to gaining a competitive edge (Hermann, Pentek & Otto, 2015). Technological business applications have a major role to play in advancing organizational knowledge capabilities and many technology innovations are now playing key roles in organizing knowledge especially for storing, sharing, and disseminating knowledge which be accessed and retrieved later (Mathew, 2009). Effective flow of knowledge can now be facilitated through the use of appropriate technology and mutual understanding among people (Egan, 2003). So appropriate technology, people and the flow of knowledge have become systematically integrated. In order to enhance competency and innovation, most organizations are now adopting IT applications for their transactions such as asset management, customer relations and total quality management. IT applications are now being used by organizations to empower the workforce with the capacity to share knowledge in a collaborative environment, through the use of interactive tools like intranets, emails, video conferencing and discussion groups via zoom.

The adoption or otherwise of these IT applications is determined by ease of use, accessibility and reliability of the technology (El Said, 2015). For instance, the technology of computers facilitates knowledge management as a tool which assists individuals and groups to acquire organizational knowledge (Nemani, 2010). When the usage of technology facilitates distribution, acquisition, sharing and transfer of knowledge, the practices are encouraged and achieved easily. However, when the usage of such technology promotes prohibition, access to knowledge stored in such medium becomes problematic. According to Paroutis and Al Saleh (2009), three main factors that influence knowledge sharing behaviour are summarised in the knowledge management literature as technological factors, organizational factors, and human factors. The knowledge management literature has underscored the importance of interactive. KM technologies which will promote the easy transfer of knowledge. Some recent technologies are known as Web 2.0 technologies or platforms (Levy, 2009; Weinberger, 2007). It is argued that such technologies have distinct technical features that facilitate engagements for knowledge sharing. They are also believed to remove some of the conventional barriers to sharing knowledge (Kaiser et al., 2007).

Today, globalization and its attendant competition has stimulated innovation in education, in particular, in HEIs. The higher education sector contributes to the

development of intellectual property and knowledge production, by extending knowledge skills and producing quality and valuable graduates for the development of society as a whole (Pinto, 2014). Technology plays a vital role in attaining quality product and service delivery in higher education institutions (Abass, Arowolo & Igwe, 2021). Knowledge sharing, which is a main component of knowledge management, is an activity in HEIs that requires full implementation of IT applications in addition to knowledge and individuals to diffuse knowledge from teaching and research through various e-learning and blended e-learning platforms. Knowledge management processes involve technologies, people and structures to develop effective learning, decision making and problem solving. In HEIs successful KM strategies is contingent, not only on synergies among faculty and administrative members but also software tools and applications (Abass, Arowolo & Igwe, 2021). In order to support processes of knowledge management IT must be developed and widely applied and integrated into HEIs' technology platform (Wong, 2005) to support continuous creation, dissemination and use of knowledge. Again, in order to boost competitiveness, successful KM must also be founded on the availability of efficient and effective knowledge-centred faculty and administrative members.

Additionally, mobile technologies for learning have emerged as a dynamic resource for learning in universities particularly, the creation of mobile social networks for learning and knowledge management (Gikas & Grant, 2013). Mobile social networks are the social interaction of individuals using and social network sites and mobile applications to establish connections with each other in a bid to explore common interests (Rennie & Morrison, 2013). Also known as virtual communities, lecturers and students access interactive platforms and create communities to share ideas and information related to their learning expectations. These technologies, in combination with wireless networks such as Wi-Fi and Bluetooth support and make the learning process as well as the communication pathways between lecturers and students flexible (Gikas & Grant, 2013).

2.2.2 Knowledge Management

Knowledge management (KM) is a strategic function that enables organizations to identify knowledge for efficient usage in order to accrue long-term benefits (Darroch & McNaughton, 2002). The main objective of KM is to avail usable knowledge from one

person to another for the intention of production. In the pursuit of competitive advantage, organizations formulate KM strategies to create and use knowledge resources both individually and collectively. Effective knowledge management practices help to improve innovation and performance (Darroch & McNaughton, 2002; Nonaka & Takeuchi, 1995) and as a mechanism for addressing complex innovation challenges by integrating new and existing knowledge in the innovation process (Cavusgil et al., 2003). The main activities that define KM are (a) identifying knowledge, (b) creating knowledge, (c) storing knowledge, (d) sharing knowledge and (e) applying knowledge.

Identifying knowledge

Knowledge is defined as a contextual information that can be applied as concepts, facts, rules, judgements, principles, intuitions, thoughts and feelings (Gobet, 2018).

Knowledge management process begins with reviewing the existing knowledge resources available and identifying knowledge gaps that have to be replenished to enhance the capacity. There are typically six knowledge assets that can be identified in an organization. These are (a) stakeholder relationships, (b) human resource skills or competences, (c) physical infrastructure, (d) organizational culture, values, and philosophy, (e) traditional practices and routines, and (f) intellectual property (Gunjal, 2019). Identifying and acquiring key external knowledge for its operations depends on an organizations prior stock of knowledge and investments and can be characterised by its intensity, speed and direction (Cohen & Levinthal, 1990; Song et al., 2018).

Creating knowledge

Producing new knowledge covers "a process that 'organizationally' amplifies the knowledge created by individuals and crystallizes it as part of the knowledge network of the organization" (Nonaka & Takeuchi, 1995 pp 59). Creating new knowledge refers to the introduction of new ways of conducting business processes individually and collectively. Creating new knowledge can be achieved through training, consultancy and brainstorming (Paudel, 2020). Training can be effected through the rotation of jobs, committee assignments simulations, seminars, workshops and lectures. The aim if knowledge creation is to foster innovative practices and develop enhanced performance foundation. The process of amplifying knowledge in driven by to sets of activities. These are (a) Conversion of tacit knowledge into explicit knowledge (Nonaka & Takeuchi,

1995) and (b) The movement of knowledge from the individual level, to group level, to organizational level and finally to inter-organizational level (Crossan et al., 2003).

Sharing knowledge

Knowledge sharing is one of the knowledge management activities that promotes organizational success and supports creativity and shared intellectual capital to achieve the best results for the organization (Van den Hooff, & de Leeuw van Weenen, (2004). Again, knowledge sharing is a key ingredient in learning organizations because it supports collaboration and reuse of individual employees' knowledge through information technology as well as work groups and databases that are historically considered knowledge sharing system. Knowledge sharing also requires essentials such as an integrative environment for collaboration, training, learning and education (Ivanova, Vinogradova & Zadadaev, 2019). Social communication is a key success factor for any knowledge sharing endeavour, because the exchange of knowledge among individuals is contingent on the willingness of organizational members to share their knowledge (Pivec & Maček, 2019). An effective knowledge sharing therefore depends on the sharing behaviours of individuals members. A lack of knowledge sharing in organizations will accordingly have a negative impact on its knowledge management.

There are two dimensions of knowledge sharing which are knowledge donation (KD) and knowledge collection (KC). Knowledge donation refers to the sharing of personal intellectual capital through communication. Knowledge collection refers to gaining intellectual capital through consultations with stakeholders and partners. Knowledge donation and collection enhances organizational processes, routines and practices for the generation of innovations (Razak et al., 2018; Wang & Kwek, 2018). Additionally, when knowledge is shared and exchanged within organizations it produces new information and experiences for linear growth. Above all, new knowledge with feedback and support grows exponentially (Liao et al., 2007).

Storing knowledge

Knowledge is stored or accumulated in organizations in either tacit form or explicit form. As argued by Cohen and Levinthal, (1990); Zahra and George, (2002) the absorptive

capacity of an organization is dependent on its prior stock of knowledge which helps to better understand new knowledge whilst improving the stock of knowledge (Zhao & Anand, 2009). This presupposes that knowledge storing must be built on past-oriented, and path dependent foundations and require that new external acquired knowledge is related to facilitate easy comprehension and a smooth transformation process. Knowledge stocks accumulated by the higher education institution could be in the form of patents and intellectual properties (Srivastava et al., 2015), patent citations (Kim & Inkpen, 2005), scientific publications (Kang, 2012) and prior product innovations (Estrada et al., 2010). Challenges for storing knowledge can be overcome when organizations adopt strategies for integrating the use of knowledge into information technology systems. This will facilitate continuous access to the organization's knowledge base whilst encouraging employee creativity and innovation. Knowledge storage can be further enhanced through the implementation of continuous training programs to improve and revise the organization's core processes, routines and procedures.

Applying knowledge

Knowledge application refers to the process of transforming information into knowledge and skills with the sole aim of gaining a competitive edge. The main objective of knowledge application is to integrate knowledge acquired from internal and external sources to drive the objectives of the organization (Ode & Ayavoo, 2020). Knowledge application processes enable organizations to leverage knowledge in order to improve their operations, develop new products, as well as generate new knowledge assets (Boateng & Agyemang, 2015)**.** Knowledge application also offers the organization knowledge integration strategies for solving problems in the (Ode & Ayavoo, 2020). Knowledge application is the primary goal of knowledge management as it ensures that available knowledge is applied for the benefit of the organization. Empirical research suggest that effective application of knowledge reduces cost and increases the efficiency of organization (Allameh, & Zare, 2011).

Knowledge based resources can be achieved when the relevant knowledge is applied with the aim of enhancing business actions and decisions. Even though some organizations may work hard and diligently to acquire knowledge repositories, they are unable to pay attention to transforming these repositories into information resources which employees are able to apply in the engagement of their business activities as well as in the generation

of new ideas for the future (Allameh, & Zare, 2011). Knowledge must therefore be applied whilst keeping other organizational dimensions like organizational culture and process designs in mind (Paroutis & Al Saleh, 2009).

Organization Learning

Organizational learning is regarded as a strategic tool for achieving long-term organizational success (Argote, 2013; Easterby-Smith & Lyles, 2011) as well as a basis for a possible competitive advantage (Vera & Crossan, 2004).. It is characterized by collaboration in the work space because individual knowledge and insights are transferred to group or team level and then to the organizational level (Crossan et al., 2003) in order to achieve enhanced performance (Kogut & Zander, 1992; Nonaka and Takeuchi, 1995) in today's competitive marketplace an organization must maintain its position in a rapidly changing environment and organizational learning is a strategic tool that is linked to the development of new knowledge (Huber, 1991) and therefore positively impacts organizational innovation, since knowledge creation enhances the introduction of new products and services (Smith *et al*., 2005). In the process of organizational learning, members of an organization are able to detect errors and correct them by restructuring organizational routines and actions (Argirys and Schön, 1978). Organization learning promotes open-mindedness, shared vision, and commitment to learning has a positive effect on innovation outcome (Nonaka & Takeuchi, 1995).

2.2.3 Challenges of KBV

Changes in today's global world is now challenging established theories such as the OT, RBV and KBV. Even systems and paradigms are shifting from the industrial era to the information age. There are major emerging challenges in the organizational sciences domain given the fact that yesterday's organizational knowledge and strategies cannot guarantee success for the present or future (Senge, 1990). In this digital era of knowledge-based technology, the terminology often used now are digitalization and innovation (Hermann, Pentek, & Otto, 2015). It has indeed become difficult to understand and balance these shifts without applying digitalization and innovation transformation. As far as the KBV is concerned, there are hurdles that may emerge from divergent interests between the current expectations of organizational leaders and that of employees'

conditions, especially in the area of specialized knowledge. Specialized knowledge cannot be easily coordinated as owners of such knowledge cannot freely part with such 'expensive' knowledge and lose their 'power' (Lessard & Zaheer, 1996). In the pursuit of coordinating specialized knowledge in a uniformed manner, cooperation among employees must be encouraged through hierarchical structures without the imposition of bureaucratic enforcements. Better administrative processes are to be encouraged in order to avoid employee apathy.

In view of the fact that significant organizational knowledge dominantly resides in the minds of individual employees (Grant, 1996), organizations need to explore and understand what motivates employees to freely share knowledge and what demotivates them from doing so. When an organization understands these determinants, they can then implement the appropriate management practices to encourage knowledge-sharing behaviour. This will enhance productivity, growth, innovation and a holistic organizational competitiveness (Paroutis & Al Saleh, 2009). Communicating effective socialization activities among employees can be channelled through the organizational culture.

Organizational culture

The KBV views the culture of an organization in line with the reward structures that are established to recognize employees who freely create and share knowledge. It is also believed that the culture of an organization is one of the main factors that ensure an effective organizational learning for innovation because culture forms beliefs, shared values and work systems that is able to either boost or impede knowledge sharing (Hislop, 2013). Organizational culture refers to the norms and shared values that define an organization as part of their practices of individual and group members (Miron *et al.*, 2004). Organizations employ people with the expectation that they will apply knowledge in their respective actions with regards to their assigned roles and duties. In this regard it is important that these expectations be emphasized and well outlined in the recruitment processes when hiring new employees. This is because the organization expects a certain basic intellectual curiosity among new employees based on their experiences. Knowledge management grows in organizational cultures that portray flexible human relations

orientations (Chang & Lin, 2015). Such HR orientations operate like family and promote employee empowerment, employee development and excellent interpersonal relations as opposed to bureaucratic hierarchies and reporting channels in which high level decision making is dependent on knowledge of lower level employees. KBV must therefore emphasize participative organizational structures which make room for employee motivation as well as an environment that encourages the sharing and dissemination of knowledge holistically (Abdi & Senin, 2014).

2.3 The Organizational knowledge creation theory

In consonance with absorptive capacity, the theory of organizational knowledge creation views knowledge creation as an ongoing social accomplishment which takes place through continuous dialogues, interactions and socialization (Brix, 2017; Nonaka, 1994; Nonaka & Takeuchi, 1995; Nonaka et al., 2006; von Krogh et al., 2000). This view is based on the fact that human beings and organizations are dynamic, interacting with others within their environment (Nonaka & Takeuchi, 1995). As a result of this dynamism, humans grow together as they create knowledge, and this process of interaction within the organization, which is a place ('Ba') makes them go beyond their individual boundaries, resulting in 'change' of oneself, others and the organization as a whole. The concept of 'Ba' (which means 'place' in Japanese), is that all knowledge is situated in a context, be it social, cultural or historical, and this represents a shared space where people interact (Nonaka & Konno, 1998; Nonaka & Takeuchi, 1995). This shared space can be in the physical form, such as the office space, the mental form, such as ideas or the virtual form such as internet, intranet, emails and social meetings (Nonaka et al., 2000a). This theory of organizational knowledge creation is a suitable and comprehensive knowledge framework since it has been widely applied in organisational management, covers the processes of knowledge creation and sharing and further explains the organizational context, knowledge assets and process. Knowledge assets are the inputs, outputs and moderators within the knowledge creation process e.g. skills, values, organizational culture, trust, norms, routines and experience. Knowledge is discovered by an individual, shared among organizational members and finally incorporated into the organizational knowledge system (Nonaka et al., 2000a).

In addition, research has highlighted two types of knowledge aforementioned: tacit knowledge and explicit knowledge (Nonaka, 1994). Tacit knowledge is knowledge that is acquired through experience and practice and therefore is difficult to document, visualize or share with one another because it is embedded in the individual's mind and more experiential in nature. As a result of it being subjective, cognitive and difficult to formalize and transfer, tacit knowledge is an important ingredient for competitive advantage because it is hard for competitors to copy, reason why some organizations innovate better than others. Organizations that want to gain and sustain a competitive advantage must therefore try to enhance their tacit knowledge (Nonaka et al., 2000), by creating and sharing through personal interaction, as it is embedded in people's intellectual capabilities. The cognitive aspect of tacit knowledge is about the mental models, ideals, beliefs and viewpoints that human form or create in their minds as they interact with other people. Explicit knowledge is however, easy to codify, readily available for sharing to organizations and their members in data form, manuals, formulas and specific actions which can be handed down even to future employees.

The SECI Process

The 4 phase process known as SECI is the way by which knowledge is created (see figure 1). Phase 1 of SECI begins with *Socialization,* which explains the sharing and transfer of tacit knowledge as a result of shared experiences, ways of thinking, technical gestures and the creation of knowledge as a team or as a group. Phase 2 is *Externalization. At this stage* tacit knowledge is articulated or transformed into explicit concepts which are understandable for individuals, groups or the organization through readily under-stood devices. Phase 3 which is *Combination,* is the process of putting together bits and pieces of explicit knowledge into sets of knowledge which are systematic and more complex. Finally, *Internalization* explains the process where explicit knowledge is embodied into tacit knowledge through a process of learning by practice (Nonaka & Takeuchi, 1995; Nonaka et al., 2000a). All the four phases have a positive effect on how flexible the information distribution is (Ramírez et al., 2012).

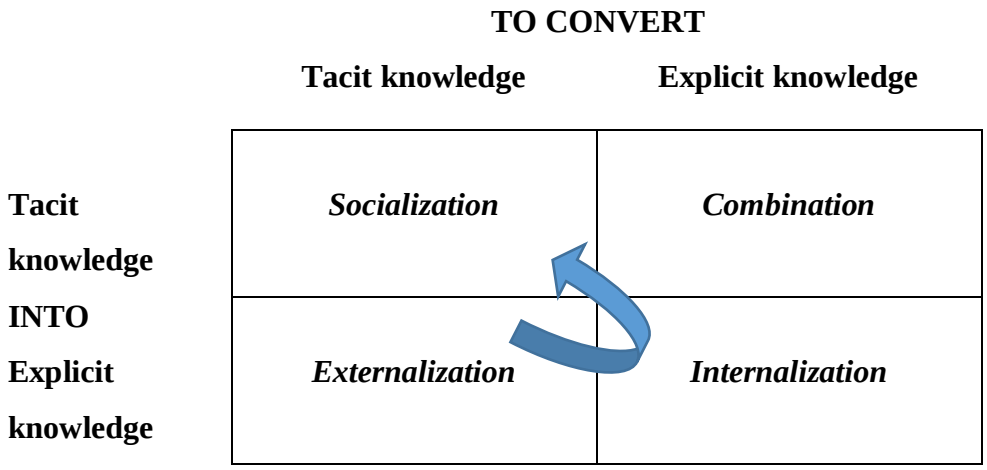

Figure 1: The SECI model (Adapted from Nonaka & Takeuchi, 1995).

2.4 Social Capital theory

Another theoretical underpinning of this study is the **social capital theory** (SCT) as developed by Bourdieu (1986), Coleman (1986) and Putnam (1993) who believed that since social capital exists between individuals, the premise is that people establish links which they purpose will invariably bring them tangible and intangible benefits. Social capital is considered as an essential catalyst for organizations to acquire knowledge and other resources to promote organizational innovation and performance. The theory of social capital, which is in consonance with the concept of inter-functional coordination, suggests that social networking among organizational members with external actors gives them access to certain vital strategic resources such as information, knowledge, social support, advice and friendship (Adler & Kwon, 2000; Burt, 1997; Coleman, 1988; Inkpen & Tsang, 2005; Nahapiet & Ghoshal, 1998; Nguyen & Ha, 2020; Putnam, 1995).

However the concept of inter-functional coordination in HEIs further suggests that networking can be among faculty members, not only with external actors in inter-faculty relationships but also with internal actors in intra-faculty relationship. This is because HEIs are made up of differentiated faculties and departments with varying disciplines and specializations that are considered to be external to one another but are situated within the same internal space. As such members are given access to both external and internal social capital within the same academic community. The process of creating and sharing valuable external knowledge in any organization is linked with the nature of structure of social network (Borgatti & Cross, 2003). Having access to resources beyond the physical

boundaries of an organization, or in the case of HEIs, beyond the boundaries of faculties and departments, is increasingly become an essential condition for achieving competitive advantage (Diriye, 2019; Liu, Dutta & Park, 2020; Nonaka, 1994; Osobajo & Bjeirmi, 2020), recognizing the fact that an organization's critical resources can be found outside (Dyer and Singh, 1998, Anderson et al., 2002).

Social capital theory further suggests that actors in networking relationships who may be individuals, organizations, institutions or communities, are able to tap into the resources that are embedded in these relationships for their benefit (Bourdieu, 1986; Lin, 2008; Nahapiet & Ghoshal, 1998). Reagans and McEvily (2003) found that close relationship and cohesive network structures enhance effective sharing of knowledge among the actors within the network. Without social interactions, the transfer of tacit knowledge element is not likely to happen (Kogut & Zander, 1996; Szulanski, 1996). As such, healthy social relationships actually promote tacit knowledge transfer better than explicit knowledge (Hansen, 1999; Reagans & McEvily, 2003). Intense social networks with close interactions therefore results in increased tacit knowledge transfer (Krackhardt, Nohria, & Eccles, 2003; Sorenson et al., 2006). Absorptive capacity takes advantage of key resources that are embedded in the organization's network of relationships and promotes an effective deployment of such resources for competitive advantage (Zou et al., 2018). However, the role of the organization's inter-functional coordination strategies cannot be overlooked when examining its absorptive capacity, as it is embedded in contexts where it is utilized (Trentin, Forza, & Perin, 2015).

Nahapiet and Ghoshal, (1998) define social capital as "the sum of the actual and potential resources embedded within, available through, and derived from the relationships possessed by an individual or social unit" (Nahapiet & Ghoshal, 1998, p. 243). Three dimensions of social capital are elucidated in the literature as structural social capital, cognitive social capital and relational social capital (Inkpen & Tsang, 2005; Nahapiet & Ghoshal, 1998). Structural social capital refers to the whole pattern of connectedness among network parties from varying parts of a social network. Cognitive social capital refers to the aggregate of shared opinions, mental models and meanings derived from these collaborations and interactions among network parties. Finally, relational social capital refers to the bonds and personal relationships which are built from these collaborations and communications with people within the network. It has been

established in the literature that ties, mutual interest and trust play a role in these three dimensions of social capital (Hau, Kim, Lee, & Kim, 2013).

Whilst contributing to promoting the process of sharing knowledge (Ganguly et al., 2019), social capital also helps to rightly interpret the knowledge of other people by giving them the requisite knowledge and understanding in an atmosphere of mutual trust and respect (Akhavan & Mahdi Hosseini, 2016). Numerous studies have established a relationship between social capital and knowledge sharing (Chow & Chan, 2008; Chang & Chuang, 2011; Holste & Fields, 2010; Nguyen & Ha, 2020; Yang & Farn, 2009). These three dimensions greatly influence and also contribute to the quality and quantum of knowledge sharing behaviour in a work environment (Chang and Chuang, 2011; Kim et al., 2013; Nguyen & Ha, 2020).

There is however, a downside of social capital which needs to be addressed as these can have adverse or negative consequences (Pillai et al., 2017). Organizations that are overly dependent and reliant on external entities can easily become vulnerable to threats (Pettit et al., 2013). Again, when organizations exaggerate the building of strong social capital or engage in too many intensive relationships the tendency to face opportunity costs and high risk becomes imminent (Mitręga & Zolkiewski, 2012). Further, being overly committed to established relationships can also lead to postponement of structural adjustments that hamper the positive use of social capital (Pillai et al., 2017). It would be therefore necessary to develop capabilities and processes that can transform potential negative consequences of social capital into a positive ones.

2.5 Conceptual overview

The main research field that this research falls into is Absorptive Capacity Research, although this dissertation is actually grounded in three main areas of research. The researcher looks at *Absorptive Capacity* and an organisational mechanism: *Inter-functional Coordination* in the context of the *Higher Education Institution* in terms of knowledge acquisition, sharing and the generation of new ideas thereof among academics for the benefit of the university. This is important especially now that new knowledge markets and players are emerging with stiff competition in this knowledge economy. A wide array of conceptual research on absorptive capacity has highlighted a positive relationship between absorptive capacity and innovation (e.g., Lane, Koka, & Pathak,

2006; Todorova & Durisin, 2007; Volberda, Foss, & Lyles, 2010; Zahra & George, 2002).

2.5.1 Innovation generation

Innovation Generation (INNG), which is the outcome variable of the proposed conceptual model for this study refers to an organisation's generation or development of innovations in the forms of products, services, productions, marketing or management (Ritala, Olander, Michailova, & Husted, 2015). Innovation Generation is derived from the use of new knowledge to develop new and improved products and services as the commercial output of absorptive capacity (Lane et al., 2006) as value is created for the organisation Two meta- analyses (Song et al., 2018; Zou et al., 2018), and a literature analysis by Gao, Yeoh, Wong, and Scheepers, (2017), together with many other empirical research have given support for the positive relationship between absorptive capacity and innovation generation. Some have however posited, that this relationship may be indirect (Cohen & Levinthal, 1990; Song et al., 2018; Volberda et al., 2010). Not much is known about these underlying mechanisms and their boundary conditions of how absorptive capacity connects to innovation. Exploring some of these mechanisms that link absorptive capacity and innovation is therefore necessary to advance both theory and practice. From the perspective of organizational learning (Argote & Miron-Spektor, 2011), inter-functional integration may play a key role in converting externally absorbed knowledge into innovative products and therefore very important for sustaining competitive advantage (Wooldridge & Minsky, 2002; Yang & Tsai, 2019).

The effects that inter-functional coordination has on knowledge acquisition and innovation generation are therefore analysed and evaluated in the whole ACAP process. The ability to internalize external or new knowledge into the operations of an organization facilitates innovation and this enhances the overall performance of that organisation (Ahuja & Katila, 2001; Kogut & Zander, 1992). Generating innovative products and services is thus an essential activity for the success and growth of any organization and it is also critical for sustainability and survival. In today's globalized and competitive knowledge-based environment, higher education institutions need to adopt strategies that will enable them to continually enhance their capabilities so that they can respond to the changing demands of their clients and stakeholders who are

increasingly becoming complex. Continuous improvements and innovation of curricula and services are therefore a pivotal prerequisite for survival. This dissertation builds on the key elements of all three streams of research so that the effect of this integration mechanism in the absorptive capacity research can be identified and brought to the fore for innovation generation in the higher education sector.

In the context of this study, absorptive capacity will contribute to a higher educational institution's innovative outcomes and performance by enabling a university to assess the value of external knowledge, acquire the useful ones, and then combine such knowledge with its existing knowledge to generate innovation outcomes (Cohen & Levinthal, 1990) such as new curricula, programme combination and better research output and above all, better graduates for the job market. In this case, Absorptive capacity can contribute to the university's innovation performance by operating as a tool which will process useful knowledge from the external environment into useful outcomes. Again, since knowledge is imperfectly spread across faculties, departments and units in a university, ideas or information from one department can provide input to another, which can yield innovative outcomes so long as effective exchanges are made between these departments (Cohen & Levinthal, 1990, pp. 131–132). In this case, Absorptive capacity may contribute to the institution's innovative performance through the integration mechanism, inter-functional coordination, by operating as a pathway for transferring knowledge for cross-departmental innovation activities (Kostopoulos, Papalexandris, Papachroni, & Ioannou, 2011).

2.5.2 Absorptive capacity

The theory of Absorptive Capacity states that the innovative capabilities of any establishment depend on its ability to recognize how valuable new external information is, its ability to assimilate it and apply it in addition to its existing internal knowledge for innovative gains (Cohen & Levinthal, 1990). This underscores the relevance for understanding knowledge acquisition and assimilation as it holds a direct importance to innovation generation. Introduced by Wesley Cohen and Daniel Levinthal when they wrote a seminal paper in 1989 for the Economic Journal (Lane et al., 2006), citation data

from Web of Science indicates that Cohen & Levinthal, (1990)'s seminal work has since been cited about 9,000 times by published articles in over 900 journals (Zou et al., 2018).

While presenting the concept of ACAP as an organizational capability that allows organizations to use external new knowledge for their benefit, Cohen and Levinthal (1989, 1990) established ACAP in the literature by linking the organization's research and development (R&D) ability to its capabilities for learning and innovation. This is because ACAP uses new external knowledge to facilitate internal innovation (Lane, Lyles & Salk, 2001; Lane & Lubatkin, 1998), since innovation is now largely seen as vital for the success of any business endeavour in addition to being very critical for survival and sustainability (Laursen & Salter, 2006). Further, Cohen & Levinthal (1990); Zahra & George (2002) propose that a firm's strength of absorptive capacity is dependent on its prior knowledge and diversity. Cohen and Levinthal (1990) further stress that "*some portion of that prior knowledge must be very closely related to the new knowledge in order to facilitate assimilation, and some portion of that knowledge must be fairly diverse, yet related, to permit effective, creative use of the new knowledge"* (Cohen & Levinthal 1990, pp136). This means that ACAP tends to be path dependent and cumulative, and largely relies on an organization's "ability to store, share, and exchange knowledge internally" (Cohen & Levinthal, 1990; Lane et al., 2006). They, therefore, commonly highlight how effectively this new knowledge is exploited by being integrated with the organization's own knowledge base, reason why absorptive capacity positively impacts essential organizational outcomes like innovation. In addition, diverse knowledge boosts individuals' capacities to make new connections (Cohen & Levinthal, 1990) and this diversity boosts innovation processes through the recombination of new and existing ideas.

The absorptive capacity of an organization also depends on the totality of its individual members' absorptive capacities. This, in effect, means that in order to develop the absorptive capacity of an organization, prior efforts of all constituent members need to be built on. However, ACAP does not only refer to acquiring and assimilating knowledge by the organization, but more importantly, its efforts at exploiting the said knowledge by transferring it, from the initial point of entry to all units and department of the organization (Cohen & Levinthal, 1990). This can be achieved through an effective communication system and collaborative efforts of members. In addition to

encompassing an organization's ability to imitate other organizations' products or processes, these three dimensions of identification, assimilation and exploitation of knowledge show an organisation's ability to utilize knowledge which is less commercially focused like scientific research (Lane et al., 2006). Therefore, an organization's long-term survival and success depend on developing and maintaining its absorptive capacity as it can complement or reinforce that organization's knowledge base.

2.5.3 Conceptualization of ACAP and dimensions

Conceptualization refers to the breaking of research ideas into common meanings in order to develop a common consensus among users, a process which leads to the framing of meaningful concepts for creating a theory (Sequeira, 2014). The process of conceptualization is used to reify abstract words like "happiness", "satisfaction" into concrete ideas in order to specify exactly what we mean in our research to derive a concept. Also known as "a construct", a concept can be made up of a word or a set of words representing an idea, event or phenomenon. This process is necessary because a researcher needs to have a clear understanding of the terminologies that are used in the research in such a way that there are no ambiguities regarding definitions and their interpretations or even their measurements later in the research for the creation of new knowledge or the addition of new knowledge to existing knowledge (Sequeira, 2014). In order to understand fully a given concept, it needs to be broken down into parts of a whole. Thus, concepts need to be organized into separate parts, components or dimensions (Sequeira, 2014). Researchers may sometimes have varying conceptualizations for a particular concept which often leads to a lack of consensus for an idea, as in the case of ACAP.

The study of ACAP continues to be problematic despite its growing use due to the varying definitions, components, antecedents, outcomes and dimensions. Cohen & Levinthal (1989, 1990, and 1994) referred to ACAP as a firm's "ability to identify, assimilate, and exploit knowledge from the environment" as part of its fundamental learning process (Cohen & Levinthal, 1990; Lane & Lubatkin, 1998; Lane et al., 2006). The diversity of dimensions of the ACAP concept in the literature is precisely because of the realisation that new external knowledge resources have emerged as being so essential (Kogut & Zander, 1992; Grant, 1996; Matusik & Heeley, 2005; Camisón & Forés, 2010; Alnafrah

& Mouselli, 2019; Paudel, 2020). Most of these reviews on absorptive capacity suggest that absorptive capacity routines are made up of multiple process dimensions (Zahra & George, 2002; Lane et al., 2006; Todorova & Durisin, 2007; Volberda et al., 2010; Song et al., 2018). Lane et al. (2006), further propose a process definition comprising three dimensions: exploratory, transformative and exploitative stages of learning for ACAP. Lewin et al., (2011) also propose a more proactive perspective of ACAP, viewing it as a set of routines that surround the organization's ability to begin change from within, in addition to identifying and assimilating ideas from the external environment. Carlo et al. (2012) also conceptualize routines as a behavioural dimension of ACAP. Song et al. (2018) also develop the concept further by pointing to three (3) separate dimensions which are (1) absorptive effort, (2) absorptive knowledge base, and (3) absorptive process. Other scholars have clearly stayed away from defining the concept, while proposing various dimensions and perspectives (Lane & Lubatkin, 1998; Lane, Salk, & Lyles, 2001; Matusik & Heeley, 2005; Camison & Fores, 2009; Reus et al., 2009; Volberda et al. 2010). No wonder that it is referred to as an umbrella concept (Lewin et al., 2011) which does not provide much guidance to practitioners (Patterson & Ambrosini, 2015).

All these various dimensions, however, unanimously project the power of ACAP in converting externally gained knowledge into usable and profitable products and services, A look at these processes from a practice perspective shows that all these process dimensions are necessary and complement each other, as they function together to transform new, external knowledge into organizational innovation and performance (Todorova & Durisin, 2007; Zahra & George, 2002). Again, none of these individual dimensions of absorptive capacity can function very well without the other dimensions in tandem (Song et al., 2018; Zahra & George, 2002). Even so, many empirical studies conceptualise absorptive capacity as an overall construct (e.g., Chang, Gong, & Peng, 2012; Cui et al., 2018; Javalgi, Hall, & Cavusgil, 2014; Tsai & Yang, 2017) since the focus of research is on an organization's overall ability to absorb external knowledge.
Due to the richness of the ACAP concept many scholars have attempted to extend it in the organization field, as the basic capability for learning, which is linked to achieving success in organizational innovation and organizational performance (Lane et al., 2006; Lewin et al., 2011; Zahra & George, 2002). This concept indicates that firms have diverse capabilities for absorbing knowledge and applying this knowledge in innovation

processes (Esterby-smith, Graça, Antonacopoulou, 2008). Apart from its applicability to innovation (Cohen & Levinthal, 1990), studies have considered its applicability to other areas such as inter-organizational alliance, collaboration and learning (Lane & Lubatkin, 1998), entrepreneurship (Liao, Welsch, & Stoica, 2003), supply chain management (Azadegan, 2011), marketing (Xiong & Bharadwaj, 2011), and international business (Lyles & Salk, 1996).

2.5.4 Dimensions of absorptive capacity

An analysis of the ACAP literature highlights five complementary dimensions of the process as (1) identification or recognition of the value of knowledge, (2) acquisition of knowledge, (3) assimilation of knowledge, (4) transformation of knowledge and (5) exploitation of knowledge. A literature review of 289 articles conducted by Lane et al., (2006) on the concept of absorptive capacity, reveal that few studies tackle the ACAP concept from the perspective of its dimensions. Indeed, more than 35% of these authors do not mention any of the three dimensions of ACAP as they appear in the model of Cohen and Levinthal (1990) in their works. The next section defines the dimensions as highlighted in the literature in order to understand the multidimensional nature of ACAP.

Identification or recognition of the value of knowledge

The ability to recognize the value of new knowledge depends on prior knowledge and investment and also highlights the strategic nature of absorptive capacity concept. An organization improves its absorptive capacity when it invests more in R&D and is able to recognize the value of new knowledge (Cohen and Levinthal, 2015). Even though this dimension is very important, not many empirical studies have taken it into account.

Acquisition of knowledge

This dimension was introduced by Zahra and George (2002), as the first dimension of ACAP. It represents an organization's ability to identify and acquire external knowledge that is essential to its operations and performance. Knowledge acquisition is also dependent on prior knowledge and R&D investments. Motivation and effort are also factors that help one to acquire knowledge with intensity and speed (Zahra & George 2002). Not much empirical research has taken this dimension into account even though it is important. Acquiring knowledge is usually facilitated by the coordination capacities of the organization and these are measured by three components (1) inter-functional

exchange interfaces, (2) staff participation in facilitating knowledge integration (3) implementation of organizational routines (Jansen et al., 2005).

Assimilation of knowledge

"Assimilation refers to the firm's routines and processes that allow it to analyse, process, interpret and understand information obtained from external sources" (Zahra & George, 2002. pp 189). In order to better understand, analyse and interpret knowledge, employees need to mobilize their basic training abilities, their experience to learn new knowledge. They also need to be motivated. Not many studies have explored this dimension empirically. Lane and Lubatkin (1998) attempt to measure knowledge assimilation between two organizations in a dyadic learning context. They use the similarities in managerial functions of the two organizations. This similarity is expressed through the degree of task formalization, centralisation and compensatory activities or practices. Similarly, the quantitative study findings, conducted by Jansen and colleagues (2005) show that, assimilation is influenced by socialization interfaces such as cross-functional interactions and connection mechanisms at the organizational level.

Transformation of knowledge

Transformation is an additional dimension, introduced by Zahra and George 2002 as part of realized absorptive capacity (RACAP) in their conceptualization of absorptive capacity. "Transformation denotes a firm's capability to develop and refine the routines that facilitate combining existing knowledge and the newly acquired and assimilated knowledge" (Zahra & George, 2002. pp 190). Transformation is a process of adding or subtracting knowledge or interpreting existing knowledge in a different manner. Transformation is made up of two components which are internalization and conversion. However, this dimension is sharply criticized by Todorova and Durisin (2007) who rather present it as an alternative to assimilation, and not as a dimension of ACAP. Moreover, due to the lack of theoretical consensus, the relevance of this dimension has not received much attention to be explored empirically. The study by Jansen et al. (2005) show that the transformation is influenced by three variables which are the coordination capabilities, systems capabilities and socialization capabilities of the organization.

Exploitation of knowledge

Exploitation refers to an organization's ability to apply new external knowledge to achieve its goals (Cohen & Levinthal, 1990). Additionally, "*Exploitation as an organizational capability is based on the routines that allow firms to refine, extend, and leverage existing competencies or to create new ones by incorporating acquired and transformed knowledge into its operations"* (Zahra & George, 2002. pp 190). Both authors measure the effect of this dimension by the number of patents or knowledge productions. Knowledge exploitation has been the subject of many studies unlike the other dimensions (Cohen & Levinthal, 2015). An organization's ability to exploit knowledge is based on the availability of mechanisms for knowledge transfer such as formalization, socialization and connectedness.

In order to further resolve the conceptual ambiguity surrounding the true definition of ACAP and provide theoretical precision of the construct, other scholars recently undertook a careful distillation of earlier empirical and theoretical literature and arrived at three dimensions or functions of ACAP as (1) absorptive effort, (2) absorptive knowledge base, and (3) absorptive process (Song et al., 2018). The first core function occurs when valuable external knowledge is identified after great efforts at searching and scanning the environment (Cohen & Levinthal, 1990; Lane & Lubatkin, 1998). Here, investments are made by the organization to build knowledge as they identify and acquire new external knowledge which is believed to be valuable and accessible. This is usually achieved through dedicated efforts of proactive search (Song et al., 2018), and require "intensity of effort" as a critical element (Cohen & Levinthal, 1990, p 131). This, of course, comes through management's commitment towards investing in research and development (R&D), and developments in technology. The second core function refers to the efforts made by the organization to stock up and accumulate knowledge continuously in order to understand and be able to transform new external knowledge for use internally (Song et al., 2018). The third core function, known as *Absorptive Process,* refers to the efforts made by the organization to put in place its own internal procedures and processes to facilitate the sharing and diffusion of external knowledge internally (Song et al., 2018). These three functions come together to activate the absorptive capacity process.

2.5.5 Dimensions of absorptive capacity in HEIs

In spite of the abundant research on the ACAP concept, it still remains dominantly researched in the business industry. All these conceptualizations and dimensions that have been discussed have been explored in the organizational field. However, this study focuses on empirically conceptualizing ACAP and its dimensions in the HEI perspective as a basic capability for learning, which is linked to achieving success in product innovation such as improved curricula, enhanced academic instruction and quality research output, as well as superior institutional performance (Liu, Dutta & Park, 2020; Lane et al., 2006; Lewin, Massini, & Peeters, 2011; Zahra; George, 2002). This process is necessary in the HEI because the study needs to bring out a clear understanding of the terminologies that are used to represent the dimensions of ACAP in academia in such a way that there are no ambiguities regarding their interpretations or even their measurements in the research. This will help to broaden the knowledge-based view in terms of the creation of new knowledge or the addition of new knowledge to existing knowledge specifically in the HEI domain. It will also help to develop common consensus among users, especially in the framing of meaningful concepts for developing theory in the HEI. Therefore, we explore the contextual meaning of ACAP and the perceived dimensions as they pertain in academia through a sequential exploratory mixed method design in order to bring coherence and clarity to the ACAP construct specifically in the HEI domain. This will facilitate theory development and theory refinements of the knowledge-based view as we use the absorptive capacity lens to explore knowledge sharing and transfer for innovation in the university perspective.

Empirical findings from this study reveal that ACAP is a multi-dimensional construct in HEIs with three functions or dimensions which is translated into a three- phase process of (a) knowledge search stage where the external environment is scanned in search for valuable new knowledge through investment efforts made by both the research and development (R&D) department and individual academics of the university; (b) knowledge accumulation stage where the prior knowledge stock is beefed up with newly acquired ideas, information and knowledge for internal usage and storage. These new external additions must be related in a way to the existing knowledge for easy understanding and acquisition by faculty staff and other members through collaborative training and development, coaching and mentoring, knowledge sharing and effective communication; (c) process transformation stage when institution members adapt to

changes in the daily operations. New and old knowledge are processed for the rolling out of improved programs, new course contents, new course combinations and transformed academic instruction (virtual learning), leading to the production of quality graduates for the job market, quality research output, patents, proprieties, and enhanced publication of research work. These findings are discussed extensively in chapter four.

2.5.6 Organizational Mechanism for ACAP in HEIs

"A mechanism is a structure performing a function in virtue of its component parts, component operations, and their organization. The orchestrated functioning of the mechanism is responsible for one or more phenomena" (Bechtel & Abrahamsen, 2005, pp 423). The concept of mechanism has in recent times received much attention in the social science literature. Some of the common elements that have warranted the need for social mechanisms from varying perspectives have been the lack of satisfaction with the relationships between variables and an ardent interest to know and highlight why and how or through which processes an outcome was actually arrived at (Mayntz, 2004). There have been arguments that mechanisms provide answers to the problems of common causes, pre-emptions and results, as well as correlations that are not valid (Steel 2004). The concept 'mechanism' has indeed become a regular buzzword in research that focuses on explaining the organizational change, such as learning mechanisms (Levinthal & March 1993), mechanisms for building trust and connections reputed to drive competitiveness (Glückler & Armbrüster, 2003), and mechanisms that promote organizational harmony (Lamberg & Pajunen, 2005).

Researchers have also underscored the need for valid mechanism-based theorization (Anderson et al 2006) and have in fact begun to consider how we could empirically determine causal mechanisms (Pajunen 2005). However, most researchers have not really conceptualized the true definition of "mechanisms". Even attempted definitions have remained vague and sometimes, even contradictory. There is therefore a need for an explicit explanation of the nature of organizational mechanisms and how they work, in order to develop the mechanisms approach. In the domain of organization research there are four main characteristics of mechanisms which are interrelated. Mechanism, first of all, are made up of component parts (Bechtel & Abrahamsen, 2005). These component parts are made up of entities as well as activities and these entities are viewed as the objects such as managers, employees, owners or other stakeholders, who undertake

activities, individually or interactively based on their mode of operation for production. Second, mechanisms are supposed to produce something, and each component part of an organizational mechanism plays a unique role in the production of whatever outcome that is expected (Glennan, 2002). For example, a manager of an HEI insisting on a change their overall performance (activity) may form a component of a mechanism that produces the objective that the institution needs to integrate information holistically to innovate new products. This managerial objective is then communicated to the other component parts (employees) to play their roles in the achievement of that outcome (new products). Third, this production is essentially dependent on the hierarchical structure of mechanisms (Machamer et al. 2000). Component parts cannot be isolated from each other because each component's contributions to the mechanism activity depends on its mode of operation, and its relation to other components (Bechtel & Abrahamsen 2005). Finally, the models of mechanisms describe the relevant characteristics of their operations in the organizational processes.

In consonance with the ACAP process, this study highlights three relevant types of organizational mechanisms which could be designed in response to specific contexts at a given time to achieve the right outcomes. These are socialization mechanisms, coordination mechanisms and system mechanisms (Jansen et al. (2005). Socialization mechanisms are simply organizational mechanisms that are linked to capabilities for socialization which propagates common codes of communication and also creates broad, comprehensive rules for action (Volberda, 1998). It hinges on interdepartmental connectedness and socialization techniques. Coordination mechanisms are organizational mechanisms that are linked to capabilities for coordination which enhances the exchange of knowledge across disciplines and hierarchies (Jansen et al. 2005). It hinges on job rotation and cross-functional interfaces. The purpose for coordination is to decentralize decision-making through the establishment of lateral processes. System mechanisms are organizational mechanisms linked to capabilities for systems and routine programming prior to their execution (Jansen et al., 2005). It hinges on formalization and centralization Interestingly, for the HEI context, this study focuses on Jansen et al. (2005)'s coordination mechanisms. This mechanism brings together variable sources of expertise and enhance lateral interactions between differing functional knowledge holders (Jansen et al., 2005). We focus on the coordination mechanism that is consistent with cross-functional interface and therefore introduce inter-functional coordination (IFC) mechanism. IFC is referred to as "the magnitude of interaction and communication, the

level of information sharing, the degree of coordination, and the extent of joint involvement across functions in specific new product development tasks." (Song and Montoya-Weiss (2001, pp. 65). From the perspective of the HEI, Inter-functional coordination would therefore refer to the integration and collaboration of differing faculties and departments of a university to enhance communication and information flow so as to attain institutional goals (Auh & Menguc, 2005; Narver & Slater, 1990; Hübnerová, Tomášková, & Bednář, 2020; Kanovska & Tomaskova, 2012). This means that different academics with different disciplines and specializations are able to embrace differing views and work with such varying perspectives for the good of the whole university. We discuss IFC extensively under inter-functional coordination research in subsequent sections.

2.5.7 Governance Mode for ACAP in HEIs

The core benefits of ACAP are contingent on three (3) important aspects of external knowledge. These are “the Knowledge type” (i.e., the nature of the external knowledge) (Winkelbach & Walter, 2015); “the governance mode” of knowledge (i.e., how the knowledge is being assessed) (Sears & Hoetker, 2014); and “the learning source” of knowledge (i.e., from whom the knowledge is being assessed) (Xiong & Bharadwaj, 2011). For the purposes of this study, we focus primarily on “governance mode” of external knowledge (i.e., how external knowledge is assessed within the HEI community). Governance mode is defined as the structural arrangements that connects a receiving organization to the external source of knowledge (i.e., the donating organization indicating how the learning organization is connected with the source of knowledge) (Williamson, 1998). These structural arrangements may vary, depending on the extent to which the donating organization has ownership and control, over the receiver, and may even dictate alternative ways to connect with the given external knowledge donator. Thus, the choice of governance mode may differ, ranging from fully integrated hierarchical arrangements with full ownership and control to an arm’s length market transactions, with no ownership and control (Williamson, 1998).

According to the literature there are varying governance modes for sourcing external knowledge such as market transactions (market purchases, contracts, licensing), strategic alliances (formalized voluntary organization-to-organization agreements, corporate

venture capital investments and joint ventures), informal networks (informal interactions among companies as a result of their close locations or social networks among companies' top management teams), mergers and acquisitions (among parent organizations and their subsidiaries) and intrafirm relationships (Choi & Contractor, 2015). Since there are varying types of ownership and control, there are differences in governance modes depending on the richness of the interactions and coordination costs that come with them for a particular external knowledge source. And these conditions may influence the effectiveness of an organization's absorptive capacity (Song et al., 2018). Governance modes that offer opportunities for richer interactions may offer superior access to external knowledge sources (Gulati & Nickerson), which in turn increases knowledge flows, although richer interactions are also likely to incur more coordination costs. For example, in the case of mergers and acquisitions, the integration process of two previously disparate entities coming together is likely to destabilize existing knowledge routines as well as power structures, which can create confusion and disruptions, and even cause conflicts because of differences that exist in their organizational routines (Reus, Lamont, & Ellis, 2016). These increased integration costs may offset the potential benefits of enhanced interactions which can cause lower effects of ACAP in the said context. However, informal networking, which lies the middle of the governance mode continuum, may provide a balance in the trade-off between interactions and coordination and provide more potential for reduced coordination costs but richer communication.

In the HEI context, the study highlights both inter-faculty and intra-faculty relationships (Choi & Contractor, 2015) as key governance modes for sourcing external knowledge within the HEI community, which have been least discussed in the ACAP literature. It has been noted that prior literature on governance mode have dominantly focused on the external focal organization as the source of external knowledge. Therefore, most studies have examined external connections and alliances, albeit international relationships between business organizations as parent and subsidiary partners. However, we argue that in the HEI perspective, governance mode is not only about focal organizations in the external domain, but also in the internal because knowledge can also be sourced internally. HEIs are made up of differentiated faculties and departments with varying disciplines and specializations that are considered to be external to one another but are situated within the same internal space. Even though HEIs may also have international

partners, this study focuses on the local connections among differentiated faculties and departments within the same university community. Governance modes in this instance are likely to offer opportunities for richer interactions and superior access to external knowledge sources, i.e. faculty-to-faculty arrangements which in turn increase knowledge flows. Moreover, such interactions are not likely to incur much coordination costs since all the parties have a common institutional goal, to enhance the performance of the institution in terms of improved curricula, quality graduates and enhanced research output. In this instance one faculty could be considered as the parent partner to another faculty as the subsidiary partner. In another vein, the faculty could be considered as the parent partner to other departments and units as the subsidiary partners. Moreover, the HEI context should be devoid of any hierarchical arrangements that are characterized by ownerships and controls except in few cases of specialized knowledge (Lessard & Zaheer, 1996). Even in cases of specialized knowledge, academics can find ways to successfully integrate faculties and departments to remain innovative without compromising the benefits of specialization (Lee & Kapoor, 2017). Further, complex issues of internal and external fit as far as environmental and organizational practices are concerned do not arise. Organizational practices refer to "an organization's routine use of knowledge for conducting a particular function" (Kostova & Roth 2002, pp. 216). During the process of knowledge transfer, organizations come to the realization that they have to adapt some parts of a practice to fit their local context (Ansari et al. 2010). This arises as a result of some misfits at both the organizational and the environmental levels (Kostova & Roth, 2002). Therefore, practices have to undergo re-contextualization sometimes as they transcend national borders and business environments (Brannen 2004). Such occurrences are not likely to be experienced in inter-faculty and intra-faculty relationship in HEIs due to their homogeneous nature. In consonance with the social capital theory and inter-functional coordination perspectives, it is assumed that inter-faculty trust can exist between distinct faculties within an HEI, such as departments and units that are engaged in interfaculty exchanges (Tsai, 2014; Yang & Tsai 2019). Similarly, intra-faculty trust can exist among departments and units within the faculty that are engaged in intra-faculty knowledge exchanges. Trust is also believed to lower governance costs for all governance modes (Gulati & Nickerson, 2008). This extends prior research on external knowledge transfer processes (Szulanski et al., 2016), which has overlooked the importance of inter-faculty and intra-faculty governance mode as a way of coordinating knowledge transfer. The study adds a meaningful factor for varying

outcomes of transfer initiatives, beyond dominant highlights in the literature, such as variations in organizational routines and processes (Reus, Lamont, & Ellis, 2016) and environmental and cultural differences between partners (Kostova & Roth, 2002).

2.6 Methodology of literature review on absorptive capacity

The proliferation of extant literature on the absorptive capacity construct has yielded over twenty-five thousand (25,000) published papers, books and chapters since its inception about thirty years ago, with its applications and interpretations in organizational science research domain, such as marketing management (Lichtenthaler, 2009 ; Yang & Tsai, 2019), economics and strategic management (Ahuja & Katila, 2001; Garcia-Sanchez, Garcia-Morales & Martin-Rojas, 2018; Lane & Lubatkin, 1998; Lane et al., 2006; Patterson & Ambrosini, 2014; Volberda et al., 2010; Zou et al., 2018; Yao & Chang, 2017), and organizational learning (Chen et al., 2009; Gavetti & Levinthal, 2000; Lane, Salk & Lyles, 2001; Lane, Koka & Pathak, 2006; Lane & Lubatkin, 1998; Nonaka, Toyama, & Nagata, 2002; Senge & Sterman, 1992; Yao & Chang, 2017). The seminal works of Cohen and Levinthal (1989), in which they proposed ACAP not only as an organizational capability and a by-product of internal organization research and development, but also attributed it to the innovation outcomes of an organization, has been responsible for making absorptive capacity theory the theory of "reference" in the ever-expanding absorptive capacity research.

In order to gain a better understanding of the absorptive capacity research domain and gather as much information and knowledge as possible, many published articles were identified and analysed. The databases of Google Scholar, Emerald Insight, Science Direct, Scopus, Web of Science and EBSCO were used to search for scholarly, peer-reviewed articles which have been published on absorptive capacity from 1989 (the year of the seminal works of Cohen and Levinthal) to 2020. These databases were selected because they have a very wide coverage of journals. In searching for journal articles on absorptive capacity research, the key word "absorptive" which focused specifically on the literature was typed in, sorted by relevance, that used the term and in most cases the word "capacity" simultaneously popped up as the next word to go with it in the research field. Only articles published in English language were considered in this review. A total of two hundred and four (204) papers were identified at the initial stage and their abstracts

were carefully read to ensure that the paper indeed analysed absorptive capacity in detail. In cases where there was uncertainty or doubt about the content detail, there was the need to read the whole paper in order to ascertain its relevance and usefulness for this research. Again, the bibliography of some papers who cited, in particular, the works of Cohen and Levinthal, (1990) led to the discovery of a further fifty-four (54) papers whose abstracts were read in detail to confirm their relevance and importance for this research. Thus, a total pool of two hundred and fifty-eight (258) papers were identified for this research.

A citation analysis (see Table 2) was further conducted, using Harzing's Publish or Perish software to help identify the scholarly citations in Google Scholar on absorptive capacity research. A publication that is regularly cited is deemed an influential paper and reflects the quality of its importance and value in terms of the scientific knowledge it imparts in the research domain (Gundolf & Filser, 2013). Finally, a dedicated effort was made to eliminate the least important papers so that a sample of thirty-four (34) papers which were relevant to our inquiry (all published in top-tier journals) were eventually selected and used for this research. Table 1 presents the details of the selected journal article publications on absorptive capacity research used, together with their core themes, methodologies and journals that published them.

Table 1: Influential Papers in Absorptive Capacity research

Author/Year	**Methodology**	**Research theme/idea of ACAP**	**Journal**
Cohen & Levinthal, (1990)	Quantitative	Path dependency of ACAP for learning and innovation. (Seminal works)	*Administrative Science Quarterly*
Kogut & Zander, (1992)	Conceptual	How organizations create new knowledge: A dynamic view	*Organization Science*
Senge & Sterman (1992)	Conceptual	Thinking globally in "institutional learning"	*European journal of operational research*
Nonaka, (1994)	Theoretical	Managing the dynamics of organizational knowledge creation	*Organization Science*
Szulanski, (1996)	Quantitative	A look at impediments to knowledge transfer in organizations	*Strategic Management Journal*
Grant, (1996)	Theoretical	Exploring the knowledge-based perspective of an organization	*Strategic Management Journal*

Lane & Lubatkin, (1998)	Conceptual	Conceptualizing the firm-level ACAP	*Strategic Management Journal*
Gavetti & Levinthal, (2000)	Quantitative	A look at cognitive & experiential search of knowledge	*Administrative science quarterly*
Nonaka, Toyama, & Nagata, (2002)	Conceptual	Knowledge view of an organization	*Industrial and corporate change*
Lane, Salk & Lyles, (2001)	Conceptual	Three Components of ACAP	*Strategic Management Journal*
Tsai, (2001)	Quantitative	How network position moderates ACAP for innovation performance	*Academy of management Journal*
Ahuja & Katila, (2001)	Quantitative	Effects of acquisitions on innovation performance	*Strategic Management Journal*
Zahra & George, (2002)	Review	Reconceptualization and extension of ACAP. Potential and realized ACAP	*Academy of Management Journal*
Lane, Koka & Pathak, (2002)	Thematic Analysis	Analysing the various themes in ACAP studies	*Academy of Management Proceedings*
Liao, Welsch & Stoica, (2003)	Quantitative	ACAP and organizational responsiveness	*Entrepreneurship Theory and Practice*
Jansen, Bosch & Volberda, (2005)	Quantitative	Effect of organizational antecedents on PACAP & RACAP	*Academy of Management Journal*
Matusik & Heeley, (2005)	Quantitative	Multiple dimensions of ACAP	*Journal of Management*
Lane, Koka & Pathak, (2006)	Review	Reification of ACAP through explorative, assimilation and transformative learning	*Academy of Management Review*
Fosfuri & Tribo, (2008)	Review	Antecedents of potential ACAP explored	*Omega*
Todorova & Durisin, (2007)	Review	"Recognizing The value", Alternative understanding of "Transformation"	*Academy of Management Review*
Camison & Fores, (2010)	Quantitative	Measuring the PACAP and RACAP of the ACAP construct	*Journal of Business Research*
Lichtenthaler (2009).	Quantitative	Two critical components of prior knowledge: Market and technological knowledge	*Academy of Management Journal*
Chen et al. (2009)	Quantitative	How relationship learning and ACAP impact innovation outcomes	*Industrial Marketing Management*

Volberda et al., (2010)	Review	Realizing the potential of ACAP in the organization field.	*Organization Science*
Lewin, Massini & Peeters, (2011)	Conceptual	Routine based model of internal & external ACAP capabilities	*Organization Science*
Patterson & Ambrosini, (2014)	Mixed Methods	Assimilating external Knowledge into the firm	*Technovation*
Yao & Chang, (2017)	Quantitative	Micro foundations perspective of Absorptive Capacity	*Strategic Management Journal*
Ali et al., (2018)	Review	Organizational Structure and ACAP	*Journal of Knowledge Management*
Garcia-Sanchez, Garcia-Morales & Martin-Rojas, (2018)	Quantitative	The moderating role of Technological assets on ACAP	*International Entrepreneurship and Management Journal*
Song et al., (2018)	Meta-Analysis	Conceptual distillation & empirical synthesis of ACAP	*Journal of Knowledge Management*
Zou et al., (2018)	Meta-Analysis	ACAP as a strong determinant of innovation and knowledge transfer	*Innovation: Organization &Management*
Distel, (2019)	Quantitative	Exploring the multilevel antecedents of ACAP	*Journal of management*
Yang & Tsai (2019)	Quantitative	Absorptive Capacity & Innovation Performance, Role of Cross-functional Integration	*Industrial Marketing Management*

Source: Database Article Review

2.6.1 Citation analysis of absorptive capacity papers

A citation analysis was conducted to bring out the papers that were deemed most influential out of the data set of thirty-four (34) papers on absorptive from 1989 to 2020 (see Table 2). These important papers were also the basis for the thematic analysis and, as mentioned earlier, some of their bibliographies were relied upon to select some of the good publications on ACAP research. The analysis revealed that papers published in the second half of the period being studied have been least cited. Hopefully, in time, they will receive the necessary acknowledgements for more citations.

Table 2: Citation Analysis for "Absorptive Capacity" papers

Article	Journal	Cites
Cohen & Levinthal, (1990)	*Administrative Science Quarterly*	44,994
Kogut & Zander, (1992)	*Organization Science*	18,261
Senge & Sterman (1992)	*European Journal of Operational Research*	816
Nonaka, (1994)	*Organization Science*	27,314
Szulanski, (1996)	*Strategic Management Journal*	11,687
Grant, (1996)	*Strategic Management Journal*	22,326
Lane & Lubatkin, (1998)	*Strategic Management Journal*	6,797
Gavetti & Levinthal, (2000)	*Administrative Science Quarterly*	2296
Nonaka, Toyama, & Nagata, (2000)	*Industrial and corporate change*	1,756
Lane, Salk & Lyles, (2001)	*Strategic Management Journal*	2,721
Tsai, (2001)	*Academy of management Journal*	5,961
Ahuja & Katila, (2001)	*Strategic Management Journal*	2,955
Zahra & George, (2002)	*Academy of Management Journal*	12,565
Lane, Koka & Pathak, (2002)	*Academy of Management Journal*	224
Liao, Welsch & Stoica, (2003)	*Entrepreneurship Theory and Practice*	713
Jansen, Bosch & Volberda, (2005)	*Academy of Management Journal*	2,640
Matusik & Heeley, (2005)	*Journal of Management*	336
Lane, Koka & Pathak, (2006)	*Academy of Management Journal*	3,290
Fosfuri & Tribo, (2008)	*Omega*	908
Todorova & Durisin, (2007)	*Academy of Management Journal*	2,041
Camison & Fores, (2010)	*Journal of Business Research*	794
Lichtenthaler (2009).	*Academy of Management Journal*	1242
Chen et al. (2009)	*Industrial Marketing Management*	654
Volberda et al., (2010)	*Organization science*	1345
Lewin, Massini & Peeters, (2011)	*Organization science*	701
Patterson & Ambrosini, (2015)	*Technovation*	162
Yao & Chang, 2017	*Strategic Management Journal*	63
Ali et al., (2018)	*Journal of Knowledge Management*	77
Garcia-Sanchez, Garcia-Morales & Martin-Rojas, (2018)	*International Entrepreneurship and Management Journal*	53
Song et al., (2018)	*Journal of Knowledge Management*	49
Zou et al., (2018)	*Innovation: Organization &Management*	84
Distel, (2019)	*Journal of management*	46
Yang & Tsai (2019)	*Industrial Marketing Management*	17

Source: Database Article Review

2.6.2 Discussion on absorptive capacity papers

Given the powerful implications of absorptive capacity, many studies have demonstrated a keen interest in understanding the contingent, as well as the resultant factors of ACAP. The concept has transformed from a static view that seemed to focus on prior knowledge, to a more dynamic and process-based view that focuses on collective capability. This

study identified fundamental concepts or themes that run through these selected papers. Some commonalities were observed in these papers in terms of their content, core ideas, controversies or arguments. The cumulativeness and path dependency of ACAP has been posited by both Cohen and Levinthal (1990) and Zahra and George (2002), who believed that the role of past experience is key to integrating existing knowledge with new knowledge for the achievement of innovative outcomes.

> "By having already developed some absorptive capacity in a particular area, a firm may more readily accumulate what additional knowledge it needs in the subsequent periods in order to exploit any critical external knowledge that may become available" (Cohen & Levinthal, 1990, pp 136).

The absorptive capacity for the future is usually determined by the absorption of new knowledge in the present for organizational processes. Zahra and George, (2002), together with Todorova and Durisin (2007) also elaborated Cohen and Levinthal's (1990) three core dimensions by extension and they both examine the moderating roles of sociocultural values, norms and socially enabling mechanisms on the ACAP process.

ACAP has also been thoroughly analysed in these selected papers as an independent variable (IV), dependent variable (DV) or as a mediator. This means that there are antecedent factors, such as prior related and complementary knowledge, and R & D investments, as well as outcome factors such as 'application of knowledge to commercial ends' for ACAP (Cohen & Levinthal, 1990), knowledge management processes (Lewin, Massini & Peeters, 2011), innovation (Ahuja & Katila, 2001; Cohen & Levinthal, 1990; March, 1991; Hameed, Nisar, & Wu, 2021; Yang & Tsai, 2019), knowledge creation capabilities of organizations (Gavetti & Levinthal, 2000; Grant, 1996; Kogut & Zander, 1992; Nonaka, 1994), superior performance (Lane, Koka, & Pathak, 2006; Lewin, Massini, & Peeters, 2011; Zahra & George, 2002), and competitive advantage (Liu, Dutta & Park, 2020; Lane, Koka, & Pathak, 2006; Nonaka, 1994; Osobajo & Bjeirmi, 2020; Zahra & George, 2002)

Further, the ACAP construct has been unanimously analysed on an organizational level (Camison & Fores, 2010; Lichtenthaler, 2009; Lane et al., 2006; Liao et al., 2003; Tsai, 2001; Todorova & Durisin, 2007; Zahra & George, 2002), and so its application at an individual level can result to a wrong conceptualization. However, ACAP is undoubtedly dependent on individual level inputs, as explained by Cohen and Levinthal (1990). At the

individual level, knowledge will not strongly impact on any organization unless it is transferred, shared or encapsulated at the organizational level. This is because the main focus of ACAP is 'the ability to apply and exploit' new knowledge to the benefit of the whole organization in the area of innovation, organizational performance and above all, competitive advantage.

To add to this, some authors unanimously emphasize the need for organizational routines and processes of ACAP in a sequential manner (Camison & Fores, 2010; Jansen, Bosch & Volberda, 2005; Lane, Salk & Lyles, 2001; Lane, Koka & Pathak, 2006; Lichtenthaler 2009; Matusik & Heeley, 2005; Todorova & Durisin, 2007; Zahra & George, 2002). Lewin, Massini & Peeters, (2011) emphasize on external and internal meta-routines of ACAP, while Matusik and Heeley (2005) and Zahra and George (2002) agree on the fact that there are no direct observations of ACAP routines and capabilities and also stress the need for a better comprehension for the operationalization of the ACAP concept. Lane and Lubatkin (1998); Lane et al. (2001) propose the use of self-reports in the referencing of ACAP, whilst Lane and Lubatkin (1998) and Camison and Fores (2010) believe in the use of widely devised scales for measuring ACAP at the organizational level. Further, Distel (2019); Lane and Lubatkin (1998); Lane, Koka & Pathak (2006); Liao et al., (2003); Lichtenthaler (2009); Matusik and Heeley, (2005); Song et al. (2018); Todorova and Durisin (2007); Zahra and George (2002) propose the multifaceted nature of ACAP. Other papers included basically examine the knowledge creation capabilities of organizations (Gavetti & Levinthal, 2000; Grant, 1996; Kogut & Zander, 1992; Nonaka, 1994; Nonaka, Toyama, & Nagata, 2002).

The study also found that Szulanski's (1996) measurement scale for analysing ACAP was mostly used for operationalization by some of these selected papers. However, most of the prior knowledge factors were categorized by Szulanski (1996) as an asset rather than capability even though Cohen and Levinthal (1990) posit that prior knowledge "includes basic skills or even a shared language but may also include knowledge of the most recent scientific or technological developments in a given field" (Cohen & Levinthal, 1990, pp 128). What an organization is able to do depends on its prior activities and learning (Kogut and Zander, 1992). This means that prior knowledge is a process since the accumulated knowledge and experiences of an organization are regarded as an organizational-learning process. The "ability to recognize the value of new information,

assimilate it, and apply it to commercial ends" (Cohen & Levinthal, 1990, pp 128) means that the concept of prior knowledge shifts from being an asset to being a capability, once it becomes a process, and not a static kind of resource. Moreover, since ACAP is closely related to knowledge management as well as organizational learning, most of the papers conceptualized ACAP as an organizational "capability" and not as an "asset." This "capability" concept takes account of the path dependency of "prior knowledge" (Cohen and Levinthal, 1990) and the attendant processes that are needed for the generation of exploitable knowledge in the organization. Future research could therefore analyse Szulanski's (1996) measurement items and modify them to include words like 'ability' and 'process' to reflect the "capability" concept.

The citation analysis also helped to categorize ACAP into the core research streams of specialization that has so far attracted the attention of scholars. The thematic analysis also helped to identify the fundamental concepts or themes that are being studied by scholars. Five (5) research streams of ACAP, which are all relevant to this dissertation, were identified as follows:

1. Knowledge transfer and knowledge creation capabilities of organizations (Gavetti & Levinthal, 2000; Grant, 1996; Kogut & Zander, 1992; Lane et al. 2001; Minbaeva et al., 2003; Nonaka, 1994; Nonaka, Toyama, & Nagata, 2002; Szulanski, 1996; Tsai, 2001; Yang & Tsai, 2019).
2. Inter-organizational learning (Chen et al., 2009; Lane et al., 2001; Lane & Lubatkin, 1998; Senge & Sterman,1992; Yao & Chang, 2017).
3. Intra-organizational learning (Liao et al., 2003; Tsai, 2001; Lichtenthaler, 2009)
4. Dynamic capabilities resulting from ACAP (Cohen & Levinthal, 1990; Jansen et al., 2005; Lane et al., 2006; Lichtenthaler, 2009; Zahra & George, 2002)
5. Innovation performance as an outcome of ACAP (Ahuja & Katila, 2001; Cohen & Levinthal, 1990; Garcia-Sanchez et al., 2018; Lane et al., 2006; Tsai, 2001; Yang & Tsai, 2019).

2.7 Inter-functional coordination research

The concept is simply about bringing together employees from different department, units or functions in the sharing of information, knowledge and resources in order to

create optimum value for customers, and also increase profitability for the organization (Narver & Slater, 1990). Auh and Menguc (2005 pp 252) advance the concept further, adding that "inter-functional coordination describes the ability of people from different functional areas to accommodate disparate views and work around conflicting perspectives and mental models by putting aside their functional interests for the better of the organization as a whole". Auh and Menguc (2005 pp 252) further posit that "inter-functional coordination represents a key form of internal social capital of an organization". This suggests that this kind of collaboration will yield customer satisfaction and retention where customers have the desire to do repeat business with the organization (Stading & Altay, 2007). These positive outcomes which are attained from inter-functional coordination are usually founded on the organizational culture and philosophy which promotes the idea to synergistically integrate employees from diverse functional departments to work together as a team for the achievement of organizational goals (Atuahene-Gima, 1996; Yang & Tsai, 2019). Further, inter-functional coordination is an important element of market orientation as it influences the implementation of market orientation strategies (Atuahene-Gima, 1996; Tomaskova, 2009; Kahn, 1998). The first definition of inter-functional coordination in relation to market orientation is proposed by Narver and Slater (1990) who posit that inter-functional coordination is aimed at coordinating the use of organizational resources for the creation of improved value for target customers in the holistic purchasing process. Additionally, Jaworski and Kohli (1993) stress the necessity to have perfect coordination of all the departments in order to enable employees to communicate and work together with the aim of achieving effectiveness, competitive advantage and positive influence on business performance.

According to Mintzberg (1979) inter-functional coordination, at its core may be considered as a fundamental requirement for human activity in organizations. This refers to how labour is divided into different tasks and how these tasks are coordinated for accomplishment in organisations. Mintzberg (1979) outlines five (5) foundational processes in which organisations coordinate their tasks as follows:

1. The process of mutual adjustment for informal communication among workmates.
2. The process of direct supervision where an individual is responsible for overseeing the work of others.

3. The process of standardizing the work routines by specifying the content of tasks.
4. The process of standardizing the work output by specifying the results of work.
5. The process of standardizing the skill sets required to accomplish specific tasks.

Inter-functional coordination eliminates functional or departmental boundaries as all functions integrate to focus on the holistic goal of delivering value to customers (Wooldridge & Minsky, 2002; Yang & Tsai, 2019). Integration is a process aimed at bringing unity of purpose among functional departments in order to accomplish holistic organisational tasks (Lawrence & Lorsch, 1967). Although knowledge specialization can result in incompatible and conflicting thought worlds (Dougherty, 1992) and hamper effective communication (Bechky, 2003), leading to barriers of cooperation and comprehension (Carlile, 2004), integration helps to rise above these knowledge differences and incompatibilities (Majchrzak et al., 2012).

It can be concluded therefore, that institutions of higher learning can strategically apply the concept of inter-functional coordination to share knowledge, resources and ideas among academics from different faculties and departments to yield better research output, innovative programmes and teaching for the purpose of establishing better relationships and superior value for their clients/students and stakeholders to ultimately boost performance, profitability and a competitive edge in this globally competitive knowledge-driven economy. Even though most studies view social capital as an external resource, inter-functional coordination has clearly revealed that organizations also have internal social capital (Tsai & Ghoshal, 1998). Establishing working relationships with employees from other functional departments can generate diverse ideas and solutions which can serve as complementary internal resources and valuable assets for developing dynamic capabilities. Again, the three dimensions of social capital (Nahapiet & Ghoshal, 1998) (i.e., structural social capital, cognitive social capital and relational social capital) are all reflected in the concept of inter-functional coordination in organizations. The whole pattern of connectedness among people from varying functional departments depicts the structural social capital in inter-functional coordination whereas the aggregate of shared opinions, mental model and meanings derived from these collaborations and

interactions depict the cognitive social capital. Further, the bonds and relationships which are built from these collaborations and communications with people from different functional backgrounds and knowledge base yields commitment, trust, confidence and identification which also depict the relational social capital of inter-functional coordination. Understandably, inter-functional teamwork in organizations can be seen as an organizational mechanism which facilitates the achievement of holistic goals (Atuahene-Gima, 1996).

Despite the positive effects of inter-functional coordination outlined, research also reveals that when there is too much of such collaboration, it could lead to a collaborative overload which will have negative effects (Cross et al., 2016). Inter-functional coordination needs to be managed effectively in such a way that collaborative meetings are organised for only key employees from each functional unit so that other work processes can go on uninterrupted to maintain their efficiency (Cross et al., 2016). It is therefore not necessary to allow all employees to attend every collaborative meeting especially if it is not to make key strategic decisions.

2.7.1 Methodology of literature review on inter-functional coordination

The concept of inter-functional coordination has received considerable attention in the management and marketing literature to date. Many managers and business executives are trying to break down silos and barriers, especially in situations where greater cross-team collaboration may be required (Casciaro, Edmondson & Jang, 2019). Again, there are various terminologies and pertinent concepts related to inter-functional coordination in the research foci, such as “inter-functional collaboration” (e.g., Canacott, Ellis and Tadajewski, 2018), “inter-functional Integration” (e.g., Kahn, 2001), “inter-departmental collaboration” (e.g., Lee, 2020), “organizational configuration” (e.g., Lohmann & zur Muehlen, 2019) and “cross-group collaboration” (e.g., Kwan, 2019).

Inter-functional Coordination (IFC) dates back to the 1990s when the concept was defined as the coordination of all organizational activities to enhance business performance (Hübnerová, Tomášková, & Bednář, 2020; Kanovska & Tomaskova, 2012). The concept has been widely linked to Market Orientation as a necessary behavioural component (Atuahene-Gima, 1996; Tomaskova, 2009; Kahn, 1998; Narver & Slator,

1990). In terms of maintaining and sustaining a competitiveness, inter-functional coordination is a very important principle which can facilitate information sharing and development of knowledge (Wooldridge & Minsky, 2002; Yang & Tsai, 2019).

In order to gain a better understanding of the Inter-functional Coordination research domain and gather as much information as possible, many published articles were identified and analysed. The databases of Google Scholar, Emerald Insight, were used to search for scholarly, peer-reviewed articles which have been published on Inter-functional Coordination. Again, these databases were selected because of their wide coverage of journals. In searching for journal articles on Inter-functional Coordination research, key words which focused specifically on the literature were typed in and sorted by relevance. Other publications used the term "Inter-functional" and "Cross-functional and combined them with other related terms such as "Coordination", "Integration", "teamwork" and "collaboration" which were specifically helpful as they narrowed down the search. Most of the journals that popped up were in the area of marketing or management research. Only articles published in English language were considered in this review. A total of 32 papers were identified at the initial stage and, following the same process, their abstracts were carefully read to ensure that the papers indeed analysed Inter-functional Coordination in detail. In cases where there was uncertainty or doubt about the content detail or its relevance, there was a need to read the whole paper in order to ascertain its usefulness for this study.

A citation analysis was further conducted using Harzing's Publish or Perish software to help identify the scholarly citations in Google Scholar on inter-functional coordination research. Finally, after dedicated efforts on the part of the researcher, the least important articles were eliminated and eventually, fourteen (14) papers which were relevant to our inquiry were selected and used for this dissertation. Table 3 gives an overview of the selected journal article publications on Inter-functional Coordination research which were used, together with their core themes, methodologies and journals that published them.

Table 3: Influential Papers in Inter-functional Coordination research

Author/Year	Methodology	Research theme/idea of ACAP	Journal
Narver & Slater, (1990)	Quantitative	How market orientation impacts profitability	*Journal of marketing*
Hitt, Hoskisson & Nixon, (1993)	Theoretical	Antecedents and outcomes of inter-functional coordination	*Journal of Engineering & Technology Management*
Atuahene-Gima, (1996)	Quantitative	The role of inter-functional teamwork in the Market Orientation-Innovation link	*Journal of Business Research*
Kahn, (2001)	Quantitative	Correlation of Market Orientation & inter-functional integration for innovation performance	*Journal of Product Innovation Management*
Ross Wooldridge & Minsky, 2002	Review	How climate and socialization facilitate IFC to impact organizational performance	*The Learning Organization*
Auh & Menguc, 2005	Quantitative	How IFC moderates TMT diversity-innovation performance link	*Industrial Marketing Management*
Troy, Hirunyawipada & Paswan, (2008)	Meta-Analysis	Impact of cross-functional integration on new product success	*Journal of Marketing*
Garcia, Sanzo, & Trespalacios, (2008).	Quantitative	Role of Organizational climate in the Marketing-R&D link of Innovation Performance	*Technovation*
Kanovska & Tomaskova, 2012	Quantitative	Examining the link between IFC and manufacturers' services	*Journal of Engineering Economics*
Rapp, Beitelspacher, Schillewaert, & Baker, (2012)	Quantitative	How organizational structures influence coordination and customer orientation	*Journal of Business Research*
Wang et al, (2017)	Qualitative	An investigation of the IFC pattern on firm performance in industrial SMEs	*Journal of General Management*
Tajeddini, Altinay & Ratten, (2017)	Quantitative	The moderating role of IFC on Organizational structure-service innovativeness link	*International Journal of Hospitality Management*
	Quantitative		

Nguyen, Ngo, Bucic & Phong, (2018)		The role of competition in IFC knowledge Sharing	*Industrial Marketing Management*
Yang & Tsai (2019)	Quantitative	Absorptive Capacity & Innovation Performance, Role of Cross-functional Integration	*Industrial Marketing Management*
Hubnerova, Tomaskova & Bednar, (2020)	Quantitative	Inter-functional Coordination Items Important for Business Performance of SMEs	*Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*

Source: Database Article Review

2.7.2 Citation analysis of inter-functional coordination papers

A citation analysis was further conducted to bring out the papers that were deemed most influential out of the data set of fourteen (14) papers on inter-functional coordination (see Table 4). These important papers (e.g., Atuahene-Gima, 1996; Kahn, 2001; Narver & Slater, 1990) were also the basis for the thematic analysis which revealed that papers published in the latter part of the period under study (1990-2020) have been least cited and will probably receive more acknowledgements for more citations in years to come.

Table 4: Citation Analysis for "Inter-functional Coordination" papers

Article	**Journal**	**Cites**
Narver & Slater, (1990)	*Journal of marketing*	14373
Hitt, Hoskisson & Nixon, (1993)	*Journal of Engineering & Technology Management*	178
Atuahene-Gima, (1996)	*Journal of Business Research*	1422
Kahn, (2001)	*Journal of Product Innovation Management*	482
Ross Wooldridge & Minsky, 2002	*The Learning Organization*	82
Auh & Menguc, 2005	*Industrial Marketing Management*	255
Troy, Hirunyawipada & Paswan, (2008)	*Journal of Marketing*	340

Garcia, Sanzo, & Trespalacios, (2008)	*Technovation*	127
Kanovska & Tomaskova, 2012	*Journal of Engineering Economics*	38
Rapp, Beitelspacher, Schillewaert, & Baker, (2012)	*Journal of Business Research*	64
Wang et al, 2017	*Journal of General Management*	4
Tajeddini, Altinay & Ratten, (2017)	*International Journal of Hospitality Management*	91
Nguyen, Ngo, Bucic & Phong, (2018)	*Industrial Marketing Management*	36
Yang & Tsai (2019)	*Industrial Marketing Management*	17
Hubnerova, Tomaskova & Bednar, (2020)	*Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*	2

Source: Database Article Review

2.7.3 Discussion on inter-functional coordination papers

Fundamental concepts or themes that run through these selected papers were analysed. Some similarities were observed in these papers in terms of their content, core ideas, controversies or arguments. Most of the selected papers focused on the determinants and outcomes of market oriented practices on sales and profitability (Atuahene-Gima, 1996; Garcia, Sanzo, & Trespalacios, 2008; Kahn, 2001; Kanovska & Tomaskova, 2012; Narver & Slater, 1990; Rapp et al., 2012; Wang et al, 2017), factors that promote new product and service innovativeness (Atuahene-Gima, 1996; Auh & Menguc, 2005; Garcia, Sanzo, & Trespalacios, 2008; Hitt, Hoskisson & Nixon, 1993; Kahn, 2001; Tajeddini, Altinay & Ratten, 2017; Troy, Hirunyawipada & Paswan, 2008) and organizational performance in value creation (Hubnerova, Tomaskova & Bednar, 2020; Ross Wooldridge & Minsky, 2002; Wang et al, 2017; Nguyen, Ngo, Bucic & Phong, 2018).

Inter-functional coordination has also been found to be a capability of an organization for the creation of superior value with coordinated efforts by all the functions. The understanding of the patterns of inter-functional coordination in the higher education institution domain is not yet complete due to the paucity of research in that area. Hence,

the lack of synergies among the various departments may be experienced due to internal politics and marginalization. Besides, not all department members will be willing to put aside their functional interests to accommodate disparate views from conflicting perspectives of other functional departments. The ability of an organization to innovate is often linked with its ability to cross functions or boundaries, both internally and externally for the sharing and transfer of knowledge.

IFC has also been thoroughly analysed in these selected papers either as an independent variable (IV), dependent variable (DV) a mediator, or as a moderator. This means that there are antecedent factors, such as market orientation (Atuahene, 1996; Kanovska & Tomaskova, 2012; Narver & Slator, 1990; Wang et al., 2017), climate and socialization (Ross Wooldridge & Minsky, 2002), technological tool of sales force (Rapp, Beitelspacher, Schillewaert, & Baker, 2012), as well as outcome factors such as value creation for competitive advantage (Hitt et al., 1993), new product success (Troy et al., 2008; Tsai & Hsu, 2014), cross functional knowledge sharing (Nguyen et al., 2018) and business performance (Hubnerova, Tomaskova & Bednar, 2020). IFC has also been analysed as a mediator between ACAP and innovation (Yang & Tsai, 2019) as well as a moderator on organizational structure and service innovativeness link (Tajeddini, Altinay & Ratten, 2017) and top management team diversity and innovation performance link (Auh & Menguc, 2005). The citation analysis helped the researcher to categorize inter-functional coordination into the core research streams of specialization that has so far attracted the attention of scholars. The thematic analysis also helped to identify the fundamental concepts or themes that are being studied by scholars. Three (3) research streams of inter-functional coordination, were identified as follows:

1. **Market Orientation** (MO) (Atuahene-Gima, 1996; Garcia, Sanzo, & Trespalacios, 2008; Kahn, 2001; Kanovska & Tomaskova, 2012; Narver & Slater, 1990; Rapp et al., 2012; Wang et al, 2017).

2. **Innovation Performance** (IP) (Atuahene-Gima, 1996; Auh & Menguc, 2005; Garcia, Sanzo, & Trespalacios, 2008; Hitt, Hoskisson & Nixon, 1993; Kahn, 2001; Nguyen et al., 2018; Tajeddini, Altinay & Ratten, 2017; Troy, Hirunyawipada & Paswan, 2008; Yang & Tsai, 2019).

3. **Firm Performance** (FP) (Hubnerova et al., 2020; Nguyen et al., 2018; Ross Wooldridge & Minsky, 2002; Wang et al, 2017).

2.8 Higher education institution domain

The concept of the Learning Organization (LO) has been variously analysed and defined by scholars (Senge, 1990; Nonaka, 1991; Ortenblad, 2002, 2004; Garvin, 1993). It is usually assumed that universities ought to be learning organizations (Ali, 2012; Brown, 1997; Lorange. 1997; Ortenblad & Koris, 2014) since their core function has to do with continuous learning, teaching, creation, and knowledge acquisition. Most of these assumptions have been theoretically based rather than empirically based, using the various characteristics of universities which practically align with characteristics of a learning organization, such as continuous learning, the learning climate, culture, structure etc. (Voolaid & Ehrlich, 2017). Senge et al., (2012) even referred to schools engaging the Learning Organisation concept as "Learning Schools".

Research is a curiosity-driven inquiry which is purposely aimed at producing knowledge (Adria & Boechler, 2004; Sarantakos, 2005). Research is expected to be scientific in nature and therefore may be viewed as the systematic process of collecting, analysing and interpreting data for a given purpose (Leedy & Ormrod, 2010). One key feature of scientific research is transparency, and it calls for access to the logic based on which conclusions are drawn and the premise for such conclusions (Ketokivi & Choi, 2014). Stokes (1997) categorises scientific research into three main types depending on the main objectives of the research. These are basic research, applied research and use inspired basic research. Basic research, is driven by the sole aim of creating understanding or generating knowledge for the advancement of science. Applied research is conducted for the sole aim of using the findings to solve problems or generate innovation. Use inspired basic research embraces both the aim of creating understanding and considering the use of practical application (Ooms et al., 2015). University researchers usually show more interest in basic research as it gives them the advantage of advancing their field of inquiry and their career. Industry, on the other hand prefers to engage in applied research for the purpose of innovation. Use-inspired basic research presents both university researchers and industry the opportunity to meet their individual and collective goals (Stokes, 1997). All three types of research can eventually enhance innovation.

It is worthy to note that universities (academia) and businesses (industry) differ in their ways of generating and managing knowledge due to the varying motivations and rationales for engaging in research (Bruneel et al., 2014; Starkey & Madan, 2001). The literature underscores the need to establish the institutional and cultural differences between HEIs and industry practitioners (Bansal et al, 2012; Bartunek and Rynes, 2014; and Barroca et al., 2018). While knowledge amongst practitioners rely primarily on empirical evidence to show whether policy, decisions, processes and strategic assumptions are right, and shared openly and informally among peers, academic knowledge is often proprietary because of the credit that may be gained by the researcher when this knowledge is accepted for publication in an academic journal after comprehensive analysis, thorough documentation, cross-examination, and proven as valid by peer review. Further, Barroca et al (2018) posit that that academics' and practitioners' time horizons differ, with academic timelines being much longer than practitioners. While practitioners tend to move relatively quickly in response to the urgent demands of its business requirements, academia prefer an exhaustive, investigative, rigorous and analytical approach to ensure that everything is systematically explored. This means more time is spent to generate high quality research in academia than managers spend to address business issues (Walsh et al., 2007; Paton et al., 2014).

Higher education institutions can benefit a great deal from applying the concept of the learning organization if they develop strategies, which when implemented, will enhance the academic efficiency and effectiveness in terms of research output, knowledge delivery and the rolling out of new programs and/or curricula. They need to adopt knowledge management strategies to continually enhance capabilities that will enable them to respond to the changing demands in their environment (Chong, Yuen & Gan, 2014; Cronin 2001; Fullwood & Rowley, 2017; Ibrahim & Ali, 2021; Örtenblad and Koris, 2014; Santosh & Panda, 2016). In such conditions, continuous improvements and innovation of curricula and services become the main prerequisite for their survival (Khalili, 2016; Escribano *et al.,* 2005). They can do this by, first of all, studying the external environment, in light of their institutional capabilities, after which strategies will be put in place. This is so because universities already have the advantage of possessing a lot of resources for knowledge e.g. academic staff who are skilled in research methods and data collection and departments for Research and Development (R&D), (Borden & Kezar, 2012). However, there exists some barriers in the flow of organizational or

institutional knowledge, such as differences in departmental knowledge stock, structural variations and differing levels and heights of specializations, which may hamper knowledge flow from one department or faculty to the other (Dee & Leisyte, 2016; Ramjeavon & Rowley, 2020; Tian et al., 2009). Particularly, individual and group knowledge may not align with knowledge needed for holistic organization/institution and when such blockages in knowledge flow prevail, the knowledge created by one department may not be useful in informing change or improving practices for problem solving in other departments of faculties of the universities. Again, most universities lack the mechanisms that can easily facilitate the flow of communication and coordination across departments and faculties who operate independently in different fields of endeavour (Kezar, 2005), and this tendency disperses pockets of knowledge and prevents the flow or transfer of internal knowledge, a situation that does not promote the transfer of knowledge from the individual level to group level and thence to the organization/institution (Crossan et al., 1999). This situation impedes change or improvements as a result of the lack of common consensus for shared knowledge base leading to failed attainment of institutional targets (Eckel & Kezar, 2003), although individual or departments may excel in their knowledge capacities. Already the university climate is rigid and inflexible (White & Weathersby, 2005) and generally characterized by poor teamwork, dialogue and collaboration (Ramjeavon & Rowley, 2020; Willcoxson, 2001) as academic work is usually individualistic and autonomous (Al Kurdy et al., 2020; Ramjeavon & Rowley, 2020; Seonghee & Boryung, 2008), making knowledge sharing a very difficult task among academics.

The involvement of academics in research collaboration and the capacity of collaboration to drive research and innovation are all contingent on the existence of an enabling environment that includes structures, systems and incentives that support research collaboration (Al-Kurdi et al., 2020; Kwiek, 2020). This will encourage the building of collaborative intentions that will eventually be translated into action (Bartels & Koria, 2014). Research collaboration refers to interactions through social capital and other resources, for the purpose of engaging in research which is aimed at advancing knowledge in the field of inquiry and the development of opportunities for innovation (Mensah & Enu-Kwesi, 2018). Research collaboration is a fundamental feature of the knowledge-based economy that thrives on knowledge with great investment in research, innovation and human and social capital (Leydesdorff, 2012). Further, putting in

measures like a good communication strategy which involves all stakeholders can eliminate some of these barriers to the sharing of knowledge. People can also be motivated to share knowledge through incentives and rewards, such as open recognition, internal promotions, career development and positive feedback to the sharers of knowledge on how useful and helpful their knowledge has been for other researchers and stakeholders (Fullwood et al., 2013). Stakeholders within the university include the following category of personnel:

1. Senior Management (Vice Chancellor/President, Pro-Vice Chancellor/ Vice President and Registrar)
2. Deans, Director and Heads of Departments (HODs)
3. Human Resource Directorate (HRD)
4. Finance Directorate (FD)
5. Faculty staff
6. Administrative staff

University policies need to be revised to incorporate the facilitation of open scholarly communication links through the internet with fast and speedy connectivity which will foster free and unlimited access to scholarly information for the academic community (Dulle, Minish-Majanja & Cloete (2010), without cost and copyright restrictions. This is a good initiative that will promote collaboration amongst academics in the sharing of information and knowledge so that the absorptive capacity concept can flourish in universities as hiding academic work is not beneficial to anybody. Another significant aspect of research collaboration is its ability to act as a vital medium for creating and transforming tacit knowledge effectively into competitive innovations that can spur economic growth and development (Johnson et al., 2002; Robin & Schubert, 2013).

Literature indicates that tacit knowledge is a key source of competitive advantage as it is embedded in the owner and cannot be easily transferred without the owner's participation in the knowledge exchange process (Karlsson & Andersson, 2009; Osobajo & Bjeirmi, 2020). Social embeddedness theory posits that individual behaviours are affected by the strength of the social structure of their relations (Granovetter, 1985; Luo et al., 2006). Weak ties are characterized by lack of trust and competition (Dahlstrom & Ingram, 2003; Granovetter, 1985; Uzzi, 1999), while strong ties are characterized by frequent interaction, a high level of cooperation, reciprocity and trust (Granovetter, 1973;

Rindfleisch & Moorman, 2001). Therefore, the interplay between inter-functional coordination and competition is very important in inter-functional knowledge sharing (Nguyen et al., 2018). Managers of higher education institutions need to understand how various coordination mechanisms can enhance inter-functional knowledge sharing so they can develop effective knowledge management strategies (Nguyen et al., 2018). Moreover, technological advancements in Information Technology (IT) for networking have been developed to create opportunities for knowledge management and therefore Senior Management support in focusing on investments in technological infrastructure towards this move will be highly beneficial in achieving success. In fact, the involvement of the Vice Chancellor or President and his management team will communicate the importance of this "agenda for change" towards knowledge management practices. Again, in order to rally support for this vision of knowledge sharing, the Vice Chancellor/President and his management team must involve all Deans, Directors, Heads of departments, Faculty and Administrative staff in processes of formulation and implementation. By so doing employees will not see the vision as Management's own but as their own (Mei, Lee & Al-Hawamdeh 2004). Further, since the Human Resource directorate is responsible for policy formulation, they need to be communicated to because their support is very much required to endorse this policy which can later serve as a scorecard for performance evaluation purposes. Finally, this initiative must be communicated to the Finance directorate, because their support and approval is required to enable the allocation of any budgetary resources for coordinating collaborative activities such as workshops, seminars and colloquia for these knowledge sharing initiatives (Mei, Lee & Al-Hawamdeh, 2004).

2.8.1 Methodology of literature review on HEIs

Higher education institutions in all over the world, apart from providing higher education to students and society as a whole, are also mandated by laws to conduct research in a bid to heighten the knowledge base of the economy as they foster links with industry and organizations (Ibrahim & Ali, 2021; Mensah & Enu-Kwesi, 2018; Moon, Mariadoss, & Johnson, 2019). This means that in addition to their core mandate of knowledge creation and production, research and teaching, higher education institutions are required to undertake a third mission, as a source of innovation through knowledge transfer for industry (Lambert, 2003; Moon et al,. 2019; Song, Kim, & Kang, 2016), and problem-

solving skills that are applicable in practice (Hughes & Kitson, 2012). Knowledge acquisition, assimilation, transformation and exploitation (Zahra & George, 2002) among university staff for commercialization yields innovative activities as this "activation trigger" (Zahra & George, 2002) promotes knowledge transfer and sharing through a conscious effort by all stakeholders to collaborate.

As usual, in order to gain a better understanding of the Higher Education Institutions (HEIs) or Tertiary Educational Institutions research domain and gather as much information as possible, many published articles were identified and analysed. The databases of Google Scholar, Emerald Insight, Science Direct, Scopus, Web of Science and EBSCO were used to search for scholarly, peer-reviewed articles which have been published on Tertiary Educational Institutions or Higher Education Institutions research within the period of 1999 to 2020. Again, these databases were selected because of their wide coverage of journals. In searching for journal articles on "Tertiary Educational Institutions" or "Higher Education Institutions" research, key words such as "Tertiary Education", "Higher education", "Universities", and short phrases such as "Knowledge management in universities", "Knowledge management practices in tertiary educational institutions" and "Absorptive capacity and knowledge sharing among academics" which focused specifically on the literature were typed in and sorted by relevance. Most of the journals that popped up were in the area of knowledge acquisition and learning concepts. Only articles published in English language were considered in this review. A total of 34 papers were identified at the initial stage and, following the same process, their abstracts were carefully read to ensure that the papers indeed analysed tertiary educational institutions research in detail. In cases where there was uncertainty or doubt about the content detail or its relevance, there was the need to read the whole paper in order to ascertain its usefulness for this dissertation.

A citation analysis was further conducted to help identify the papers which were deemed influential publications on Tertiary Educational Institutions research. A publication that is regularly cited reflects the quality of its importance and value in terms of the scientific knowledge it imparts in the research domain (Gundolf & Filser, 2013). Finally, after dedicated efforts, the least important articles were eliminated and eventually, seventeen (17) papers which were relevant to our inquiry were selected and used for this dissertation. Table 5 gives an overview of the selected journal article publications on

Higher/Tertiary Education Institutions research which were used, together with their core themes, methodologies and journals that published them.

Table 5: Influential Papers in the Higher Education Institutions research

Author/Year	**Methodology**	**Research theme/idea of ACAP**	**Journal**
Dill, (1999)	Review	Academic learning organization	*Higher Education*
Avdjieva & Wilson, (2002)	Mixed Method	Using quality initiatives to promote OL capabilities in higher education systems	*Managing Service Quality*
Eckel & Kezar, (2003)	Qualitative	Key strategies for adopting new mental models for institutional change	*Higher Educ. Policy*
Kezar, (2005)	Qualitative	Exploring Collaboration in HEIs	*Research in Higher Educ.*
White & Weathersby, (2005)	Qualitative	Assessing the possibility of universities being learning organizations	*The Learning Organization*
Bratianu, (2007)	Theoretical	Effects of mental & functional barriers to universities being learning organizations	*Journal of Applied Quantitative Methods*
Seonghee & Boryung (2008)	Quantitative	Factors for knowledge sharing in universities	*Library & Info. Science Research*
Ridzuan et al 2008	Quantitative	Importance of Knowledge Management practices for HEIs	*Asian Journal of University Educ.*
Dulle, Minish-Majanja & Cloete (2010)	Quantitative	Open access to scholarly communication in universities	*World library & info. Congress*
Khamis Ali, (2012)	Quantitative	Learning organization characteristics within the HEIs	*Int. Journal of Educational Management*
Fullwood, Rowley & Delbridge, (2013)	Quantitative	Knowledge sharing in universities	*Journal of knowledge management*
Örtenblad & Koris, (2014)	Review	The relevance of the Learning organization idea to HEIs	*Int. Journal of Educational Management*

Dee & Leisyte, (2016)	Theoretical	Promoting the use of organizational learning theories in HEIs	*Handbook of theory and research*
Voolaid & Ehrlich, (2017)	Quantitative	Linking organizational learning & characteristics of HEIs	*The Learning Organization*
Veer Ramjeawon & Rowley, (2017).	Qualitative	Barriers and enablers to knowledge management in universities. Case of Mauritius	*The Learning Organization*
Supapawawisit, Chandrachai, & Thawesaengskulthai (2018).		Critical factors of research and innovation creation in public universities in Thailand	*International Journal of Trade and Global Mkts*
Ramjeawon & Rowley, 2020		Enablers and barriers to knowledge management in universities: perspectives from South Africa and Mauritius	*Journal of Information Management*.

Source: Database Article Review

2.8.2 Citation analysis of higher education papers

The researcher further conducted a citation analysis using Harzing's Publish or Perish software to help Identify the scholarly citations in Google Scholar on Tertiary Educational Institutions research within the period of 1999 to 2020 (see Table 6). This was done to bring out the papers that were deemed most influential out of the data set of 17 papers. These important papers were also the basis for the thematic analysis and, as mentioned earlier, some of their bibliographies were relied upon to select some of the good publications on Tertiary Educational Institutions research. The analysis revealed that papers examined the idea of knowledge sharing and transfer among academics (Fullwood, Rowley & Delbridge, 2013; Kezar, 2005; Seonghee & Boryung, 2008) were most cited, in addition to Dill, (1999) who reviewed the idea of universities as academic learning organizations.

Table 6: Citation Analysis for **"**Tertiary Educational Institutions research" papers

Article	**Journal**	**Cites**
Dill, (1999)	*Higher Education*	353
Avdjieva & Wilson, (2002)	*Managing Service Quality*	139

Eckel & Kezar, (2003)	*Higher Education Policy*	121
Kezar, (2005)	*Research in Higher Education*	321
White & Weathersby, (2005)	*The Learning Organization*	123
Bratianu, (2007)	*Journal of Applied Quantitative Methods*	56
Seonghee & Boryung (2008)	*Library & Information Science Research*	345
Ridzuan et al 2008	*Asian Journal of University Education*	16
Dulle, Minish-Majanja & Cloete (2010)	*World library and information congress*	62
Khamis Ali, (2012)	*International Journal of Educational Management*	79
Fullwood, Rowley & Delbridge, (2013)	*Journal of knowledge management*	453
Örtenblad & Koris, (2014)	*International Journal of Educational Mgt.*	101
Dee & Leisyte, (2016)	*Handbook of theory and research*	44
Voolaid & Ehrlich, (2017)	*The Learning Organization*	25
Veer Ramjeawon & Rowley, (2017).	*The Learning Organization*	88
Supapawawisit, Chandrachai, & Thawesaengskulthai (2018).	*International Journal of Trade and Global Markets*	14
Ramjeawon, & Rowley, (2020).	*Journal of information management*	15

Source: Database Article Review

2.8.3 Discussion on HEI papers

The researcher also searched for the fundamental concepts or themes that run through these selected papers. Some similarities were observed in these papers in terms of their content, core ideas, controversies or arguments. Most of the selected papers focus on knowledge management, in particular, knowledge creation, transfer and sharing (Eckel & Kezar, 2003 ; Fullwood, Rowley & Delbridge, 2013; Kezar, 2005; Ridzuan et al 2008; Seonghee & Boryung, 2008), organizational learning (Avdjieva & Wilson, 2002; Dee & Leisyte, 2016; Voolaid & Ehrlich, 2017), learning organizations (Bratianu, 2007; Khamis Ali, 2012; Dill, 1999; Örtenblad & Koris, 2014; White & Weathersby, 2005) and

barriers/enablers to learning or knowledge acquisition (Dulle, Minish-Majanja & Cloete, 2010; Ramjeawon & Rowley, 2020; Supapawawisit *et al.*, 2018; Veer Ramjeawon & Rowley, 2017).

Factors affecting knowledge management processes either positively or negatively include the following: Technology, rewards and incentives, culture, organizational structure, leadership style and human resource among others (Arntzen *et al.*, 2009; Dulle et al., 2010; Fullwood et al., 2013; Ramjeawon & Rowley, 2020; Supapawawisit *et al.*, 2018; Veer Ramjeawon & Rowley, 2017). Technology has been seen to positively impact knowledge management processes (Arntzen *et al.*, 2009; Gill, 2009; Supapawawisit *et al.*, 2018) when the appropriate ICT platforms are established. This will help universities to advance towards a knowledge-based learning institution, especially if there is a good fit between IT and the organization's socio-cultural factors (Gill 2009). Universities who create incentives for recognizing academics' contributions to knowledge sharing succeed in engaging academics in knowledge sharing (Supapawawisit *et al.*, 2018). They appreciate the opportunity to improve themselves whilst deepening their relationships with colleagues through knowledge sharing. Further, they also see working with others as creating opportunities for promotion and career development (Fullwood *et al.*, 2013). However, culture in universities is perceived to negatively affect KM in universities as academics are seen to be individualistic, and self-serving and prefer to work independently (Fullwood *et al.*, 2013; Seonghee & Boryung, 2008; White & Weathersby, 2005). The organizational structure of HEIs is also a key factor for effective KM processes since formal and informal structures facilitates social interaction (Kezar, 2005; Ramjeawon & Rowley, 2020). Some studies have explored the role of leadership in HEIs for developing effective knowledge management and concluded that top management support is important for initiating KM and knowledge sharing (Gill, 2009; Fullwood *et. al.*, 2013). Human resource has not received much attention as a facilitator of KM in universities (Gill, 2009; Supapawawisit *et al.*, 2018), even though human resource management is seen as a critical driver of research and innovation. Human resource management, together with enhanced technology and KM, can reduce or eliminate gaps in knowledge transfer and this can lead to enhanced competitiveness and improved performance (Avdjieva & Wilson, 2002; Dee & Leisyte, 2016).

A recent study by Supapawawisit *et al.* (2018) reveals that financial resources is the most critical factor for improving research and innovation in public universities in Thailand. However, the issue of financial resources (i.e., funding) has not received much attention. Besides, Arntzen *et al.* (2009) earlier find that lack of resources and time are key impediments to knowledge sharing and exchange. But no past study has explored nor identified funding as affecting KM either positively or negatively in HEIs and, therefore, is a rich area to explore by future researchers.

The citation analysis helped the researcher to categorize Tertiary Educational Institutions research into the core research streams of specialization that has so far attracted the attention of scholars. The thematic analysis also helped to identify the fundamental concepts or themes that are being studied by scholars. Three (3) research streams of Tertiary Educational Institutions, were identified as follows:

1. Characteristics of a Learning Organization and whether higher education institutions are or can become learning organizations (Bratianu, 2007; Khamis Ali, 2012; Dill, 1999; Örtenblad & Koris, 2014; White & Weathersby, 2005)
2. What constitutes Organizational Learning and how the theory is linked to higher education institutions (Avdjieva & Wilson, 2002; Dee & Leisyte, 2016; Voolaid & Ehrlich, 2017)
3. The importance of Knowledge Management as a strategic tool for higher education institutions (Eckel & Kezar, 2003; Fullwood, Rowley & Delbridge, 2013; Ridzuan et al 2008; Kezar, 2005; Seonghee & Boryung, 2008; Veer Ramjeawon & Rowley, 2017; Ramjeawon & Rowley, 2020).

2.9 Conceptual framework

The conceptual framework (figure 2) has five (5) key success factors adapted from the studies of Song et al., (2018) with modifications in line with this study. Innovation generation is the endogenous construct or dependent variable that is predicted by direct factors as well as mediated relational factors. Absorptive knowledge search (AKS), absorptive knowledge accumulation (AKA) and absorptive process transformation (APT) are the exogenous constructs or independent variables that predict the outcome variable.

They, however, have to go through a variable that is both exogenous and endogenous (independent and dependent) - Knowledge acquisition (KA) - to achieve that outcome in the ACAP process. This study further introduces an organisational mechanism - inter-functional coordination (IFC) that is relevant to complete the ACAP process. IFC serves as a mediator that plays the role of governing and enhancing the relationship between the independent and dependent variables (Hair et al., 2017)

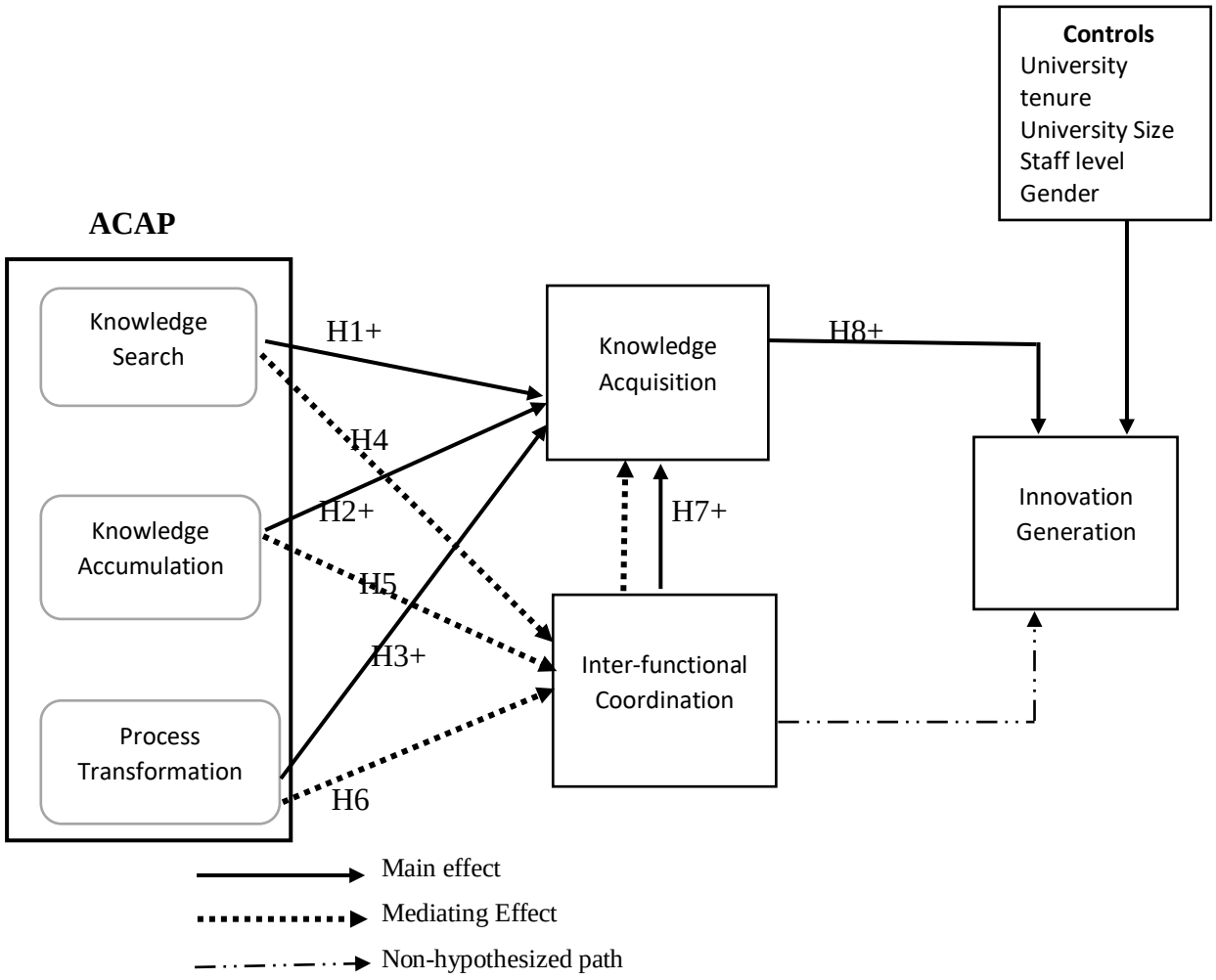

Figure 2: Conceptual Framework of ACAP process (Adapted and modified from Song et al., 2018).

2.10 Hypotheses development

Hypotheses were developed on the basis of a research framework for this study that addresses the gap in absorptive capacity research: the intermediary role played by inter-functional coordination to complete the ACAP process in the higher education institution.

Thus, the main hypotheses that are explored in this study are that (a) inter-functional coordination mediates the relationship between the three (3) dimensions of absorptive capacity and knowledge acquisition, leading to the success of innovation generation. Knowledge acquisition also plays the role of mediator between the three (3) dimensions of absorptive capacity and innovation generation even though that relationship has already been established in literature (Song et al., 2018) and was therefore not hypothesized in this study.

2.10.1 Absorptive capacity and knowledge acquisition

The absorptive capacity concept originating from Cohen and Levinthal (1990), describe it as "the ability of an organization to recognize the value of new, external information, assimilate it, and apply it to commercial ends" (Cohen & Levinthal, 1990, p.128). Subsequently, Zahra and George, (2002, pp.189) define it as "a firm's capability to identify and acquire externally generated knowledge that is critical to its operations".

Accordingly, the first dimension of ACAP, being the "absorptive knowledge search" of a higher education institution would refer to its continuous attempts at recognizing new and valuable information within its external environment. This entails the institution's efforts to primarily search for and identify external knowledge which they deem useful. By performing the function of a "radar"(Song et al., 2018), individual academics or faculty members scan the external environment to identify valuable information, knowledge or ideas which can be acquired to enhance the university's overall performance output (Choi & Park, 2017; Cohen & Levinthal, 1990; George et al., 2001; Huang et al., 2015; Lane & Lubatkin, 1998; Todorova & Durisin, 2007). Higher education institutions who make such efforts to acquire new knowledge do not see such activities as an expense but rather as an investment which will yield high returns. And these investments are dependent on financial and human resources for research and development (R&D) as well as new technological expertise (Song et al., 2018) and require "intensity of effort" as a critical element (Cohen & Levinthal, 1990, pp. 131) in order to acquire the needed new knowledge as well as emerging technologies as key resources for institutional growth and success (Alnafrah & Mouselli, 2019; Grant, 1996; Kogut & Zander, 1992; Paudel, 2020). Acquisition of knowledge is usually determined by "the intensity, quality and speed" of a higher education institution's efforts are to identify and finally get new knowledge (Zahra & George 2002, pp. 189). Additionally,

the absorptive knowledge search of the higher education institution must be "forward looking" (Cohen & Levinthal, 1994) as it will enable the institution to proactively detect and acquire valuable, accessible and relevant external knowledge to facilitate improved work progress and also enhance academic discourse. Finally, knowledge acquisition plays an important role with regards to the search and the development of new connections, as well as speed and quality of absorption (Patterson & Ambrosini, 2015). The researcher therefore hypothesizes that:

H1: A*bsorptive knowledge search is positively related to knowledge acquisition in HEIs.*

The absorptive knowledge accumulation of a higher education institution refers to the stock of knowledge that has been stored already by the institution. This prior knowledge helps the higher education institution to understand the usefulness of external new knowledge and be able to recombine it with the existing knowledge and transform them together to suit its purposes such as finding new ways to solve problems or create new curricula and programs. As argued by Cohen and Levinthal, (1990); Zahra and George, (2002) the absorptive capacity of an organization is dependent on its prior knowledge which helps to better understand new knowledge whilst improving the stock of knowledge (Zhao & Anand, 2009). This presupposes that the absorptive knowledge accumulation of a higher education institution or any other organization must be built on foundations that are past oriented, and path dependent, and require that new external acquired knowledge is related to facilitate easy comprehension and a smooth transformation process. Knowledge stocks accumulated by the higher education institution could be in the form of patents and intellectual properties (Srivastava et al., 2015), patent citations (Kim & Inkpen, 2005), scientific publications (Kang, 2012) and prior product innovations (Estrada et al., 2010).

Understanding new external knowledge facilitates easy transformation and exploitation of such new knowledge by functioning as a "processor" (Matusik & Heeley, 2005; Song et al., 2018; Zahra & George, 2002). Prior knowledge is very important as learning is associative (Gagne, 1962). That is, it helps to link the new knowledge with the existing one. Gagne's (1962) theory of hierarchical learning argued that an individual who has existing knowledge can easily acquire related new knowledge. Furthermore, the theory

referred to existing knowledge as possessing lower-order capabilities that enable an individual to gain higher-order capabilities which are embedded in the new knowledge. The researcher therefore hypothesizes that:

H2: A*bsorptive knowledge accumulation is positively related to knowledge acquisition in HEIs*

The absorptive process transformation of a higher education institution, which is key to this study, refers to the efforts made by the institution to put in place its own internal procedures and processes and structures to enable the sharing, dissemination and diffusion of external knowledge internally at all levels, faculties or departments of the institution by functioning as a "transmitter" (Cohen & Levinthal, 1990; Lewin et al., 2011; Lia et al., 2003; Matusik & Heeley, 2005; Song et al., 2018). Cohen and Levinthal (1990) earlier suggested that the absorptive capacity of an organization is contingent on the establishment of knowledge-sharing procedures and processes to diffuse knowledge across the various linkages between individual capabilities and expertise through a process of knowledge integration (Grant, 1996; Nonaka, 1994). In doing so, the knowledge held by individuals can be shared, exchanged and integrated through teams to become organizational (Crossan, Lane, & White, 1999).

These organizational processes are what will facilitate the integration of knowledge, a process which involves the collective action of individual and group members based on their understanding of the knowledge received at the individual level and which is then translated from the group level to the organizational level (Crossan, 1999). Equally important are improved Information Technology (IT) systems for networking to help create opportunities for knowledge management in the academic environment. Managers of higher education institutions must therefore invest in advanced technological infrastructure towards the acquisition of knowledge and this will be highly beneficial in achieving success at improving and renewing curricula and program content and relevance. They must also create community-based learning and inter-disciplinary research and teaching and also implement structures and networks to reward people for supporting collaborations (Kezar, 2005). Absorptive process transformation makes learning more interactive because institutional practices like socialization and inter-functional integration and collaboration are required to share knowledge and its various applications (Jansen et al., 2005) and by so doing, relevant knowledge will be distributed

or transmitted to every faculty, department or unit within the tertiary institution (Tomaskova, 2018; Shina, 2020). Absorptive process transformation also facilitates the storing and retrieval of knowledge holistically for the institution or organization. The researcher therefore hypothesizes that:

H3: *Absorptive process transformation is positively related to knowledge acquisition in HEIs.*

2.10.2 Mediating role of inter-functional coordination

Mediation explains a sequence of relationships in which an independent variable affects an intervening variable (mediator), which in turn affects a dependent variable (Baron & Kenny, 1986; Nitzl et al., 2016; Zhao et al., 2010). A mediator variable plays the role of revealing the true relationship between the independent and dependent variables (Hair et al., 2017). As such, the most important intervening "transformation process" that can facilitate easy transfer and sharing of knowledge among academics is how the differing functions are able to collaborate and coordinate effectively by communicating in an atmosphere of transparency and collaborative teamwork.

Inter-functional coordination is an integration mechanism that reflects the degree to which different functions within an organisation coordinate interact, communicate, share information (Narver & Slater, 1990; Troy et al., 2008) in an environment of trust and cooperation which also reflects the mutual alignment of inter-functional interdependencies (Swink & Schoenherr, 2015). This mechanism refers to the synchronization of communication, dissemination of information, ideas and resources in an integrative and collaborative manner among different functional units within an organization to create value for customers (De Luca & Atuahene-Gima, 2007; Javalgi et al., 2014; Wooldridge & Minsky, 2002; Yang & Tsai, 2019). Inter-functional coordination within the university environment will therefore ensure that goals of different faculties, departments and units are aligned, permitting regular interactions and transparent communication that fosters the sharing, transfer, and integration of diverse knowledge (Troy et al., 2008; Yang & Tsai, 2019) throughout the university. Inter-functional integration should begin from the top hierarchy of higher education institutions

and subjected to high degree of control by the Vice Chancellor and his top management team (Grant, 2013).

Drawing from knowledge-based perspective, this study hypothesizes that inter-functional coordination may mediate the relationship between the absorptive capacity dimensions and knowledge acquisition for the generation of innovations in the university. According to Fernhaber and Patel (2012), social integration mechanisms when connected to absorptive capacity can help the university to create a shared identity and mission, which can enhance trust and thus improve communication and coordination across differing functional departments. When inter-functional coordination is linked to absorptive capacity it facilitates the development and implementation of new programs, curricula and research output. On the basis of the knowledge-based theory (Grant, 1996), once the relevant departments of a higher education institution have absorbed new external knowledge, the university has to design effective mechanisms such as cross-functional teams and tasks that can easily and quickly integrate that knowledge throughout the university for the creation of new ideas (Jansen, Tempelaar, Van den Bosch, & Volberda, 2009). Inter-functional integration activities can intervene to generate a shared body of knowledge and facilitate multiple applications of external knowledge (Song et al., 2018).

According to Nguyen, Ngo, Bucic, and Phong (2018), external knowledge of customer needs, market trends, and technological evolutions can stimulate new ideas and enhance innovation through inter-functional knowledge sharing. Collaboration across faculties and department will enable the university to better integrate marketing, R&D, and other complementary knowledge resources to create new knowledge (Lin, Wang, & Kung, 2015) and achieve product and service innovations (Calantone & Rubera, 2012). Through the coordinating mechanism of a collaborative community, different faculties departments and units can better align their shared purpose within and across their targeted projections and utilize their diversity of capability, which facilitates innovation (Adler, Heckscher, & Prusak, 2011). Furthermore, externally absorbed knowledge must be transferred or disseminated across functions before it can create valuable outcomes such as new product success (Luo, Slotegraaf, & Pan, 2006).

On the basis of the arguments espoused, this study proposes that inter-functional coordination is a necessary integration mechanism through which externally acquired

knowledge will be effectively transformed into innovation outcomes. This means that, universities with a high absorptive capacity should be more likely to develop greater inter-functional coordination, which will enhance their innovation gains. In other words, inter-functional coordination may be a key intermediary mechanism through which the effect of absorptive capacity is translated into innovation. Acquiring and sharing information between departments, formulating and implementing strategies, and developing business plans are the key aspects of inter-functional coordination (Altinay, 2010; Deng & Dart, 1994). Apart from reaping external knowledge together through their collective absorptive effort, this kind of collaboration will facilitate the generation of new internal knowledge resources (Tsai & Ghoshal, 1998) through their coordination with other functional departments and faculties, thereby creating strength and dynamic capabilities from the synergistic effects of inter-functional coordination. The researcher therefore hypothesizes that:

H4: *The positive relationship between absorptive knowledge search and knowledge acquisition is mediated by Inter-functional coordination in HEIs.*

A higher education institution's storehouse of knowledge represents its most valuable resource, which makes it relevant in this knowledge economy that is fraught with global competition as a result of an increase in knowledge markets and on-line technology. However, the storehouse of knowledge in universities are more often fragmented and stored in various individuals, departments and faculties because of the interdisciplinary nature of academic research. As such, both academic and administrative staff of diverse disciplines need to be stimulated to share information and knowledge through the establishment of knowledge sharing routines and contact meetings like workshops, seminars and colloquia in a bid to facilitate easy and open exchange of ideas, knowledge and opinions so that a holistic knowledge base will be developed and maintained cumulatively for the university. This knowledge, when stored, will subsequently help the university staff to understand the usefulness of incoming new knowledge and be able to recombine it with the existing knowledge to transform them together for university-wide benefits (Cohen and Levinthal, 1989, 1990). Moreover, in the process of linking external knowledge to the university's prior knowledge competencies, inter-functional coordination will facilitate both the reinterpretation of diverse perspectives and the recombination of existing competencies to generate novel ideas (Mohr, Sengupta, &

Slater, 2010). Through the integration of diverse functional expertise and perspectives, the university will be better able to enhance the flow of external knowledge into the innovation process and will therefore be more likely to achieve innovation success (Troy et al., 2008). As mentioned earlier, tacit knowledge is a key source of competitive advantage as it is embedded in the owner and cannot be easily transferred without the owner's participation in the knowledge exchange process (Karlsson & Andersson, 2009). An integrative mechanism like inter-functional coordination is therefore required as a conduit for sharing and transmitting both tacit and explicit knowledge (Nonaka, 1994) and its multiple applications (Volberda, 2005) to every faculty, department and unit within the university, to facilitate the storing of university-wide knowledge (Jansen et al., 2005). The researcher therefore hypothesizes that:

H5: *The positive relationship between absorptive knowledge accumulation and knowledge acquisition is mediated by Inter-functional coordination in HEIs.*

Higher education institutions in Ghana lack the mechanisms that can easily facilitate the flow of information and coordination across faculties and departments who operate autonomously and independently (Kezar, 2005), thus, preventing the flow or transfer of internal knowledge which remains "sticky" (Szulanski, 1996). Sticky knowledge refers to knowledge that cannot easily be transferred from one unit to another within an organization simply because it is not well codified and therefore its usefulness is ambiguous (Szulanski, 1996). The reason could also be because the recipients lack motivation or the capacity to absorb knowledge. This situation that does not promote the transfer of knowledge from the individual level to group, department or faculty level and thence to the organization/institution level (Crossan et al., 1999). It also impedes changes or improvements as a result of the lack of common consensus for shared knowledge base. Although individual or departments may excel in the knowledge capacities, institutional targets become difficult to achieve (Kezar & Eckel, 2003). Inter-functional institutional structures or teams will enable universities to effectively disseminate external knowledge throughout all the faculties (Cohen & Levinthal, 1990; Lane et al., 2006), which will facilitate innovation generation outcomes (Tsai, 2001).

As mentioned earlier, the involvement of academics in research collaboration and the capacity of collaboration to drive research and innovation are all contingent on the existence of an enabling environment that includes structures, systems and incentives that

support research collaboration. Both academic and administrative staff need to collaborate in contact meetings and be willing to set aside their separate departmental interests so that the absorptive process of learning can take place interactively as they share disparate ideas, knowledge and opinions. This will encourage the building of collaborative intentions that will eventually be translated into action (Bartels and Koria, 2014). As Schomaker and Zaheer (2014) clearly emphasized, knowledge transfer is contingent on a good and reliable communication process between the sender and receiver. Further, because learning new external knowledge can enhance awareness of market opportunities and challenges, absorptive capacity can help differing functional departments to overcome barriers to collaboration and achieve unity of effort (Daft, 2010) through inter-functional coordination. Additionally, the need to assimilate externally acquired knowledge will encourage different faculties, departments and units to cooperate and share information and in the transfer of valuable external knowledge to the university (De Luca & Atuahene-Gima, 2007; Peeters et al., 2014). The researcher therefore hypothesizes that:

H6: *The positive relationship between absorptive process transformation and knowledge acquisition is mediated by Inter-functional coordination in HEIs.*

Social communication is considered as a key success factor in knowledge management, as far as sharing and exchange of knowledge is concerned, and individuals are willing to share and exchange knowledge among themselves (Pivec & Maček, 2019). Internal knowledge acquisition is also facilitated through the existence of connections and relationships among different faculties or functions (Tomaskova, 2018; Tsai, 2001) whose members show willingness to share or exchange knowledge and ideas, based on mutual trust. Internal knowledge acquisition also promotes the flow of knowledge within the university which enhances cooperation and coordination among faculty members and helps the process of integrating external knowledge into the entire university (Nahapiet & Ghoshal, 1998).

Absorptive capacity may enhance integration among faculties, departments and units through social integration mechanisms (Jansen et al., 2009; Lewin, Massini, & Peeters, 2020; Zahra & George, 2002), such as inter-functional coordination. From an organizational knowledge creation perspective, absorptive capacity routines represent organizational learning processes (Lane et al., 2006; Volberda et al., 2010) that may

promote inter-functional integration. Organizational knowledge creation activities of individual faculties and departments facilitate the acquisition of common knowledge, which further promotes constructive interaction, communication, and collaboration across functions within the university (Grant, 2002; Senge, 1990). The absorption of external knowledge, with its attendant information-processing demands require higher levels of coordinated integration across functions to assimilate and apply that knowledge to innovate successfully (Lane et al., 2006). Inter-functional coordination and knowledge sharing will enable the university to develop a knowledge integration capability (Gardner, Gino, & Staats, 2012). Even though the academic environment is characterized by individualistic tendencies, the practice of inter-functional coordination will enable the collaboration and integration of faculty and administrative staff of various faculties and departments to enhance communication and information so that collective goals of the institution can be achieved (Atuahene-Gima, 1996; Narver & Slater, 1990). Inter-functional coordination will enable all the different functional departmental members to set aside their individual functional interests and accept differing views from varying perspectives in their quest for detecting and acquiring new knowledge as social capital (Nahapiet & Ghoshal, 1998) for the higher education institution. The researcher therefore hypothesizes that:

H7*: Inter-functional coordination is positively related to Knowledge Acquisition in HEIs.*

2.10.3 Knowledge acquisition and innovation generation

The knowledge-based view reiterates that knowledge is a valuable resource of organisations and by implication for higher education institutions. It is therefore central to organisational and institutional innovation (Von Krogh et al., 2012). Acquiring new knowledge has become a key strategic resource for innovation (Ahuja & Katila, 2001; Butnariu, 2020; Cabrera & Cabrera, 2002; Cohen & Levinthal, 1990; March, 1991; Hameed, Nisar, & Wu, 2021), and performance (Choi & Park 2017; Huang et al. 2015; Kotabe, Jiang, & Murray 2017; Lane, Koka, & Pathak, 2006). In the value creation process, innovation is dependent on individual employees' experiences, skills and knowledge, (Wang & Wang, 2012). Because knowledge resides within individuals, it is important to share for all organisational members to acquire in order to establish new routines for solving problems (Von Krogh et al., 2012). When tacit knowledge is shared

it is converted into explicit knowledge for collective learning, which subsequently develops the knowledge available to the organisation. External knowledge can be used to develop new and improved products and services as a commercial output of an organization's absorptive capacity (Lane et al., 2006).

Additionally, when an organization is able to successfully internalize the external knowledge acquired into its operations, this will naturally spur innovation to improve organizational performance (George et al., 2001). The innovative performance of a higher education institution thus refers to how it achieves and sustains innovation through the constant search for new ideas that have the potential for developing and improving academic programmes and content for commercialization (Ahuja & Katila, 2001; Cohen & Levinthal, 1990; Laursen & Salter, 2006; Tamer Cavusgil et al., 2003). From the theory of absorptive capacity, Cohen and Levinthal (1990); Zahra and George (2002) have proposed that an organization's strength of absorptive capacity depends upon its prior knowledge and diversity, reason why absorptive capacity positively impacts essential organizational outcomes like innovation. In addition, diverse knowledge boosts individuals' capacities to make new connections (Cohen & Levinthal 1990) and this diversity boosts innovation processes through the recombination of new and existing ideas. The process of innovation is not sorely an internal affair. So, universities need to be aware of their clients' current economic trends, external ideas and current research. They also require different human capital skills in order to improve or maintain their performance as they will be under pressure from the external environment to innovate, especially now with globally competitive graduates on the job market and increased on-line technology and diverse demographics of students (Voolaid & Ehrlich, 2017). For this reason, higher education institutions need to build capacities that will enable them respond to the changing needs of the external environment by constantly and continuously searching for and acquiring new knowledge and understanding, and transforming and exploiting new knowledge, and above all, diffusing new knowledge internally at all levels (faculties or departments of the institution), all in a bid to churn out innovative programme combinations and better research output. The researcher therefore hypothesizes that:

H8: *Knowledge acquisition is positively related to innovation generation in HEIs.*

CHAPTER THREE

3.0 Methodology

Methodology is the truth-seeking and philosophical framework within which an investigation is conducted (Brown, 2006). The research methodology employed in any research must primarily be the most appropriate to achieve the objectives of the study. Methodology must comprise the compilation of methods or rules that underpin a specific research; second, the principles, philosophies and values that support the research approach. (Somekh & Lewin, 2005). Finally, Mackenzie & Knipe (2006) outline the difference between methodology and method. They posit that ***methodology*** is the overall approach to research linked to the paradigm or theoretical framework while the ***method*** refers to systematic means, procedures, or instruments used to gather and analyse data.

This chapter outlines the research methodology that was used in this study. It includes the most common research paradigms, research approaches and designs. Specifically, it outlines the research philosophy, research approach, research strategy, methods of data collection, study population, sampling procedure and technique, sample size determination, data collection procedure, data analysis procedure, pre-test or expert opinion on research instrument, measures and validation and the ethical foundation of the research. It begins with a general overview of the whole research process which followed a four-phase approach for both the qualitative (Study One) and quantitative (Study Two). In the first phase, the interview questions, measurement items and research scales were defined. Phase two entailed how the data collection proceeded by developing semi-structured interviews and survey questionnaire of which expert opinions were sought from seasoned academics to ensure content validity and appropriateness of measurement items. This "expert opinion" exercise entails a structured discussion on the relevance of interview and questionnaire items and a subsequent feedback discussion, leading to a number of modifications and the final format of the semi-structured interview questions and survey questionnaire.

In the third phase, the sample used for both the qualitative and quantitative studies in this dissertation were then defined after a non-probability purposive sampling criterion was carefully followed. This aimed to cut off all the higher education institutions that are not

significant in terms of research and publication. Phase four of the research process comprised of the actual data collection in two stages: Study One (qualitative) and Study Two (quantitative), which was carried out during a period of twenty (20) weeks.

3.1 Research methodological paradigm

A research paradigm is used to describe a researcher's 'worldview' (Guba & Lincoln, 1994; Mackenzie & Knipe, 2006). This means that a paradigm constitutes the abstract beliefs and principles that shape how researchers see the world, and how they act within that world (Lather, 1986). Therefore, a research paradigm refers to the researchers' philosophical perspective, school of thought, or shared beliefs, that inform the interpretation or meaning of research data. Finally, a research paradigm is the lens through which a researcher looks at the world. It, therefore, has significant implications for every decision made in the research process, including the choice of methodological aspects of the study in order to determine the research methods that will be used and how the data will be analysed (Guba & Lincoln, 1994).

A paradigm consists of four components: ontology, epistemology, methodology, and axiology (Lincoln & Guba, 1985). It is important for every researcher to have a deep understanding of these components because they constitute the basic beliefs, assumptions, norms and values that characterise and guide each paradigm. Awareness of philosophical assumptions underpinning the research paradigm will enhance the quality of study and can contribute significantly to knowledge and practice, and the creativity of the researcher (Mackenzie & Knipe, 2006).

3.1.1 Ontology of a paradigm

Ontology examines the underlying belief system of the researcher, about the nature of being and existence (Crotty, 1998), in other words "*what is"*. Ontology is so essential to a paradigm because it helps the researcher to gain an understanding of the things that constitute the world, as it is known (Scott & Usher, 2010). Ontology also seeks to determine the real nature, or concepts which constitute themes that the researcher analyses to make sense of the meaning embedded in his or her research data. Ontology makes the researcher to ask questions like: *What is the nature of reality? What is the nature of the situation being studied? Is there reality out there in the social world?* These

questions help the researcher to shape his or her thinking about the significance of the research problem, how to understand the problem being investigated and contribute to the solution of the problem (Kivunja & Kiyuni, 2017).

3.1.2 Epistemology of a paradigm

Epistemology refers to how we come to know something; how we know the truth or reality, or what counts as knowledge within the world (Cooksey & McDonald, 2011). It concerns the nature and forms of human knowledge and how it can be acquired, communicated and comprehended by the researcher, in order to be able to extend and deepen understanding in a particular field of research. Epistemology makes the researcher to ask questions like*: What is the nature of knowledge? What is the relationship between the knower and the known?* These questions help the researcher to place themselves in the research context in order to discover what is new in the face of what is known. Thus, to understand the epistemology of a paradigm, the researcher must inquire how we know what we know as the basis for investigating the 'truth'. (Davidson, 2000; Kivunja & Kiyuni, 2017).

3.1.3 Methodology of a paradigm

Methodology refers to the plan of action or strategy that underlies the choice of methods or approaches to be used for analysis (Crotty, 1998). It therefore deals with what, why, from where and how to collect data for analysis. Methodology therefore articulates the flow of the processes followed in doing a research project, in order to gain knowledge about a research problem (Kivunja & Kiyuni, 2017). It makes the researcher to ask a question like*: How can the inquirer go about getting the desired data, knowledge and understanding to help answer the research question and contribute to knowledge?* (Guba & Lincoln, 1994).

3.1.4 Axiology of a paradigm

Axiology refers to making the right decisions in terms of the ethical issues to be considered when embarking on a research project (Finnis, 1980). The researcher needs to define, evaluate and understand the concepts of right and wrong behaviour associated with the research. It makes the researcher to ask questions like*: What is the nature of ethical behaviour? What must I do to respect the right of all participants and secure*

their goodwill? What are the cultural, intercultural and moral issues that need to be considered and how can they be addressed? It is important for the researcher to consider his or her regard for human value of all the participants who would be involved with the research project (Kivunja & Kiyuni, 2017).

Research is considered as a systematic study or investigation, which requires data collection, analysis and interpretations to establish a deep understanding of a phenomenon, predict an outcome or to empower society or individuals in a similar context (Burns, 1997; Mertens, 2005). The choice of a research paradigm impacts the way reality or knowledge is studied, understood, and also determines the intent, expectations and motivation for the research (Mackenzie & Knipe, 2006). The researcher must propose a paradigm as the first step, which provides the starting point for sequential selections concerning methodology, research design, and methods (Mackenzie & Knipe, 2006).

There are basically three paradigms or belief groups which are positivists, constructivists or interpretivists and pragmatists. The positivists are of the belief that there is only one reality, which can be measured and known through the use of quantitative methods to measure this reality, whilst the constructivists/ interpretivists believe that there is no single reality or truth, but multiple realities, as such, reality needs to be interpreted and recommends qualitative methods to determine these multiple realities (Krauss, 2005; Wahyuni, 2012). The pragmatists (otherwise known as realists) assume that reality is continually re-negotiated, discussed, interpreted and therefore the best method to use is the one that resolves the problem. This study's methodological paradigm was that of pragmatism which embraces the use of multiple methods tailored to specific questions and objectives of research as well as diverse methods of data collection and analysis, utilized in the mixed methods study (Creswell, 2003). Mixed methods research is an approach to investigation involving both qualitative and quantitative data collection, combining the two forms of data, and using well-defined designs that may comprise theoretical frameworks and philosophical assumptions.

3.2 Positivism

The positivists believe in empiricism, which is through the scientific method of experimentation, direct manipulation, observation and measurement of facts can be

achieved to help discern natural laws (Trochim & Donnelly, 2008). The ontology of positivists is that of "realism". Realism holds the view that objects exist independent of the one who knows (Cohen et al., 2013). Positivism can be applied to the social world provided the method for investigation is value-free and interpretations of a causal type is adduced to observation of effects in a similar method to the physical world (Mertens, 2005). The epistemology of positivists view science as being predominantly the means to acquire knowledge of the truth, to adequately understand the world to the extent that it can be anticipated and controlled (Krauss, 2005).

Positivists believe that the world and the whole creation are deterministic, and their operations are underpinned by the laws of cause and effect, which makes them predictable when the appropriate scientific methods are used. Positivists use deductive reasoning to postulate theories that can be tested and based on the results of studies. A theory can be declared to fit or not fit the facts underlying the theory, and where necessary may require a modification of the theory to improve its forecast of truth or realism. Positivists do not accept metaphysics and hold the position that the goal of knowledge is to describe the phenomena we experience, and they maintain that data as observed and measured in science should not be altered, and that knowledge of any other information outside scientific observation and measurements is incredible (Krauss, 2005; Trochim & Donnelly, 2008).

In view of this, positivists detach themselves from the world they subject to research study. However, contrary to this position, researchers from other paradigms like the constructivism and pragmatism accept that they should partake in the real-world natural life to a certain degree to improve understanding and communicate its evolving and developing properties and features (Healy & Perry, 2000).

3.3 Constructivism / Interpretivism

Constructivists or interpretivists believe that there is no single reality, but multiple realities. This is because realism is made up by social actors and people's insights and experiences of it (Krauss, 2005; Wahyuni, 2012). The ontology of constructivists or interpretivists is that of "relativism" Relativism views reality as subjective and differs from an individual to another (Guba & Lincoln, 1994). They acknowledge that individual

personalities have diverse upbringings, circumstances, experiences, beliefs and expectations which shape their understanding of reality within their social setting through social collaboration, communication and interactions (Mertens, 2005; Wahyuni, 2012). Human perspectives, skills and experiences are personal and subjective, and therefore, social reality may change or have multiple viewpoints (Hennink, Hutter, & Bailey, 2011). Since each of us have our peculiar experiences from our own perspective and personal point of view, each of us experience a different reality. The phenomenon of "multiple realities" therefore, exists (Krauss, 2005; Mertens, 2005).

The epistemology of constructivists or interpretivists is that of "subjectivism". They hold the view that if we do not take the individual's view into account when conducting research, we violate the fundamental view of the individual. As such, they may be opposed to methods that attempt to aggregate across individuals because everyone is unique (Krauss, 2005; Wahyuni, 2012). Consequently, constructivists or interpretivists reject objectivism and a single truth as proposed in positivism and post-positivism (Wahyuni, 2012). Constructivist or interpretivist researchers prefer to engage in dialogue with studied subjects to help understand the social world from the experiences and subjective meanings that people attach to it (Krauss, 2005; Wahyuni, 2012).

Constructivists or interpretivists prefer working with qualitative data, which makes available adequate narratives of social concepts. Contrary to the generality method adopted by positivist investigators, constructivists or interpretivists use a narrative form of analysis to explain specifics and provide more comprehensive accounts of a precise communal or social reality being investigated, commonly referred to as the idiographic approach (Neuman, 2011). In terms of axiology, constructivist or interpretivist investigators take the viewpoint of the insider perception, which intends to study the societal reality from the point of view of the populace themselves. In this regard, the experiences and values of both research participants and research investigators significantly impact the data collection and its analysis (Trochim & Donnelly, 2008; Wahyuni, 2012).

Constructivists or interpretivists contend that it is unreasonable to try discovering and establishing legitimacy/validity in any external or objective sense (Trochim & Donnelly, 2008). Generally, qualitative study is grounded on a relativistic, constructivist ontology that postulates that there is no unbiased objective reality or truth. Instead, there are

several realisms composed by social actors who experience a phenomenon of interest (Krauss, 2005). The constructivists claim that meaning is rooted in reasoning and understanding, and not in elements external to people. Therefore, information flow imprinted on our cognitive system is screened, interpreted, changed, or even rejected by the knowledge that already exists in that system; the resultant knowledge is distinctive and purposefully constructed (Lythcott & Duschl, 1990).

3.4 Pragmatism

Pragmatism paradigm accepts both the positivist and the interpretivist research philosophies and is not dedicated to any classification of philosophical viewpoint or reality (Creswell, 2003; Tashakkori & Teddlie, 2003). Pragmatists believe that objective and subjective viewpoints are not mutually exclusive but should be viewed as a continuum rather than entrenched options opposed to each other (Wahyuni, 2012). The pragmatists, therefore, do not question the ontology and epistemology as the first step to initiating their research work, but rather start with the research question to fix their research design/framework (Wahyuni, 2012).

In fact, the pragmatic paradigm proponents make the research problem paramount and have a central focus, then use every method to help comprehend the research problem (Creswell, 2003, p.11; Mackenzie & Knipe, 2006). Pragmatist researchers make the research question 'central' to their investigative strategy, which drive the data collection and evaluation methods to provide the deepest understanding into the research question without any loyalty to any specific paradigm (Machenzie & Knipe, 2006). Consequently, a combination of ontology, epistemology and axiology become a tolerable framework to apply and comprehend societal phenomena. At this stage, the most important focus is on resolving the imminent research problem with tools that work best (Wahyuni, 2012).

Pragmatist researchers do not mind working with data obtained from both qualitative interviews and quantitative surveys since it empowers them to enhance and advance understanding of the social reality (Wahyuni, 2012).

3.4.1 Philosophical justification/underpinnings of the study

The use of the pragmatist paradigm in this study is justified by the fact that pragmatism provides the underlying philosophical framework for mixed-method research. It involves taking advantage of the strengths of the objectivist and the subjectivist perspectives to help comprehensively focus first on the research problem and then better understand the societal realism. The mixed methods type of research approach is employed here because it is ideal for situations where there is a need to incorporate both exploratory and confirmatory elements with regards to the research questions and objectives of the study (Teddlie & Tashakkori 2009). The researcher wanted to synthesize differences in opinion and perception of the sampled participants (faculty staff of HEIs) on the phenomenon (contextual meaning of Absorptive capacity in HEIs) under investigation (Tashakkori & Creswell 2007; Teddlie & Tashakkori, 2009), and achieve effective investigation and results of an unknown aspect of the phenomenon (Moran-Ellis et al., 2006; Teddlie & Tashakkori, 2009). The research gap of contextualizing absorptive capacity in the HEI domain suggested the need to clearly understand what constitutes absorptive capacity in the HEI context. This qualitative component of this study helped to gather in-depth information that helped to clarify some inconsistencies in the dimensionality of ACAP. The overriding reason for using a mixed method approach is a situation where neither qualitative nor quantitative method alone is able to answer the research question. Again, pragmatist focus on the main research question as the most important practical question to be answered and choose data collection and analysis methods to help provide an understanding of the question without aligning with any philosophical paradigm.

3.5 Research approach

This subsection gives a brief overview of the research approaches and designs predominantly used by the positivist, interpretivist and pragmatist paradigms.

The positivist paradigm usually operates using quantitative approaches to data collection and analysis (Mertens, 2005). Tools for data collection are usually experiments, quasi-experiments, and test scales or surveys. Quantitative research is an approach for testing objective theories by examining the relationship among variables. These variables, in turn, can be measured, typically on instruments, so that numbered data can be analysed using statistical procedures. Positivists test theories deductively from the general

principles to specific situations, the researcher is impartial and does not influence data collection and is also able to generalize and replicate the findings.

The constructivist/interpretivist paradigm operates using qualitative methods and the instruments for data collection are interviews, observations and dialogues (Silverman, 2000; Wiersma, 2000). Qualitative research is an approach for investigating and understanding the meanings that individuals or groups attribute to a human or societal problem. It involves emergent questions and processes, data collection in the participant's local environment, data reviews and analysis to inductively draw specific and general conclusions and interpretations from themes derived from the data.

The pragmatist paradigm provides an opportunity for multiple methods tailored to specific questions and objectives of research, different theoretical perspectives, assumptions, as well as diverse methods of data collection and analysis are utilized in the mixed methods study (Creswell, 2003). Mixed methods research is an approach to investigating both qualitative and quantitative data, combining the two forms of data, and using well-defined designs that may comprise theoretical frameworks and philosophical assumptions. The fundamental belief underlying the mixed method inquiry is that the integration of qualitative and quantitative approaches provides a more comprehensive understanding of a research problem than any single approach.

3.6 Research Design

The general plan or strategy that researchers choose to combine the varying components of a study in a clear and rational manner so that data gathered is able to effectively address the research problem and objectives as clearly as possible is the research design. It constitutes the blueprint for the collection, measurement, and analysis of data. The research problem determines the type of design to use, and it constitutes the plan for the collection, measurement, and analysis of data (De Vaus & De Vaus, 2013).

This study is underpinned by the pragmatism paradigm, which offers the fundamental philosophical framework for mixed-method research leading to a better understanding of social realities (Wahyuni, 2012). Mixed methods research is a methodology that involves collecting, analysing and integrating quantitative (e.g., experiments, surveys) and

qualitative (e.g., focus groups, interviews) research (Creswell & Plano-Clark, 2011). Despite the growing popularity in the use of mixed methods research designs (Creswell & Plano-Clark, 2017), there are many issues that make their implementation quite difficult (Ivankova, 2004; Ivankova, Creswell & Stick 2006; Ivankova & Stick, 2007). Mixed methods research is time-consuming and the decision process to prioritize either the qualitative or quantitative component is quite complex (Creswell & Plano-Clark, 2011). This means that adequate planning and management of time is highly important so as to avoid a backlog of tasks especially when the research is time-sensitive.

The mixed methods type of research approach is employed here because it is ideal for situations where there is a need to incorporate both exploratory and confirmatory elements with regards to the research questions and objectives of the study (Teddlie & Tashakkori 2009). The researcher wanted to synthesize differences in opinion and perception of the sampled participants (faculty staff of HEIs) on the phenomenon (contextual meaning of Absorptive capacity in HEIs) under investigation (Tashakkori & Creswell 2007; Teddlie & Tashakkori, 2009), and achieve effective investigation and results of an unknown aspect of the phenomenon (Moran-Ellis et al., 2006; Teddlie & Tashakkori, 2009). The research gap of contextualizing absorptive capacity in the HEI domain suggested the need to clearly understand what constitutes absorptive capacity in the HEI context. This qualitative component of this study helped to gather in-depth information that helped to clarify some inconsistencies in the dimensionality of ACAP. The overriding reason for using a mixed method approach is a situation where neither qualitative nor quantitative method alone is able to answer the research question. All these issues were taken into consideration for this study by developing a Gantt chart with frequent updates of relevant timelines and corresponding tasks.

Mixed method research has five major designs. These are multilevel, sequential, parallel, conversion, and fully integrated (Creswell 2003; Creswell & Plano-Clark, 2017). These design types can be further modified into sub-types. The sequential method has two sub-types known as the “exploratory sequential mixed methods design” and “explanatory sequential mixed methods design” (Creswell & Plano-Clark, 2011). Exploratory sequential mixed methods design involves the collection of qualitative data after which questions are developed from analyzed results for the quantitative data collection. There

are therefore two distinct stages of data collection for the exploratory sequential mixed methods design (Creswell & Plano-Clark, 2011). The qualitative data collection stage precedes the quantitative data collection stage. Explanatory sequential mixed methods design also involves the collection of quantitative data after which questions are developed from analyzed results for the qualitative data collection. There are therefore two distinct stages of data collection for the explanatory sequential mixed methods design (Tashakkori & Creswell, 2007; Tashakkori & Teddlie, 2003; Teddlie & Tashakkori, 2009). The quantitative data collection stage precedes the qualitative data collection stage.

3.6.1 Study one – Qualitative research design

For the purposes of addressing the topic of interest this study employed the exploratory sequential mixed methods design so as to enable the researcher to unearth in-depth information and understand the views of these faculty staff of universities on the concept of Absorptive Capacity. This study focused first of all, on a qualitative interview approach to address the first research question; *"What constitutes Absorptive Capacity in HEIs?"*

There are several data collection techniques in qualitative surveys. Common amongst the techniques are interviews, participant observation, fieldwork, and archival research (Rubin & Rubin, 2011). Interviews are generally preferred because of the richness of data that is gathered and the fact that it provides in-depth insight into the phenomenon being understudied (Schultze & Avital, 2011). Interviews are therefore effective for qualitative research as the resultant transcripts are reliable, producing rich textual data for qualitative analysis (Cachia & Millward, 2011). Interviews are usually done through face-to-face or telephone engagements using a structured, unstructured or semi-structured format (Cachia & Millward, 2011; DiCicco-Bloom & Crabtree, 2006). There is a third emerging interview type that involves engaging participants through the internet which is increasingly becoming popular among researchers (Beck 2005; Hamilton & Bowers, 2006).

For this study, both telephone and face-to-face interviews were used, employing a semi-structured questionnaire format. This is because whilst some participants accepted to do

the telephone interview (which would be recorded) others were not comfortable with the recording aspect and preferred a face-to-face interview so that notes would be taken. Both options are equally effective in practical terms (Holt, 2010), even though telephone interviews are faster and cheaper (Henwood & Pidgeon, 2006), providing access to practically unreachable populations and affords a wider geographical coverage (Opdenakker, 2006). There are, however, some arguments against telephone interviews. For example, since the interviewer does not see the interviewee, it is not easy to collect data on non-verbal communication response which may come in the form of signs and body language (Cachia & Millward, 2011). This is an inherent shortcoming as the richness of data afforded by the interviewee's non-verbal response gestures is forfeited (Fontana & Frey, 2005). That notwithstanding, Novick (2008) argues that richness of data can be achieved with telephone interviews since interviewees are more relaxed as compared to face-to-face interviews and very likely to disclose sensitive information to the researcher. Another handicap of telephone interviews is the issue of language and hearing problems among respondents (Carr & Worth, 2001). In spite of these issues, the merits of both telephone and face-to-face interviews and their suitability for the qualitative phase of this study seemed to be the most appropriate option.

3.6.2 Population

The study population for the qualitative data collection was the higher education institution industry and the unit of analysis was Heads of departments (HODs). Qualitative data was collected using semi-structured telephone and face-to-face interviews. Ten (10) Heads of departments (HODs) of Business Schools in the selected public and private universities in the Greater Accra region of Ghana were the targeted participants selected using the purposive sampling technique. One important aspect of conducting a research is determining the unit of analysis.

The unit of analysis represents the object about which the researcher collects data (Creswell & Plano-Clark, 2011). This "object" may come in different forms, such as groups of people, social interactions, geographical units, settings, individuals or artefacts. Thus, the unit of analysis could be single or collective and determined by factors like the kind of data to be gathered, objectives of the study, scope or kind of topic, research design etc. (Zikmund et al., 2012).

3.6.3 Qualitative sampling technique

The purposive sampling method was used for the qualitative research techniques in this particular study in order to gather quality and reliable data (Etikan, Musa, & Alkassim, 2016). Since data gathering is crucial in research, it was of utmost importance that the strategy for obtaining data and who gives the data will be handled with sound judgment. The focus was therefore to get people with similar opinions who were willing to give the required information whose validity and efficiency could be relied upon because improper collection of data can lead to poor analysis of results (Tongco, 2007).

In qualitative research, sample size is not of the utmost importance (Bryman, 2012; Creswell, 2013; Zikmund et al., 2012). What is important is giving attention to the concept of saturation (Mason, 2010). Saturation occurs when the qualitative sample experiences diminishing returns i.e., when further collection of data from more respondents does not essentially lead to the gathering of new information other than what has already been realised (Bowen, 2008; Morse, 1995). There is therefore no fixed rule for sample size in qualitative research. Resorting to purposive sampling technique for this phase of the study was therefore helpful in choosing HODs who have the capacity to give detailed and rich responses due to their specialist knowledge (Teddlie & Yu, 2007; Zikmund et al., 2012).

3.6.4 Expert opinion on interview instrument

Before embarking on the actual data collection for the qualitative interview, the semi-structured instrument was pre-tested to determine the appropriateness of the interview questions, establish the referential meaning of the individual questions, identify hidden biases in the wording and rectify other anomalies that could affect the quality of the data collected for the research (Bowden et al. 2002). The judgement and opinions of three (3) experts were sought from seasoned academics from the Business Schools of top universities (Berk, 1990; Moeser, Schmitz & Moeser, 2012; Yaghmale, 2003) in the greater Accra Region. Two of the experts were actually the Deans of the business schools of Ghana Technology University College (GTUC) and Central University (CU). The third expert was the Director of the Quality Assurance Unit (QAU) of Central University (CU).

Comments given by these three experts helped in reassessing and modifying the wording of the interview instrument (Burke & Miller, 2001) to reflect the appropriate terminology. It also helped to ascertain the average time duration of the interview, test the recorder to be used for the main interview, identify possible distractions such as background noise and finally test the ability of the recorder to endure the length of the telephone interviews.

3.6.5 Sample size adequacy

In qualitative studies sample sizes are usually much smaller than in quantitative studies (Mason, 2010). This is because the qualitative sample presents a point of diminishing return, referred to as "saturation" when the collection of more data does not bring any further information. When a piece of data or code occurs once in the textual data collection, it is enough to become part of an analysis framework as long as it presents an important theme (Ritchie, Lewis & Elam, 2003). Moreover, frequencies are not so important in qualitative data collection, as long as the data or code presents useful information in just one occurrence (Mason, 2010). Further, qualitative deals more with depth of meaning rather than breadth for generalizations. Finally, being labour-intensive, analysing large samples in qualitative, will be really impractical because of its time-consuming nature.

The sampling of ten (10) Heads of departments (HODs) for this study is justified by the recommendation of Creswell (1998 pp.61) that in research interviews "from five (5) to twenty-five (25)" respondents who have all experienced this phenomenon of "Learning" is adequate. Again, Morse (1994) recommends six to ten (6-10) participants when doing a qualitative study, in which case each person is interviewed at length to have a large amount data. Further, Atran, Medin and Ross (2005 pp.753) also posit that in some studies "as few as ten informants were needed to reliably establish a consensus". Finally, Guest et al. (2006) also carried out a systematic analysis when they studied sixty women in a reproductive health care study in Africa. They concluded that in studies where respondents are homogenous "a sample of six interviews may be sufficient to enable development of meaningful themes and useful interpretations" (Guest et al., 2006 pp.78). This conclusion was drawn by them based on their findings that saturation occurred very early in their examination of codes.

3.6.6 Qualitative Data Collection

The fourth phase in the methodology framework is the specific research methods for data collection, analysis, and interpretation that researchers employ for their studies. Consequently, the method employed for the collection of data for this current study was in two (2) phases - Qualitative data collection in "Study One" and Quantitative data collection in "Study Two". Since data gathering is crucial in research, it is of utmost importance that the manner of obtaining data and who provides the data will be done with sound judgment. Qualitative data was collected to help confirm the contextual meaning, as well as the components or dimensions of Absorptive Capacity as far as the HEI is concerned. This would also help to refine the survey instrument for the quantitative data collection. We adopted this approach based on the recommendation of Creswell and Plano-Clark (2011) for the exploratory sequential design approach that we used.

Research interviews are meant to explore the views, experiences, beliefs and/or motivations of individuals on specific issues. When designing an interview schedule, it is important to ask questions that will yield as much information about the study phenomenon as possible and also be able to address the aims and objectives of the research. According to Boyd (1993), the researcher serves as an instrument for data collection. This is because the findings are mediated through this human instrument since he/she is automatically the primary contact for data collection and analysis in qualitative research. In the view of Crotty (1996) it is not humanly possible for qualitative researchers to be totally objective. If the researchers are not aware of their own preconceived notions and beliefs, it will not be possible for them to set aside these issues. It is therefore necessary for the researcher to be aware of his own values, interests, perceptions and thoughts before he or she can set aside the things that influence the research process. Drew (1993) also posits that the quality of obtained data depends on the way in which the researcher is able to provoke the respondents' recall of information and express their feelings. There are three (3) main types of research interviews in qualitative research which are: structured, semi-structured and unstructured interviews.

In structured interviews, a collection of predetermined questions are asked with no room for variation and with no scope for follow-up questions to responses that require further elaboration. They only allow for limited responses and are, therefore, not very useful when 'in-depth knowledge' is required. They are quick and easy to administer.

Semi-structured interviews consist of several key questions that help to define the areas to be explored, and also allows the interviewer or respondent to diverge in order to pursue an idea or response in more detail. This interview format provides participants with some guidance on what to talk about, which tends to be helpful to participants. The flexibility of this interview approach, as compared to structured interviews, allows for the discovery of emerging themes or elaboration of information that is important to participants but may not have previously been thought of as pertinent or relevant by the researcher.

Unstructured interviews are performed with little or no organisation and do not reflect any preconceived theories or ideas. Such an interview may simply start with an opening question such as 'Can you tell me about your experience in the higher education industry?' and will then progress as a consequence of the initial response by the participant. Unstructured interviews are usually very time-consuming, difficult to manage, confusing and usually unhelpful to both participant and interviewer. They are generally useful only where virtually nothing is known about the subject area or where significant 'depth' is not required. It is important to individualise the interview format to fit the purpose and style of the research approach. (Gill et al., 2008)

This study adopted the semi-structured type to provide room for follow up questions. Qualitative data was collected using semi-structured telephone and face-to-face interviews. Ten (10) Heads of departments (HODs) of Business Schools in the selected public and private universities in greater Accra region of Ghana were the targeted participants selected using the purposive sampling technique. The purposive sampling technique a non-random technique that does not require any set number of informants. Also known as judgment sampling, it was the deliberate choice of a particular informant because he has certain unique qualities and experiences. Given that purposive sampling is a qualitative technique, participant selection was based on their ability to provide the much-needed information and not necessarily from a population pool. This is often common with many qualitative samplings where there is much reliance on the experience and judgement of the researcher. Bryman (2012) and Zikmund et al. (2012) posit that depth rather than representativeness of sample should be the focus in qualitative sampling, hence, the purposive technique used for this study. Heads of departments (HODs) have certain unique administrative qualities and experiences in addition to their faculty experience as seasoned academics. It was decided therefore that what needed to

be known was embedded in these HODs who were able and willing to provide the information based on their experience or knowledge (Bernard, 2002, Lewis & Sheppard, 2006; Rowley, 2012). The aim was to get information regarding their understanding of what constitutes Absorptive Capacity in the HEI domain.

The semi-structured interview for this study consisted of several key questions that helped to define the areas to be explored, and also allowed the interviewer or respondent to delve deeper in order to pursue an idea or response in more detail. This interview format provided the participants with some guidance on what to talk about, which was helpful to participants. The flexibility of this interview approach, as compared to structured interviews, allowed for the discovery of emerging themes or elaboration of information that is important to participants but may not have previously been thought of as pertinent or relevant by the interviewer. In line with Gillham (2000), verbal probes were used to further ask interviewees to expand upon their responses for clarification. Examples of verbal probes used were "interesting……. tell me more about…"; "What do you mean by…?" This technique was effective in bringing out the reasons for actions, attitudes and feelings. It also provided an opportunity to delve deeper into the responses of the participants.

Prior to the actual data collection exercise, an introductory letter from Nobel International Business School (NIBS) to properly introduce the researcher as a doctoral student offering a PhD in Business Administration was sent to all participants to solicit their willingness to take part in the survey and their responses. The purpose of the survey was indicated as purely academic. The letter also detailed the title and objectives of the study and the data collection method to be used.

Further, telephone calls were made to confirm interview dates with participants after receiving their consent to participate (Berg & Lune, 2004; Singer & Frankel, 1982). Care was taken to ensure that the interview dates were fixed at the convenience of the participants (Burke & Miller, 2001; Harvey 2011). The confirmatory telephone calls also helped to establish a rapport with the respondents before the main interview (Goldman & Swayze, 2012). The interviews began with a re-introduction by the researcher, followed by reasons for the interview, after which the questions were posed. During the entire interview process, it was important to maintain a courteous and friendly tone (Berg &

Lune, 2004; Burke & Miller, 2001). Interviews were conducted in English language as the level of education of the participants was high. Most of the questions were open-ended, allowing interviewees to express themselves fully in order to yield rich data. Each interview lasted between 35 and 40 minutes, in line with the recommended average of 37 minutes recorded as the typical length of qualitative phone interviews (Ostrander, 1993; Stephens, 2007). By the end of the 6th interview the researcher had reached a point of saturation. However, two extra interviews were conducted after achieving saturation at the 6th interview so that a total of eight interviews were conducted in all. This was done on the basis of the stopping criterion argument by Francis et al. (2010) that a researcher can still go ahead to conduct a number of interviews even after the saturation point.

3.6.7 Ethical issues

The ten (10) selected heads of departments consented to participate in the interview and survey voluntarily and their anonymity was assured. Anonymity is defined as when the respondent cannot be linked to his or her responses even by the researcher (Burns & Grove, 2005). Responses would be completely anonymous, and no names of the respondents would appear anywhere in the final write-up of the study. There were no imminent risks associated with interviewees or respondents participating in this interview conducted since the introductory letters clearly explained that the purpose for the study was purely academic. In addition, the participants were informed that both the telephone and face-to-face semi-structured interviews could be completed within thirty (30) to forty-five (45) minutes on the average. The interviewees had the prerogative, however to choose the time of the interview at their convenience. We ensured that the qualitative semi-structured interview questions neither required the names of the selected universities nor the respondents.

3.7 Study two – Quantitative research design

There are four (4) main types of quantitative research designs (Creswell, 2013). The first type of research design is the descriptive design that describes the existing condition of a variable or phenomenon. The researcher usually expounds a theory/hypothesis after data collection and analysis and not before. Data collection is mostly observational in nature. The second research design is the correlational design which scrutinizes the association and relationship between variables using numerical analyses. A correlational design does

not establish cause and effect and data collection is usually observational. The third research design is the quasi-experimental design (also referred to as causal-comparative) which looks for cause-and-effect relationship between two or more variables. The researcher does not influence the variable by assigning groups and does not manipulate the independent variable. Rather, control groups are recognized or identified and subjected to or exposed to the variable. The results are then compared with results from groups which were not exposed to the variable. The fourth and final design is the experimental survey design which uses the scientific approach to determine cause-effect relationship among a group of variables in an enquiry study. Researchers try to control for all variables except the independent variable being manipulated and its effects on the dependent variable are gathered/compiled and examined for a relationship.

The study employed the experimental quantitative survey design. The survey investigation presents numerical (quantitative) description of trends, opinions, or attitudes, of a people by studying a sample of that population. It includes cross-sectional and longitudinal studies using questionnaires or semi-structured interviews for data collection, with the intention of taking a broad view or generalizing from a sample to a population (Fowler, 2009). The data collected under this survey research was cross-sectional and enabled comprehensive analyses to achieve relationships in which researchers use the statistics to measure the degree of association (or relationship) between two or more variables or sets of scores (Creswell, 2012).

3.7.1 Population and unit of analysis

The study population for the quantitative data collection was the higher education institution industry and the unit of analysis was faculty staff. According to the National Accreditation Board (NAB), there were eighty (80) accredited private and public higher education institutions in the Greater Accra Region as at the 2018/2019 academic year. To test the hypotheses which had been proposed, this research gathered a sample of twenty (20) private and public tertiary institutions in the greater Accra region. An introductory letter from Nobel International Business School (NIBS) was sent to the National Council for Tertiary Education (NCTE) to formally introduce the researcher as a doctoral student offering a PhD in Business Administration. This enabled the student to get permission and assistance in procuring the appropriate data on both public and private tertiary institutions in the Greater Accra region. NCTE provided data on both teaching and non-

teaching staff in tertiary education institutions for the 2018/2019 academic year. The full details of the teaching staff highlighted the breakdown of the five (5) levels or ranks as follows: Professor, Associate Professor, Senior Lecturer, Lecturer and Research Assistant. These categories of the faculty staff were the targeted respondents for the survey.

3.7.2 Sampling Technique

A sample refers to a part of a whole population, and a population refers to the total number of people or cases which are the subjects of a given research (Walliman, 2011). Probability sampling and non-probability sampling are two main sampling techniques available to social science researchers (Bryman, 2012). In probability sampling each case or subject within the population has an equal chance of being selected through the procedure of randomization (Battaglia, 2008). In non-probability sampling however, cases or subjects are selected in such a way that not all of them have a chance of being selected. Subjective methods are applied in deciding who can be included or not in the sample so that randomization is not an important procedure in this instance. Non-probability sampling is less expensive and quicker to implement than probability sampling (Battaglia, 2008; Bryman, 2012).

In view of the fact that data gathering is crucial in research to bring understanding in terms of the theoretical framework (Bernard, 2002) this study employed the purposive sampling approach which is a non-probability sampling technique for the quantitative sampling techniques. This technique was the deliberate choice for information gathering because the higher education institution industry is now highly competitive, and this method was justified by the interest to include only higher education institutions which have a mission for research and innovation-driven activities and interactions and are seen to be implementing a certain degree of innovation in their curricula and operations. Thus, only universities who meet this description were included in the population frame and narrowed down to those who have a considerable number of innovative activities in place. Twenty (20) top universities were therefore selected out of the eighty (80) universities in the Greater Accra region of Ghana.

In quantitative surveys, convenience sampling, also known as haphazard or accidental sampling is a non-probability sampling technique which allows the researcher to select participants who are readily accessible, available and geographically close and above all, willing to participate in the study (Dornyei, 2007). Even though permission had been sought and granted from the various Deans of the business schools through formal letters, not all faculty staff were readily available nor willing to participate in the exercise. Responses were therefore sought from those who were available and accessible at the time of data gathering. Convenient sampling was also affordable and quick to implement (Battaglia, 2008). Convenience sampling is applicable to both quantitative and qualitative research but is more frequently used in quantitative research to achieve a breadth of understanding (Etikan, 2016; Patton, 2002).

A survey method of paper-based questionnaires was self-administered to 380 participants. The questionnaire items (for the independent and mediator variables) were measured on a on a 5-point Likert-type scale ranging from 1 being the lowest score (strongly disagree) to 5, being the highest score (strongly agree). For the dependent variable, items were measured on a Likert scale with seven (7) points (1 "totally disagree" being the lowest score, and 7 "totally agree" being the highest score), based on Wang, Zhao, and Zhou's (2018) innovation incentives scale. This was done in a bid to avoid common method variance bias on the part of respondents.

3.7.3 Data collection

This study's model and hypotheses were tested using data from a sample of faculty staff of the tertiary educational industry in the greater Accra region of Ghana. The choice of this industry was motivated by the fact that the university is a knowledge intensive domain. It is a highly competitive industry with investments in knowledge creation and dissemination, technology, design, and a quick response to market needs. One good thing about studying the tertiary educational industry is the fact that most participants are highly educated making it easy for them to deliver responses in fluid English language. As such, standardized structured interview and survey procedures were used for statistical analyses.

There are five (5) levels or ranks of faculty staff as follows: Professor, Associate Professor, Senior Lecturer, Lecturer and Research Assistant, all of whom willingly participated in the exercise. Most of the responses were however received from senior lecturers and lecturers who constitute the majority of faculty staff. The respondents were informed that the survey could be completed within thirty (30) to forty-five (45) minutes on the average. However, in order not to put pressure on them, respondents could complete the survey at their own convenience by giving convenient dates for collection. In some cases, the researcher was given permission by the Dean to go from office to office to interact with respondents. In other few cases, the faculty officer of the Dean assisted in the distribution and collection. Overall, it was a wonderful experience as some respondents showed so much interest in the study and were willing to offer guidelines and professional advice.

3.7.4 Effect of validity and reliability

Precision is referred to as validity and reliability in research. Validity refers to how well a variable measures what it is supposed to measure. Validity is important in descriptive studies and when the validity of the main variables is poor, you may need thousands rather than hundreds of respondents. Reliability explains how measures can be reproduced on a retest. The more reliable a measure is, the less respondents you need to see a small change in the measure.

In order to improve content validity the measurement items for the latent variables used in this study were obtained from previous studies (Straub & David, 2004). The statements were then reworded and modified to fit our specific context, the tertiary educational industry. The questionnaire, (attached as Appendix 1) was ethically cleared by the Assistant Academic Dean of Nobel International Business School (NIBS) by the 23rd of November, 2019, with introductory letters for the various higher education institutions written and signed. Distribution of questionnaires began from the 25th of November, 2019 to the 24th of April, 2020. Collection of questionnaires was delayed because of the COVID-19 lockdown restrictions and therefore began from the 2nd of June, 2020 to the 13th of August, 2020.

3.7.5 Expert opinion (professional judgement) on research instrument

In an attempt to measure content validity and ensure appropriateness of measurement items so as to ensure construct validity and also give confidence to both the readers and researchers about instruments, the judgement and opinions of three (3) experts were sought from seasoned academics from the Business Schools of top universities (Yaghmale, 2003) in the greater Accra Region. Two of the experts were actually the Deans of the business schools of Ghana Technology University College (GTUC) and Central University (CU). The third expert was the Director of the Quality Assurance Unit (QAU) of Central University (CU).

Content validity, also known as relevance validity, intrinsic validity, or sampling validity is used to measure the variables of interest in a given study. It measures the comprehensiveness of the content and how representative the content of a scale is. It also determines the appropriate sampling of the domain of items in a questionnaire (Yaghmale, 2003). Bums and Grove (1997) posit that content validity is derived from three sources which are literature, relevant populations, and experts. This "expert opinion" exercise comprised of a structured discussion on the relevance of questions on a five-point content validity index (CVI) for the quantitative survey questionnaire items. Items were measured on a on a 5-point Likert-type scale ranging from 1 being the lowest score (not relevant at all) to 5, being the highest score (very relevant). Each expert independently responded to the questions based on the check-list for readability, relevance, clarity, accuracy and ambiguity of language (Berk, 1990; Yaghmale, 2003). This exercise resulted in a subsequent feedback discussion, leading to a number of item modifications (particularly in the survey questionnaire, (attached as Appendix 2). This exercise usually overrides the need for a pilot test being conducted as it addresses all problems of comprehension and biases.

3.7.6 Ethical issues

We ensured that the quantitative survey questionnaire did not require the names of the selected universities or the respondents. However, respondents were required to indicate their faculty level category in the university. The selected faculty staff consented to participate in the interview and survey voluntarily and their anonymity was assured. Anonymity is defined as when the respondent cannot be linked to his or her responses

even by the researcher (Burns & Grove, 2005). Responses would be completely anonymous, and no names of the respondents would appear anywhere in the final write-up of the study. There were no imminent risks associated with the respondents participating in this survey conducted. In addition, the participants were informed that the surveys could be completed within thirty (30) to forty-five (45) minutes on the average. The respondents of the survey had an alternative option to complete the survey at their own convenience by giving the researcher convenient dates for collection.

3.8 Dependent variable

A dependant variable, also known as an endogenous variable, is the outcome variable in a study. The dependant variable for Hypothesis 1 through to 8 in this study, is ***innovation generation*** of the Ghanaian higher education institution. The respondents were instructed to evaluate the survey items or statements using a Likert scale with seven (7) points (1 "Very strongly disagree" being the lowest score, and 7 "Very strongly agree" being the highest score), based on Wang, Zhao, and Zhou's (2018) innovation incentives scale. The actual scales were: 1-Very strongly disagree, 2- Strongly disagree, 3- Disagree, 4-Neutral, 5- Agree, 6- Strongly agree, 7- Very Strongly Agree. Statements which were measured included the following: (a) In terms of promotion, our university gives priority to both faculty and administrative staff who actively engage in innovation activities; (b) In terms of salary increase, our university gives priority to both faculty and administrative staff who actively engage in innovation activities; (c) Management recognizes both faculty and administrative staff for their knowledge-sharing initiatives; (d) Management rewards both faculty and administrative staff for their knowledge-sharing and creativity initiatives; (e) There is a policy in our university to give support to faculty staff for their knowledge productions and improvements through publications and research output (f) All faculty staff offer new ideas in their area of expertise that can improve programs and curricula.

3.9 Independent variables

An independent variable, also known as an exogenous variable, predicts or determines an outcome in any study (Hair et al., 2017). The independent variables which were deemed the key success factors to the outcome variable were *absorptive knowledge*

search (AKS), *absorptive knowledge accumulation* (AKA) and *absorptive process transformation (APT)*.

For Absorptive knowledge search, modified statements based on the Potential Absorptive Capacity and Realized Absorptive Capacity scales by Jansen et al., (2005), were developed. The respondents were instructed to evaluate the survey items on a 5-point Likert-type scale ranging from the lowest score of 1 (strongly disagree) to the highest score of 5 (strongly agree). The actual scales were: 1-Strongly disagree, 2- Disagree, 3- Neutral, 4- Agree, 5- Strongly Agree. Statements which were measured included the following: (a) Our university has frequent interactions with sister universities and academic partners to acquire new knowledge; (b) Our university periodically organizes special meetings with our clients and stakeholders to acquire new ideas and knowledge: (c) The search for relevant information concerning our tertiary educational industry is done on a regular basis in our university: (d) Management always ensures that new opportunities to serve our clients are quickly adopted: (e) Management motivates faculty and administrative staff to quickly analyse and interpret changing market trends.

For absorptive knowledge accumulation, modified statements based on the Potential Absorptive Capacity and Realized Absorptive Capacity scales by Jansen et al., (2005), were developed. The respondents were instructed to evaluate the survey items on a 5-point Likert-type scale ranging from the lowest score of 1 (strongly disagree) to the highest score of 5 (strongly agree). The actual scales were: 1-Strongly disagree, 2- Disagree, 3- Neutral, 4- Agree, 5- Strongly Agree. Statements which were measured included the following: (a) In our university, faculties and departments record and store newly acquired knowledge for future reference: (b) In our university, ideas and concepts are transmitted across departments and faculties for usage and storage; (c) Our university quickly recognizes the usefulness of new external knowledge to the existing stock of prior knowledge; (d) Management ensures periodical inter-departmental and inter-faculty meetings to exchange ideas, developments, problems, practical experiences and achievements.

Absorptive Process Transformation was also developed following the approach by Liao, Welsch and Stoica, (2003), Matusik and Heeley, (2005) and Zhao and Anand, (2009), which deal with the structures, routines and infrastructure for assimilating new

knowledge in the organisation. . The respondents were instructed to evaluate the survey items on a 5-point Likert-type scale ranging from the lowest score of 1 (strongly disagree) to the highest score of 5 (strongly agree). The actual scales were: 1-Strongly disagree, 2-Disagree, 3- Neutral, 4- Agree, 5- Strongly Agree. Modified statements which were measured included the following: (a) Management ensures that new external knowledge is disseminated across departments at all levels in the university; (b) We have transfer structures and routines that enable us to apply new knowledge throughout the various faculties and departments; (c) We have adopted an excellent information infrastructure for both faculty and administrative staff to share and assimilate information and knowledge.

3.10 Mediator variable

The concept of mediation recognizes that an active organism intervenes between a stimulus and a response. The idea is that "the effects of the stimulus on response behaviour is mediated by a transformation process which is internal to the organism" (Baron & Kenny, 1986, pp 1176). Mediation, thus, explains a sequence of relationships in which an independent variable affects an intervening variable (mediator), which in turn affects a dependent variable (Baron & Kenny, 1986; Zhao et al., 2010; Nitzl et al., 2016). A mediator variable plays the role of revealing the true relationship between the independent and dependent variables (Hair et al., 2017). As such, the most important intervening "transformation process" that can facilitate easy transfer and sharing of knowledge among academics is how the differing functions are able to collaborate and coordinate effectively by communicating in an atmosphere of transparency and collaborative teamwork. This intervening "transformation process" is an integration mechanism known as "inter-functional coordination".

For "inter-functional coordination" the respondents were instructed to evaluate the survey items on a 5-point Likert-type scale ranging from the lowest score of 1 (strongly disagree) to the highest score of 5 (strongly agree). The actual scales were: 1-Strongly disagree, 2-Disagree, 3- Neutral, 4- Agree, 5- Strongly Agree. Modified statements, following the approach by Narver and Slater, (1990); Zahra and Nielson (2002), and Atuahene-Gima, (2005) were developed. Statements which were measured included the following: (a) The activities of faculties and departments are tightly coordinated through inter-faculty

and inter-departmental meetings to ensure better use of our industry knowledge; (b) Functions of Quality Assurance, faculties, departments and administration are tightly integrated in cross-functional teams in our curriculum development processes; (c) In this university different faculties and departments regularly share information about our clients, technologies and competitors; (d) There is a high level of cooperation and coordination among functional departments in setting the goals and priorities for the university to ensure effective response to student conditions; (e) Top management promotes communication and cooperation among public relations, faculties/departments and finance directorate in information acquisition and use; (f) Management involves faculty and administrative staff of the university in major strategic decisions.

Knowledge Acquisition is an endogenous variable that had a two-fold relationship as an independent as well as dependent variable (Hair et al., 2017). As an independent variable it predicted innovation generation, and as a dependent variable, it was also predicted by absorptive knowledge search (AKS), absorptive knowledge accumulation (AKA) and absorptive process transformation (APT). For knowledge acquisition the respondents were instructed to evaluate the survey items on a 5-point Likert-type scale ranging from the lowest score of 1 (strongly disagree) to the highest score of 5 (strongly agree). The actual scales were: 1-Strongly disagree, 2- Disagree, 3- Neutral, 4- Agree, 5- Strongly Agree. Modified statements, following the approach of Jansen et al., (2005) were developed. Statements which were measured included the following: which (a) Management organizes meetings with our students to acquire information on new trends and demands; (b) We frequently visit our industry partners to acquire new ideas on curricula/programmes; (c) We gather industry information through formal meetings with our stakeholders.; We gather industry information through informal meetings with our stakeholders; (e) We hardly visit our industry regulators for new information and policies; (f) Our faculty staff often interact with students to gather relevant feedback.

3.11 Controls

The study controlled for tenure, size, staff level and gender of staff in universities that are similar in these variables. Some researchers are of the view that older organizations have a more advanced absorptive capacity than younger ones since they tend to accumulate more experience with more formalized routines (Cohen & Levinthal, 1990; Zahra &

George, 2000). Older institutions are more likely to build a high status or reputation with age in the industry, and this enables them to have more access to diverse sources of knowledge, identify and acquire valuable external knowledge (Nooteboom, 2000; Tsai, 2001). Older institutions may also have established advanced human resource management practices with superior human capital for scanning the useful external knowledge (Minbaeva et al., 2014). However, tenure or experience may inhibit or slow an institution's learning abilities. Conversely, younger institutions are more flexible and less formalized and are not affected by learning inertia, allowing them to respond more quickly to useful and valuable external knowledge (Flatten et al., 2011).

"Firm size is a key source of heterogeneity of absorptive capacity" (Volberda et al., 2010, pp 941). There have been mixed findings on how firm size impacts absorptive capacity. The Schumpeterian theory believes that larger firms are able to promote more innovation activities than smaller firms (Schumpeter, 1934). Even though some researchers support this view, others find no link between firm size and absorptive capacity (Cohen, Levin & Mowry, 1987). It is believed that the size of a university may give more leverage or otherwise in competitive advantage. Large universities may have larger cash flows for funding innovation activities through R&D investments. They therefore have a wider reach to a variety of knowledge and human capital skills. Again, as firm size increases, the firm can easily allocate more resources to explore different ideas. Further, as the number of staff increases, different functional roles are likely to have different expertise. Staff with diverse knowledge backgrounds can share their knowledge with other members, and such knowledge recombination will generate more novel ideas. Gender, and level of faculty staff may generate differing perspectives to issues on knowledge acquisition, sharing and transfer in general. Controlling these variables will help to avoid comparability issues.

3.12 Summary

This study used qualitative and quantitative research methods as complimentary to explore and investigate different claims to knowledge about absorptive capacity and both methods are used to address a specific research question. While the qualitative method makes it possible for the researcher to explore and understand the complexity of a phenomenon, the quantitative method gives an objective measure of reality. Both allow

the researcher to use inductive and deductive analyses in one single study to answer questions from the perspective of the participant as well as the relationship between variables which are measurable.

CHAPTER FOUR

4.0 Analysis and discussion of results

Overview

This chapter presents the analysis and results of both the qualitative and quantitative data collection, given the mixed method approach used. It is therefore in two parts. The first section, labelled as ***STUDY ONE***, presents the results of the qualitative data analysed from the semi-structured interviews conducted using telephone and face-to-face interviews conducted on the field involving ten (10) heads of departments (HODs) of Business Faculties in selected higher education institutions. It examines the contextual meaning of Absorptive Capacity in the higher education institution domain, in order to ascertain its dimensions or components in this particular context, in response to the first research question. Using content analysis, transcribed interview responses are analysed using the computer-assisted qualitative data analysis software (CAQDAS), NVivo, for the coding of the textual data. The researcher brings out themes, patterns and trends in the qualitative analysis.

The second section, labelled as ***STUDY TWO***, presents the results of quantitative data analysed from questionnaires administered on the field. It examines how the components of Absorptive capacity drive innovation generation through knowledge acquisition, in response to the second and third research questions. It also assesses the mediating role of an organisational integrative mechanism, inter-functional coordination for success, in response to the fourth research question. The section presents the tests conducted on the study's research framework using partial least squares structural equation modelling (PLS-SEM) to find answers to the study hypotheses. This includes a Confirmatory Factor Analysis (CFA) performed to test the measurement model and determine model fit, as well as the reliability and validity tests that were performed. Additionally, the outcome of the Path analysis performed to test the structural model along with the hypotheses formulated for the study are discussed in the ensuing sections.

4.1 Study one- Qualitative data analysis and results

This section focuses on the qualitative aspect of this study which is from the semi-structured phone and face-to-face interviews with Heads of departments of selected higher education institutions (HEI) in the Greater Accra region of Ghana. The aim of the

interviews was to explore and derive an in-depth understanding of the contextual meaning of Absorptive Capacity within the higher education institutions (HEI) domain. Thus the primary goal of the data collected during the phone face-to-face interviews is to answer the first research question: "*What constitutes Absorptive Capacity in higher education institutions?"* Other aims of the phone interview are to further probe into what seems to be the dimensions or phases of Absorptive Capacity as far as HEIs are concerned and assess how Absorptive Capacity in the HEI context impacts on innovation generation.

4.2 Profile of interview participants

Ten (10) Heads of departments (HODs) of Business Schools in the selected public and private universities in greater Accra region of Ghana were the sampled participants for the interviews using the purposive sampling technique which was the deliberate choice by the researcher of a particular informant because he has certain unique qualities and experiences. Heads of departments (HODs) have certain unique administrative qualities and experiences such as strategic planning, organizational skills and time management, in addition to their faculty experience of knowledge production through teaching, learning and research. The researcher decided therefore that what needed to be known was embedded in these HODs who had the ability to provide an in-depth information based on their experience or knowledge (Bernard 2002, Lewis & Sheppard 2006). Bryman (2012) and Zikmund et al. (2012) posit that depth rather than representativeness of sample should be the focus on qualitative sampling, and for this reason, the purposive sampling technique was used for this study. The aim was to get in-depth information regarding their deep understanding of what actually constitutes Absorptive Capacity in the higher education institution domain.

Out of the ten (10) sampled HODs eight (8) of them were interviewed. Out of the eight who participated in the interviews, three (3) of them agreed to have the researcher interview them via a telephone engagement and have it recorded under strict terms of anonymity. The other five (5) participants, however, were strongly against being recorded despite the strict terms of anonymity. They would rather have a face-to-face interview, with the researcher taking notes of their responses. In both cases the researcher was required to resend the responses back to the participants to review and ascertain whether the responses they gave had been well captured or not, in particular, whether there were

any omissions or commissions. They were also at liberty to make changes which they deemed fit to the transcribed responses. Again, out of the eight HODs who participated in the interviews six (6) of them were males whilst two (2) of them were females. Further, out of the eight HODs who participated in the interviews two (2) of them were from public universities whilst six (6) of them were from private universities. Finally, out of the eight HODs who participated in the interviews one (1) of them was slightly experienced, two (2) of them were moderately experienced, whilst five (5) of them were highly experienced. Table 7 gives an overview of the participants' profile.

Table 7: Profile of Telephone and face-to-face Interview Participants

CATEGORY	NUMBER OF PARTICIPANTS	PERCENT (%)
GENDER		
Male	6	75
Female	2	25
Total		100
INTERVIEW TYPE		
Telephone	3	37.5 %
Face-to-face	5	62.5 %
Total		100 %
UNIVERSITY TYPE		
Public	2	25 %
Private	6	75 %
Total		100 %
YEARS OF EXPERIENCE of HODs		
Slightly experienced	1	12.5 %
Moderately experienced	2	25 %
Highly experienced	5	62.5 %
Total		100 %

Source: Field Data (2020)

4.3 Methodology for Data Analysis

In view of the fact that the data collected during the telephone and face-to-face interview (which is 99% textual data) is significantly qualitative, it is important that a qualitative data analysis technique and process is used to provide in-depth explanation of the phenomenon being studied (Carcary, 2011). General inductive approach is a qualitative research approach that has emerged as a growing trend in the last one and a half decades

in social science and health research (Thomas, 2006). Also known as Generic inductive approach, it is very flexible methodologically, as it is not guided by any of the established qualitative methodologies, like phenomenology, grounded theory, ethnography, case study or narrative research (Creswell, 2009). However steps were taken to make this approach follow a sound logic, based on a strong foundation of four (4) pillars. These four pillars are: (a) the researcher's motivation to undertake a study, (b) a clear description of the methods, (c) Laid down strategies for establishing rigour in the study, and (d) the role of the researcher in analysing the data (Caelli, Ray & Mill, 2003; Hood, 2007; Thomas, 2006). Thus, many studies have opted for this approach by not labelling their research methodology under any of the specific traditions of qualitative research which sometimes do not fit their study (Thomas, 2006).

The generic inductive approach has some similarities with the Grounded Theory approach as they both aim to provide a conceptual approach to action and change in real life situations (Glaser, 1992). However, the generic inductive approach does not aim at building theories but limits its findings to the presentation and description of the most relevant themes. Further, data collection ends on the basis of data saturation instead of theoretical saturation, as required by the Grounded Theory. This means that data collection ends when no new insight or information is gained from collecting more data.

In sum, the generic inductive approach allows the findings to emerge from the frequency and relevance of themes from the data without it being restrained by any tradition-specified qualitative approach (Thomas, 2006) making it more flexible in theoretical support than other qualitative approaches. Its main aim is therefore to build up clear links between the research objectives and the research findings. In addition it ensures both the transparency and justification of the research design.

4.3.1 Data analysis technique

Prior to the coding of the eight (8) interview transcripts for this study, a project journal was created in order to keep track of all activities and decisions made for the development of categories from coding into a framework that sums up the raw data to convey key themes and processes. It was also important to adopt the five (5) step strategy of the generic inductive analysis as suggested by Thomas (2006). These five steps are (1) initial

reading of textual data; (2) identifying the specific parts of the text which are related to the objectives; (3) creating categories by labelling the parts of the textual data; (4) reducing overlaps and redundancies among the categories; and (5) creating a model by bringing together the most important categories. These five steps to develop relevant themes from the eight (8) interview transcripts were keenly followed.

The process of data collection and data analysis were done simultaneously and this study employed the constant comparison process up until a point when the data were returning no new information or insights, and were therefore saturated. This study further adopted thematic content analysis which is frequently used as a qualitative research technique because it is very effective in reducing the size of textual data to make the work of social science researchers' simple (Krippendorff, 1980; Mayring, 2004). It is also a powerful technique for assessing trends and patterns in interview transcripts (Stemler, 2001). The interview transcripts were coded after which the coded textual data was synthesized using thematic content analysis technique (Braun & Clarke, 2006; Joffe & Yardley, 2004). Decisions made during the content analysis for the interview transcripts relate to which data to analyse, population, context, boundaries for the analysis, how they should be defined, and the outcome of inferences to be made (Kohlbacher, 2006). Such an analysis addresses word frequencies, the definition of the data and context relative to the data, because these elements reflect important concerns in human communications (Krippendorff, 2004). The transcribed interview responses were analysed using the computer-assisted qualitative data analysis software, NVivo, for the coding of the textual data by nodes. Meanwhile, the researcher wrote different types of analytical memos in order to note the interpretations of the data. By doing so the study was able to bring out themes, patterns and trends in the qualitative analysis. From a methodological perspective, this contributes to the literature on Absorptive Capacity in higher education institutions and helps to expose the boundaries and insights into the components or dimensions of ACAP in this particular context, since past research focused predominantly on Absorptive Capacity in business organizations.

4.3.2 Data analysis process

Coding involves categorising and labelling the collected data to ease analysis and eventually answer the research question (Grbich, 2012). Coding data forms a very

important aspect of analysis during the execution of qualitative research (Basit, 2003). Coding is a widely used technique because it helps to make sense of the raw data (Bazeley & Jackson, 2013). The excerpts of responses gathered from the interview of eight (8) heads of departments (HODs) for this study were coded using inductive techniques. The process of inductive coding began with cleaning the raw data files into a common format. This was followed by multiple readings and the interpretations of the text data from the interviews, in order for the researcher to become familiar with the contents and also gain understanding of the themes, while considering all the multiple meanings that are in them (Thomas, 2006). The next was to develop or create categories from the text data into a framework. After the creation of categories, the text data from the responses of the eight interviewees was coded into their respective categories. This was done by defining the coding units and attaching them to relevant phrases, sentences and paragraphs from the interview texts (Zhang & Wildemuth, 2009). Care was taken to identify and define the themes to create categories, eliminate redundant texts and reduce overlapping texts (Thomas, 2006).

The final step was revising and refining the category system into a model of core themes and sub themes of view-points and new insights (see figure 3). It was advantageous for the researcher to personally do this coding in a bid to gain a high sense of familiarity and interaction with the data through the taking of initial notes, listening and typing to ensure accuracy before the analysis (Braun & Clarke, 2006). To prevent coding of data into wrong categories, the coding rules for each category were recorded for reference purposes into the project journal. All identified variables were assessed for commonalities (Thomas & Harden, 2008) related to the dimensions and phases of the absorptive capacity process. This helped to identify and understand the complex phases. Consequently, the inductive content analysis technique enabled an effective identification of the clear distinction between the phases.

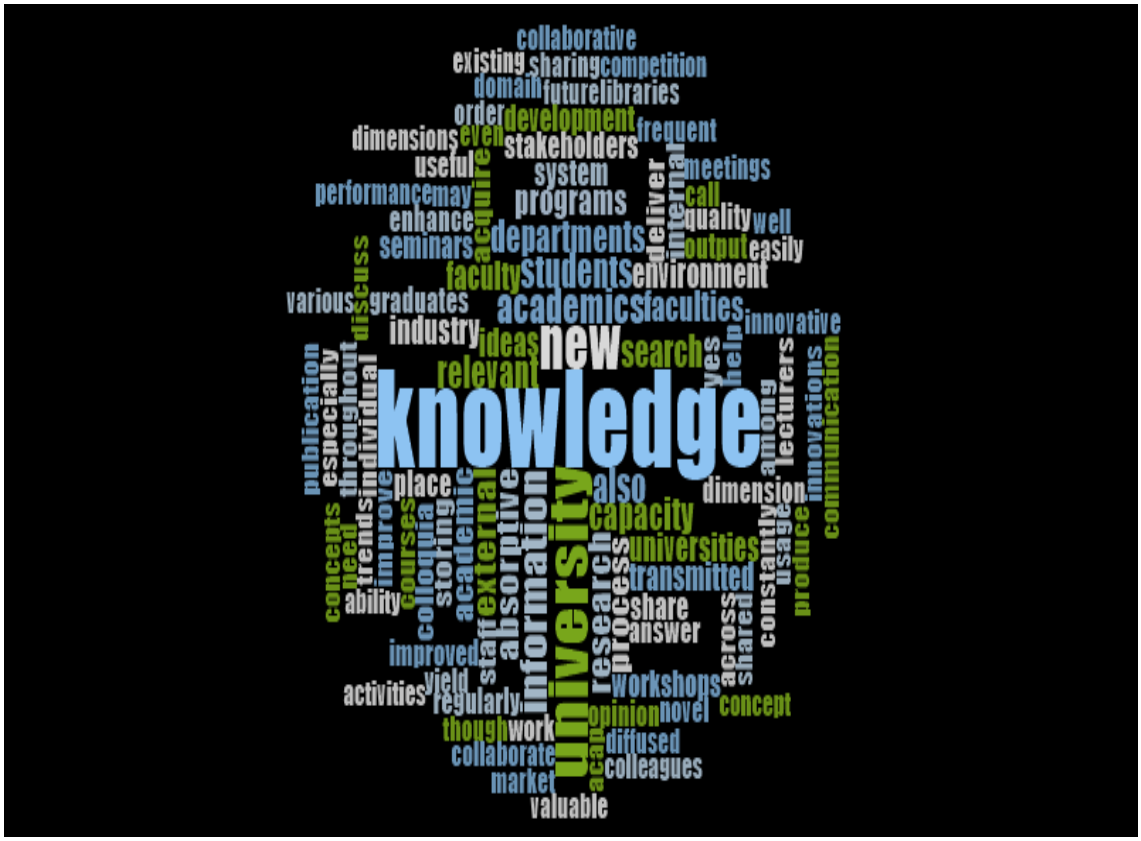

Figure 3: Word/Frequency Cloud and model

4.4 Discussion of themes and results

In relation to the phenomenon investigated: "What constitutes Absorptive Capacity in Higher Education Institutions (HEIs)?" The following themes mostly recurred in the interviews conducted with the eight (8) Heads of Departments (HODs) of selected Higher Education Institutions in Accra (see word frequency/cloud and model in figure 3)

> [*knowledge search, searching, scanning, search efforts, investments, absorptive search, prior knowledge, knowledge stock, information, ideas, valuable knowledge, useful knowledge, faculty, specialization, research & development, interdisciplinary, knowledge sharing, knowledge dissemination, knowledge acquisition, knowledge assimilation, implementation, collaborations, knowledge, skills, social, technology, create ideas, develop new courses, new programs, improved courses, innovative services, virtual learning, patents, innovation generation, development, enhanced programs, quality graduates, job market]*

In conducting the thematic content analysis, after data saturation was achieved, at which point no new codes were being returned from the data, three (3) core themes and thirty-two (32) sub-themes were identified and extracted. The three major themes relate to the main dimensions of absorptive capacity as far as the HEI context is concerned. These dimensions are (1) Knowledge Search; (2) Knowledge Accumulation and (3) Process Transformation. The next stage after identification of themes was to develop the general themes using colour coding (Thomas & Harden, 2008). This helped to distinctively differentiate the themes emerging within the data and also avoid coding interview extracts into the wrong nodes (Basit, 2003). The researcher subsequently reduced the overlaps and redundancies amongst these themes. Sub-themes were then developed (see figure 4) for coding the information. Six (6) sub-themes were identified as emerging from the core theme, *Knowledge search*. Nine (9) sub-themes were identified as emerging from the core theme, *Knowledge Accumulation*. The third core theme, *Process transformation* had the highest number of seventeen (17) identified sub-themes emerging. All the themes and sub-themes were reviewed to check for relationships between themes and coded extracts. The themes were then labelled to generate clear definitions and names for the final analysis in relation to the research question "What constitutes Absorptive Capacity in the higher education institution?" and extant literature (Braun & Clarke, 2006; Joffe & Yardley, 2004). Once selected for inclusion based on the existence of a relationship with coded extracts, the themes were reviewed and the variables of interest were also identified. The following two (2) interview excerpts summarise the contextual meaning of absorptive capacity in the higher education institution as given by two Heads of departments (HODs):

> […] *Absorptive capacity in a university for me refers to our proactive efforts at searching for valuable external information, acquiring them, and then combining such knowledge with our existing knowledge to improve outcomes of our academic operations, such as programs, courses, program combination and research output. The process of absorptive capacity can contribute to the university's innovation performance by operating as a strategic tool which will process useful knowledge from the external environment into innovative products and services for our cherished clients and stakeholders*. (Participant 8)

> […] *in the context of the higher education industry, I think that absorptive capacity is the ability of the institution to search and identify information that is relevant for improving or developing their products and services, acquire that information and use it for their development. For higher education institutions, the main aim is to train people, award certificates and do research. So whatever information that the institution will need for its growth and development will centre on these three main goals: the ability to get students trained for them to be awarded certificates and do relevant research to impact society.* (Participant 5)

Knowledge Search

Knowledge search represents the first phase or dimension of absorptive capacity in the higher education institution. Information is the bane of development as today's economy is largely based on new information. New knowledge is therefore essential for innovation. In this regard, university workers, in particular, the R&D unit and public relations staff must always be quick and proactive to scan the external environment to identify new ideas, trends and fresh opportunities to be acquired and integrated with already existing capabilities of the institution in order to succeed in the generation of new products and services. They must also act as change agents as they identify and acquire new technologies and new product applications and combinations. Such new information can be gathered from sister universities and other stakeholders such as governing and accrediting authorities, clients, suppliers and even competitors.

In line with the first hypothesis of this study's conceptual framework, managers must show commitment to investing efforts in the search for valuable new knowledge if they want their educational facilities to remain relevant in the face of stiff competition in this fast paced knowledge economy. As leaders, they must be able to stimulate and encourage creativity in their followers (Judge & Piccolo, 2004). Further, managers must be able to challenge assumptions and take risks with both faculty and administrative staff and must not be afraid to solicit ideas from them. This will encourage staff to put on their thinking caps when problems arise. By so doing managers will be able to develop trust among staff by giving them decision making opportunities and autonomy in performing their respective job roles in order to promote their ability to constantly search for new ideas

and creative ways to acquire knowledge for innovation. Individual academic staff must also be proactive and committed to the agenda for continuous change as they collaborate with their colleagues both internally and externally to enhance their intellectual capacity for knowledge acquisition in order to improve their teaching methods and research output.

Knowledge Accumulation

Knowledge accumulation represents the second phase or dimension of absorptive capacity in the higher education institution. It refers to the stock of knowledge that has been stored already by the institution. In line with the second hypothesis of this study's framework, the stock of knowledge, referred to as 'prior knowledge' helps the institution to understand the usefulness of external new knowledge and acquire it. Prior knowledge is recombined with the newly gained knowledge and transformed together for the purposes of solving problems and creating new curricula and programs. As has been established by Cohen and Levinthal (1990) and Zahra and George (2002) the absorptive capacity of an organization is dependent on its prior knowledge which helps to better understand new knowledge whilst improving the stock of knowledge (Zhao & Anand, 2009). This means that the absorptive knowledge accumulation of a higher education institution must be built on foundations that are past oriented and path dependent, and require that new external acquired knowledge is related in order to facilitate easy comprehension and a smooth transformation process. Knowledge stocks accumulated by the higher education institution could be in the form of patents and intellectual properties (Srivastava et al., 2015), patent citations (Kim & Inkpen, 2005), scientific publications (Kang, 2012) and prior product innovations (Estrada et al., 2010).

Prior knowledge is very important as learning is associative (Gagne, 1962), because it helps to link the new knowledge with the existing one. Gagne's (1962) theory of hierarchical learning argued that an individual who has existing knowledge can easily acquire related new knowledge. Understanding newly acquired ideas facilitates easy transformation and exploitation of such new knowledge with the prior existing knowledge for the development and enhancement of products and services whilst augmenting the stock of knowledge. All respondents unanimously agreed that their universities have a system or mechanism in place for internal usage storage of new

acquired knowledge for future reference. The following excerpts are from two respondents on the question: *"Does your university have a system or mechanism in place for storing new knowledge for future reference?"*

> […] *Sure we do. Apart from our general university library, we also have faculty and departmental libraries. Our professors and other specialized academics may have their own way of storing new knowledge which can be shared for future use or to deliver to their students, colleagues and industry practitioners.* (Participant 4)

> […] *Yes we do have university libraries and the various faculties and departments also have repositories for storing their unique knowledge. Individual academics also have their own database for storing knowledge which they deliver to their students.* (Participant 1)

Further, respondents unanimously agreed that ideas and concepts are easily transmitted across faculties and departments for usage and storage in their universities. Effective communication is the key to knowledge accumulation. Knowledge can also be transferred through collaborative training and development, coaching and mentoring across faculties and departments in the academic environment to augment the knowledge stock. The following excerpts are from two respondents on the question: *"Are ideas and concepts easily transmitted across faculties and departments for usage and storage?"*

> […] *We organise conferences, seminars, and colloquia across faculties, departments and units in a university, in order to share knowledge. This is because ideas or information from one faculty or department can provide input to another, which can yield innovative outcomes so long as effective collaborative exchanges are made between these faculties and departments through training and development.* (Participant 7)

> […] *We have a system in place whereby training programs are organised for information sharing across all units of the university. We also have frequent conferences, workshops and colloquia to share information at the faculty level.*

Any other information is also transmitted through staff durbars and seminars. (Participant 6)

Process Transformation

Process transformation refers to the efforts made by the institution to put in place its own internal procedures and processes and structures to enable the sharing, dissemination and diffusion of newly acquired external knowledge internally at all levels, faculties or departments of the higher education institution. Equally important is the implementation of improved Information Technology (IT) systems for networking to help create opportunities for knowledge management in the academic environment. In line with the third hypothesis of this study's framework, managers of higher education institutions therefore need to invest in advanced technological infrastructure towards the acquisition of knowledge and this will be highly beneficial in achieving success at improving and renewing curricula and program content and relevance. They also need to create community-based learning and inter-disciplinary research and teaching and also implement structures and networks to reward people for supporting collaborations (Kezar 2005). Absorptive process transformation requires more interactive institutional practices like socialization and inter-functional collaboration to share knowledge holistically. Consequently, relevant knowledge will be distributed or transmitted to every faculty, department or unit within the tertiary institution (Tomaskova, 2018; Shina, 2020). Absorptive process transformation also facilitates the storing and retrieval of knowledge holistically for the institution so that old and new knowledge can be processed into new courses, new course combinations and contents.

In today's increasingly information-dependent world, knowledge has become a powerful resource. It is therefore necessary for managers to put in place technologically advanced procedures and processes for the diffusion of newly acquired external knowledge internally at all levels, faculties or departments of the higher education institution. This will help the various faculties and departments of the university to adopt new and improved trends in the higher education industry for example enhanced academic instruction, virtual learning, quality research output, quality programs and courses to produce better graduates who are suitable for this competitive global knowledge economy and job market.

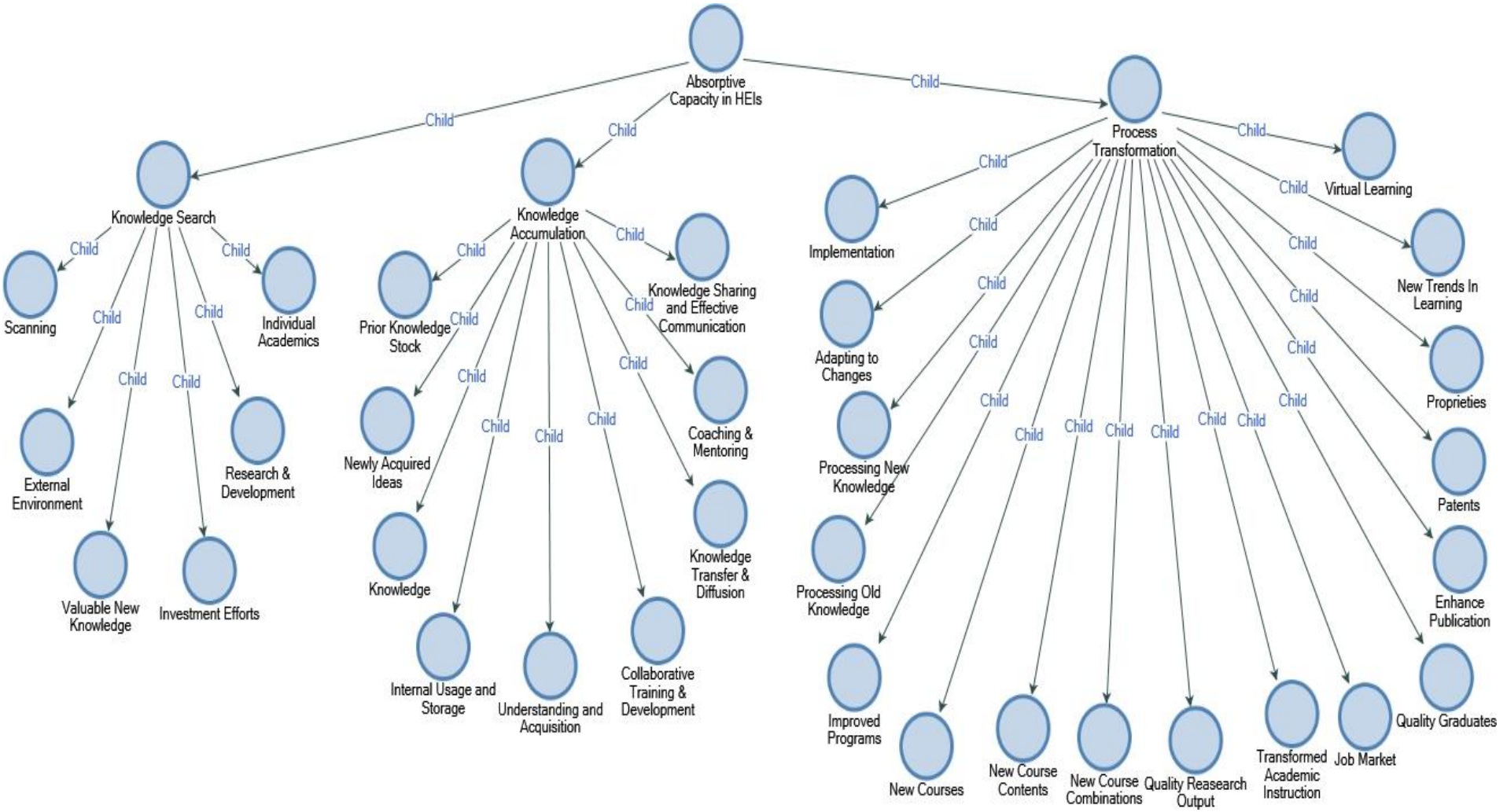

Figure 4: Project Map of 3 key themes of ACAP in HEIs and 32 sub-themes
Source: Field Data (2020)

Figure 4 shows the thematic map of the three major themes from the content analysis for this Chapter. Table 8 presents excerpts of the responses given by participants in relation to the emerging dimensions and phases of the absorptive capacity process in HEIs. The next section in this chapter presents the findings made after the telephone and face-to-face interview transcripts were subjected to content analysis.

Table 8: Excerpts of interview responses from HODs

QUESTION	PARTICIPANT	EXCERPTS OF RESPONSES
Question 8: What in your opinion would be the components, dimensions or phases of the Absorptive capacity process as far the HEI is concerned?	HOD 1	*[…] "**1. Knowledge Search**. The university is able to search for relevant information and knowledge by looking beyond its scope to identify knowledge which is deemed valuable and useful to them."* ***"2. Knowledge Accumulation.** Steps are taken by the university to acquire this knowledge to boost its prior knowledge stock for future usage by both faculty and administration within the internal system of the university"* ***"3. Knowledge Productions**. Managing the knowledge by putting in place structures to suit its internal implementation to bring about improved changes in the delivery of taught courses through improved IT applications for enhanced programs".*
	HOD 2	*[…] "The first action is to search for external new knowledge and acquire it. I would call this dimension **"External Knowledge Search".** Secondly this knowledge is diffused to members of staff through communication and training. I would call this dimension **"Knowledge Acquisition".** Finally, this new knowledge is added to existing knowledge to create and improve courses, programs and research work in order to constantly attract more students. I would call this dimension **"Knowledge Creation or Inventions".***
	HOD 3	*[…] "In my opinion there are basically three dimensions or phases of absorptive capacity which are:* *1. **Knowledge Search.** This refers to the efforts of the university in scanning the external environment in search of valuable new knowledge.* *2. **Knowledge Acquisition and Accumulation**. This refers to acquiring the knowledge and disseminating it throughout the university community for all to access and absorb.* *3. **Product Enhancement**. This refers to the innovation phase of adding the new knowledge to the existing knowledge to implement new and improved courses and programs in order to constantly produce rich and knowledgeable graduates and attract more students in the face of stiff competition among many universities within the industry."*
	HOD 4	*[…] "1. We search for new ideas, new technologies, new information and knowledge by scanning the external environment critically through dedicated efforts. This dimension would be called **"Knowledge Search phase".*** *2. We try to acquire the useful, valuable and relevant ones to add to our prior stock and disseminate them throughout the university. I would call this dimension **"the Acquisition phase".*** *3. We try to put in place technological systems and structures that will facilitate the implementation of new and improved courses and programs for our students so that we can successfully attract more students as the competition is now very tough. There are so many universities now so we try to maintain high standards. I would call this dimension **"The Process and Innovation phase".*** *4. Management encourages a deep sense of collaboration and communication during the process of implementation of enhanced products and services for our stakeholders. I would call this dimension the **"Management Support phase"."***
	HOD 5	*[…] "The dimensions of Absorptive capacity in my opinion are:* *1. **Knowledge Search**. Ability of the university to search for relevant information and knowledge by looking around to identify knowledge which is needed or deemed valuable.*

		*2. **Acquisition**. Steps for the university to acquire this knowledge into the internal system of the university by processing of the external knowledge for internal usage.* ***3. Process Innovations**. Managing the new and existing knowledge to implement innovative products and changing technological trends."*
	HOD 6	*[…]" The initial step is the ability of the university to search for relevant information and knowledge by looking around to identify knowledge which is relevant or deemed valuable. It must be noted that this knowledge has to be consistent or compatible with the old knowledge that we already have. If the new knowledge is not compatible with the existing knowledge that we have it will be difficult for us to understand so there must be a relationship between old and new knowledge before we acquire it. Finally we must try to manage the new and existing knowledge to implement innovative products and changing trends in our academic activities and operations. The three keys steps are therefore to search for new knowledge and acquire it, combine old and new knowledge, use them to innovate new programs, curricula in order to produce knowledgeable graduates for the competitive job market."*
	HOD 7	*[…] "I would propose a three step dimension for absorptive Capacity which are:* ***1. Absorptive Knowledge Search**. Searching for relevant information and knowledge by looking around our external environment to identify knowledge which is relevant or valuable for our operations.* ***2. Absorptive Knowledge Acquisition and Accumulation**. Attempts made by the university to acquire this knowledge and internalise it to add up to our existing stock of knowledge for usage and storage for future processes.* ***3. Absorptive Creation Process**. Combining the new and old knowledge to implement creative and novel programs that will attract more students for us to remain competitive."*
	HOD8	*[…] "To the best of my knowledge, there are four phases of the absorptive capacity process:* ***1. Knowledge Search.** This is the stage where the university makes efforts to scan the external environment in search of valuable new knowledge which is relevant to our operations.* ***2. Knowledge Accumulation**. At this stage the recognised knowledge is acquired and added the university's existing knowledge for storage and usage.* ***3. Knowledge assimilation**. This knowledge is diffused throughout the university community using interactive technological systems for all to access and absorb.* ***4. Innovation Process**. At this phase the new knowledge is added to the existing knowledge to implement new and improved courses and programs for our students, and subsequently attract more students every year to sustain our competitive edge among many universities within our industry."*

Source: Field Data (2020)

4.5 Findings and Implications

The study sought to find out if Absorptive Capacity has a different meaning, functions, components or dimensions in the HEI context and also to provide an in-depth understanding of the effects of Absorptive Capacity in the HEI domain for generating innovations. The concepts and themes that were derived from the raw data of the eight (8) interview participants (HODs) showed an amazing and surprisingly consistent pattern of the interpretation of insights, ideas, components or dimensions of absorptive capacity that emphasized the dominant logic and consensus of elements in the contextual meaning of ACAP in the HEI domain.

Based on the first and second order codes, the emergent dominant concepts and significant themes reveal the contextual comprehension of ACAP in academia as not too far removed from that of industry, in spite of the cultural and institutional differences between the two

domains. The compelling difference however is that whilst ACAP in industry benefits only the organization as a whole in terms of innovation performance, profitability and competitive advantage, the benefits of ACAP in academia are far more reaching as it benefits five categories of stakeholders as follows:

1. **The holistic university** - HEIs are in the business of creating knowledge through research. They also share and transfer knowledge through the act of teaching and learning, consultancies and training programs (Fullwood *et al.*, 2013; Fullwood & Rowley, 2017; Ramjeavon & Rowley, 2020; Tian et al., 2009). The quality of academics in a given institution reflects the richness of that institution in terms of its overall research/publication level or standards. Although academic knowledge is often proprietary because of the credit that may be gained by the individual academic, every university would like to boast of the highly qualified, skilled or specialized faculty staff it possesses to boost its image.
2. **Individual academics** – HEIs place a high premium on evidence of individual scholarly achievement in research publication and scholarship (Rowley, 2000). It is for this reason that academics place a high value on their individual scholarly achievement rather than on the overall goal achievement of the institution (Dokhtesmati, & Bousari, 2013; Seonghee & Boryung, 2008). Most academics focus on their self-preservation instincts and are not willing to share knowledge which they deem so valuable that it cannot be parted with so easily, especially when they have specialized competences (Carrol et al., 2003; Fullwood, et al., 2013; Goh & Sandhu, 2013; Ridzuan et al., 2008). HEIs therefore need to create incentives for recognizing the contributions of academics in the creation and sharing of knowledge (Gill, 2009; Ramjeavon & Rowley, 2020).
3. **Students** - The knowledge of academics is seen as a vital resource and an asset for HEIs because they create knowledge by doing research and disseminate knowledge to students by teaching them and transforming them into quality graduates for the job market (Fullwood & Rowley, 2017).
4. **Interdisciplinary Schools or Faculties** - Acquiring relevant knowledge helps the various faculties and departments of the university to improve their internal operations by adapting new and improved trends in the higher education industry, for example, improved curricula and course combinations, enhanced academic instruction, virtual learning, quality research output and better graduates who are suitable for this competitive global knowledge economy and job market.

5. **Industry** - Universities can also strengthen the business industry by producing highly skilled graduates, stronger business networks and excellent research output that can be practically applied in the business and commercial industry for enhanced innovative performance, competitive edge and profitability (Gassmann & Enkel, 2004; Hughes & Kitson, 2012; Moon, Mariadoss & Johnson, 2019) Universities are also a main source of creative technologies and knowledge that is critical to achieving cutting-edge organisational innovation (Mateos-Garcia & Sapsed, 2011). According to Cohen and Levinthal (1990) the knowledge acquired from universities is unique and different from the knowledge that is acquired from other sources such as customers, suppliers and competitors.

According to the results from both the telephone and face-to-face interviews, Absorptive Capacity in HEIs has three functions or dimensions which is translated into a three phase process of:

1. **Knowledge Search** Stage: - This is done by scanning the external environment in search for valuable new knowledge through investment efforts made by both the research and development (R&D) department and individual academics of the university.

2. **Knowledge Accumulation** Stage: - Augmenting the prior knowledge stock with these newly acquired ideas, knowledge, information for internal usage and storage. These new external additions must be related in a way to the existing knowledge for easy understanding and acquisition by faculty staff through collaborative training and development, coaching and mentoring, knowledge sharing and effective communication.

3. **Process Transformation** Stage: - Implementation stage of adapting to changes in daily operations i.e. processing new and old knowledge for the rolling out of innovative, improved programs, new course contents, new course combinations, transformed academic instruction, leading to the production of quality graduates for the job market, quality research output, patents, proprieties, and enhanced publication of research work and new trends in learning such as virtual learning.

4.6 Summary

By employing the generic inductive approach which is interpretive, subjective and inductive, the researcher was finally able to answer the research question of this study: "What constitutes Absorptive Capacity in the Higher Education Institutions (HEI) domain?" According to the statements made by the HODs' they are likely to through the following three (3) core stages in this Absorptive Capacity process: "Absorptive Knowledge Search", "Absorptive Knowledge stock or Accumulation" and "Absorptive Process Transformation". These findings informed the researcher to modify the adapted core dimensions by Song et al., (2018), from "Absorptive Effort" to "Absorptive Knowledge Search" (AE to AKS), "Absorptive knowledge Base" to "Absorptive knowledge Accumulation" (AKB to AKA), and "Absorptive Process" to "Absorptive Process Transformation" (AP to APT).

Again, the innovations derived from the ACAP process in the HEI domain is more beneficial to society as a whole than the ACAP process in organisational domains. While the prime goal in business organisations is for profitability and competitive advantage, the goal of the HEI is to transfer scholarly knowledge to benefit its faculties, departments and the university as a whole, produce quality graduates for the job market, enhance individual academics' stature (in terms of research output), deliver reliable findings for industry practitioners, and above all, boost the image of the university for overall competitive advantage and sustained relevance in this knowledge economy.

4.7 Study two- Initial quantitative data preparation

Initial data preparation is a crucial stage in data analysis in order to generate quality data that will yield dependable results. The raw data was integrated and entered into the PLS-SEM software, screened for missing variables, transformed and cleaned by correcting errors and removing outliers, and reduced into quality data which was finally made discrete for quantitative evaluations (Zhang et al., 2003). It was time consuming but it was worth it, to yield quality data.

A total of 380 questionnaires were distributed in person faculty staff of twenty (20) universities in the greater Accra region in order to obtain their responses and solicit information on the role of inter-functional coordination and openness in communication in the absorptive capacity process for innovative outcomes. Out of the 380 questionnaires

administered, 282 total responses were received. This represents a 70.5 % total response rate. Further examination of the 282 responses did not reveal the presence of any missing data or errors in any of the questionnaires filled thereby, resulting in an effective response rate. The data set was then subjected to some data screening and cleaning procedures through Exploratory Factor Analysis (EFA) to check for any missing values, outliers, skewness and kurtosis to ascertain its normality and linearity and above all, justification for the appropriateness of statistical approach to be used. Having passed these tests, the data was ascertained to have met the requirements for further quantitative analysis.

4.8 Descriptive statistics

Descriptive statistics are deemed a necessary precondition to other forms of statistical analysis, such as Confirmatory Factor Analysis (CFA), multiple regression, and Structural Equation Modelling (SEM) (Pallant, 2011). These may include an estimation of the mean, mode, standard deviation, standard error mean, range and variance. This section discusses the descriptive statistics of items pertaining to the six main constructs of the study, which are absorptive knowledge search, absorptive knowledge accumulation, absorptive process transformation, inter-functional coordination, knowledge acquisition and innovation performance. There are thirty (30) scale items in all. The results of the descriptive statistics performed for the 282 respondents are presented in Table 9.

Table 9: Descriptive Analysis for all 30 scale items

Scale Item	Item Code	Mean	Std. Dev	SE Mean
1. Absorptive Knowledge Search				
Our university has frequent interactions with sister universities and academic partners to acquire new knowledge.	**AKS1**	3.41	1.145	.068
Our university periodically organizes special meetings with our clients and stakeholders to acquire new ideas and knowledge.	**AKS2**	3.41	1.030	.061
The search for relevant information concerning our tertiary educational industry is done on a regular basis in our university.	**AKS3**	3.51	0.921	.055
Management always ensures that new opportunities to serve our clients are quickly adopted.	**AKS4**	3.48	1.030	.061
Management motivates faculty and administrative staff to quickly analyse and interpret changing market trends.	**AKS5**	3.17	1.162	.069
2. Absorptive Knowledge Accumulation				
In our university, faculties and departments record and store newly acquired knowledge for future reference.	**AKA1**	3.50	1.034	.062
In our university, ideas and concepts are transmitted across departments and faculties for usage and storage.	**AKA2**	3.34	0.980	.058
Our university quickly recognizes the usefulness of new external knowledge to existing stock of prior knowledge.	**AKA3**	3.36	0.979	.058

Management ensures periodical inter-departmental and inter-faculty meetings to exchange ideas, developments, problems, practical experiences and achievements.	**AKA4**	3.44	1.086	.065
3. Absorptive Process Transformation				
Management ensures that new external knowledge is disseminated across departments at all levels in the university.	**APT1**	3.44	1.001	.060
We have transfer structures and routines that enable us to apply new knowledge throughout the various faculties and departments.	**APT2**	3.14	0.998	.059
We have adopted an excellent information infrastructure for both faculty and administrative staff to share and assimilate information and knowledge.	**APT3**	3.35	1.097	.065
4. Inter-functional Coordination				
The activities of faculties and departments are tightly coordinated through inter-faculty and inter-departmental meetings to ensure better use of our industry knowledge.	**IFC1**	3.55	0.991	.059
Functions of Quality Assurance, faculties, departments and administration are tightly integrated in cross-functional teams in our curriculum development processes.	**IFC2**	3.60	0.962	.057
In this university different faculties and departments regularly share information about our clients, technologies and competitors.	**IFC3**	3.23	0.985	.059
There is a high level of cooperation and coordination among functional departments in setting the goals and priorities for the university to ensure effective response to student conditions.	**IFC4**	3.30	1.082	.064
Top management promotes communication and cooperation among public relations unit, faculties/departments and finance directorate in information acquisition and use.	**IFC5**	3.44	0.931	.055
Management involves faculty and administrative staff of the university in major strategic decisions	**IFC6**	3.36	1.183	.070
5. Knowledge Acquisition				
Management organizes meetings with our students to acquire information on new trends and demands.	**KA1**	3.26	1.064	.063
We frequently visit our industry partners to acquire new ideas on curricula/programmes.	**KA2**	3.16	1.045	.062
We gather industry information through formal meetings with our stakeholders.	**KA3**	3.26	1.013	.060
We gather industry information through informal meetings with our stakeholders.	**KA4**	3.29	0.930	.055
We hardly visit our industry regulators for new information and policies.	**KA5**	2.94	1.179	.070
Our faculty staff often interact with students to gather relevant feedback.	**KA6**	3.78	0.913	.054
6. Innovation Generation				
In terms of promotion, our university gives priority to both faculty and administrative staff who actively engage in innovation activities.	**INNG1**	4.27	1.712	.102
In terms of salary increase, our university gives priority to both faculty and administrative staff who actively engage in innovation activities.	**INNG2**	3.96	1.866	.111
Management recognizes both faculty and administrative staff for their knowledge-sharing initiatives.	**INNG3**	4.27	1.738	.104
Management rewards both faculty and administrative staff for their knowledge-sharing initiatives.	**INNG4**	4.18	1.757	.105
There is a policy to give support to faculty staff for their knowledge productions and improvement through publications and research output.	**INNG5**	4.32	1.672	.100
All faculty staff offer new ideas in their area of expertise that can improve programs and curricula.	**INNG6**	4.68	1.547	.092

Source: Field Data (2020)

These statistics in Table 9 measure the respondents' perceptions about the mediating role of inter-functional coordination in the absorptive capacity process for innovative outcomes in the Ghanaian tertiary education sector. The variables portrayed in the table represent the constructs that are captured in the conceptual framework for the study, presented in chapter two (2), the literature review, with their measurement items. It can

be observed from the table, that **INNG 6**, which states that "All faculty and departmental staff offer new ideas in their area of expertise that can benefit the university's overall work", had the highest mean of 4.68, indicating that the respondents believe that new ideas are usually shared by both faculty and departmental staff, especially, those drawn from their area of expertise that can benefit the overall work of the university. On the other hand, the lowest mean of 2.94 was recorded on **KA 5**, which states that 'We hardly visit our industry regulators for new information and policies'. This largely indicates that, contrary to the general perception, faculty staff of universities believe that their institutions actually collaborate with their industry regulators for new information, rules, regulations and policies concerning their higher educational sector in order to keep up with the pace for knowledge acquisition because of the intense competition in the sector.

4.9 Confirmatory factor analysis (CFA) of constructs

A Confirmatory Factor Analysis (CFA) was conducted to confirm the number of measurement items for each construct identified in the research framework, as well as the pattern of the item-factor relationships using their factor loadings (Brown, 2006). At this stage the model was tested to determine if it satisfies the requirements for reliability, convergent and discriminant validity. These are measured using the factor loadings of each of the measurement items for the constructs as well as the Cronbach's Alpha (α), the Composite Reliability (CR) and the Average Variance Extracted (AVE) of each individual construct. Hair *et al.* (2006) recommend values of 0.5 and above. Cronbach's alpha (α) values should be 0.6 and above for each of the constructs, as recommended by Hair *et al.* (2006). Furthermore, the CR and AVE must be ≥ 0.6 and ≥ 0.5, respectively, in order for them to be acceptable (Bagozzi & Yi, 2012).

An investigation of the preliminary results revealed that whilst some measurement items had low factor loadings, others had substantial cross loadings. Some of the measurement items had loadings that fell below the acceptable level of 0.5 and above, as recommended by Hair *et al.* (2006). These offending measurement items during the modelling processes were AKS 4 and AKS 5 (Indicators for measuring Absorptive Knowledge Search); AKA 4 (an indicator for measuring Absorptive Knowledge Accumulation); IFC 1 and IFC 2 (Indicators for measuring Inter-functional coordination); KA 1, KA 5 and KA 6 (Indicators for measuring Knowledge Acquisition). In all there were nine (9) redundant items contributing to the low AVE

values and they were all deleted sequentially until acceptable construct measures were obtained (see Table 10). This enabled the AVE values to reach the required levels of acceptability. This, together with the Cronbach's alpha (α) and CR value, indicates that the model satisfies the criteria for reliability and convergent validity.

Table 10: Final measurement model with items deleted

Scale Item	Variable Code	Treatment
1. Absorptive Knowledge Search		
Our university has frequent interactions with sister universities and academic partners to acquire new knowledge.	**AKS1**	
Our university periodically organizes special meetings with our clients and stakeholders to acquire new ideas and knowledge.	**AKS2**	
The search for relevant information concerning our tertiary educational industry is done on a regular basis in our university.	**AKS3**	
Management always ensures that new opportunities to serve our clients are quickly adopted.	**AKS4**	**Deleted**
Management motivates faculty and administrative staff to quickly analyse and interpret changing market trends.	**AKS5**	**Deleted**
2. Absorptive Knowledge Accumulation		
In our university, faculties and departments record and store newly acquired knowledge for future reference.	**AKA1**	
In our university, ideas and concepts are transmitted across departments and faculties for usage and storage.	**AKA2**	
Our university quickly recognizes the usefulness of new external knowledge to existing stock of prior knowledge.	**AKA3**	
Management ensures periodical inter-departmental and inter-faculty meetings to exchange ideas, developments, problems, practical experiences and achievements.	**AKA4**	**Deleted**
3. Absorptive Process Transformation		
Management ensures that new external knowledge is disseminated across departments at all levels in the university.	**APT1**	
We have transfer structures and routines that enable us to apply new knowledge throughout the various faculties and departments.	**APT2**	
We have adopted an excellent information infrastructure for both faculty and administrative staff to share and assimilate information and knowledge.	**APT3**	
4. Inter-functional Coordination		
The activities of faculties and departments are tightly coordinated through inter-faculty and inter-departmental meetings to ensure better use of our industry knowledge.	**IFC1**	**Deleted**
Functions of Quality Assurance, faculties, departments and administration are tightly integrated in cross-functional teams in our curriculum development processes.	**IFC2**	**Deleted**
In this university different faculties and departments regularly share information about our clients, technologies and competitors.	**IFC3**	
There is a high level of cooperation and coordination among functional departments in setting the goals and priorities for the university to ensure effective response to student conditions.	**IFC4**	
Top management promotes communication and cooperation among public relations unit, faculties/departments and finance directorate in information acquisition and use.	**IFC5**	
Management involves faculty and administrative staff of the university in major strategic decisions	**IFC6**	**Deleted**
5. Knowledge Acquisition		
Management organizes meetings with our students to acquire information on new trends and demands.	**KA1**	**Deleted**
We frequently visit our industry partners to acquire new ideas on curricula/programmes.	**KA2**	
We gather industry information through formal meetings with our stakeholders.	**KA3**	
We gather industry information through informal meetings with our stakeholders.	**KA4**	

We hardly visit our industry regulators for new information and policies.	**KA5**	**Deleted**
Our faculty staff often interact with students to gather relevant feedback.	**KA6**	**Deleted**
6. Innovation Generation		
In terms of promotion, our university gives priority to both faculty and administrative staff who actively engage in innovation activities.	**INNG1**	
In terms of salary increase, our university gives priority to both faculty and administrative staff who actively engage in innovation activities	**INNG2**	
Management recognizes both faculty and administrative staff for their knowledge-sharing initiatives.	**INNG3**	
Management rewards both faculty and administrative staff for their knowledge-sharing initiatives	**INNG4**	
There is a policy to give support to faculty staff for their knowledge productions and improvement through publications and research output.	**INNG5**	
All faculty staff offer new ideas in their area of expertise that can improve programs and curricula.	**INNG6**	

Source: Field Data (2020)

4.10 Sample characteristics

The demographic characteristics of the resulting sample of respondents are summarized in Table 11. This information comprises of the gender, staff category, faculty level, age of university, size of university, type of university ownership, and the number of working years of respondent at the university. Table 11 shows first of all that there were significantly more male respondents (60.6%) than female respondents (39.4%) from the targeted top twenty universities. This shows the dominance of male faculty staff within the Ghanaian tertiary education sector. Secondly, the majority of the respondents were Lecturers (64.5%), followed by Senior Lecturers (25.5%). There were only three associate professors (1.1%) and three Full Professors (1.1%). This is a clarion call on university faculty to upgrade themselves in knowledge acquisition by embarking on more faculty collaborations for publications, research output and innovation-driven activities and interactions in their curricula and operations. In terms of the age of university, out of the 282 responses, 234 responded their university was over ten years old (83%), 30 responded that their university was aged between 5 to 10 years (10.6%), whilst 18 responded that their university was below 5years (6.4%). This means that most of the targeted tertiary institutions are mature and stable. In terms of university size, 204 faculty staff work in large universities (72.3%), 63 faculty staff work in medium sized universities (22.3%), whilst 15 faculty staff work in small sized universities (5.3%). This means that most of the targeted tertiary institutions have a steady growth in size over the years. Generally, all the state owned or public tertiary institutions in Accra were included in the study (27%). However, there are more privately-owned tertiary institutions in Accra who participated in the study responses (73 %). Out of the 282

respondents 118 had worked for their universities over a period between 5 to 10 years (41 %), 88 had worked for less than 5 years (31.2 %), whilst 76 have been working for over 10 years (27 %). This is an indication that faculty staff do not work at one university for longer years but move from one institution to the other.

Table 11: Sample Characteristics

Variable	Characteristics	Frequency (N= 282)	Percent (%)	Mean
P1: Gender	Male	171	60.6 %	1.39
	Female	111	39.4 %	
P2: Staff Category	Faculty	282	100 %	1.00
	Administration	0	0 %	
P3: Staff Level	Research Assistant	22	7.8 %	2.23
	Lecturer	182	64.5 %	
	Senior Lecturer	72	25.5 %	
	Associate Professor	3	1.1 %	
	Full Professor	3	1.1 %	
P5: Age of University	0-5 years	18	6.4 %	2.77
	5-10 years	30	10.6 %	
	Over 10 years	234	83 %	
P6: Size of University	Small (0-500 students)	15	5.3 %	2.67
	Medium (501-2000 students)	63	22.3 %	
	Large (over 2000 students)	204	72.3 %	
P7: Ownership type of University	Public Owned	76	27 %	1.73
	Private Owned	206	73 %	
P8: Number of working years	0 - 5 years	88	31.2 %	1.96
	5 - 10 years	118	41.8 %	
	Over 10 years	76	27 %	

Source: Field Data (2020)

4.11 Quantitative data analysis and results

Several statistical techniques are available for analysing quantitative data for social science research. However, the type to use is dependent on the research objectives of

the study (Cresswell & Clark, 2007). To test the hypothetical model for this study, collected data were analysed using the partial least squares approach to structural equation modeling (PLS-SEM) on Smart PLS 3. Structural equation modelling (SEM) is a statistical technique that allows researchers to test for causal relationships between latent variables (Hair et al., 2017). SEM is actually a second-generation method for analysing multivariate data. Multivariate simply means multiple variables, therefore multivariate data analysis refers to using statistical methods to analyse multiple variables whose measures are associated with situations, events, people, organisations, activities, etc. (Hair et al., 2017). There are basically two methods of structural equation modelling which are; the co-variance-based structural equation modelling (CB-SEM) approach, and the variance-based, partial least squares structural equation modelling (PLS-SEM) approach. Whilst CB-SEM is primarily used to confirm (or reject) theories in confirmatory modelling, PLS-SEM is rather prediction-oriented and used to develop theories in exploratory modelling (Sarstedt et al., 2014a). Further, whilst the co-variance-based structural equation modelling requires that the data show multivariate normality, the variance-based approach does not require multivariate normality (Hair et al., 2017).

Finally, CB-SEM uses software packages like AMOS, LISREL, EQS and MPLUS, whereas PLS-SEM uses PLS-Graph, Smart PLS, Visual PLS and Warp PLS This study employed the variance based PLS-SEM approach, using Smart PLS software package, because the initial data cleaning exercise showed that the data were not normal.

4.12 Normality Tests

We conducted normality tests to examine skewness, kurtosis of the items in the study questionnaire. Results of analysis of the scales used in the study questionnaire revealed that all the items had skewness and kurtosis beyond plus [+] or minus [-] one ($> \pm 1.0$), which means that the data was not normally distributed, as shown in table 12. These results suggest that the data was not normally distributed, therefore it was suitable to use the PLS-SEM approach (Hair et al., 2016). It is also worthy to note that PLS-SEM is appropriate for prognostic models using much smaller or much larger samples (Chin, 1988; Hair et al., 2011). PLS-SEM method is applicable where there is limited existing theory (Tsang, 2002). Finally, PLS-SEM is used for theory application (Hair et al., 2016).

Table 12: Normality Statistics: Skewness and Kurtosis

Items	Mean	Std. D	Skewness		Kurtosis		Cronbach
			Statistic	Std. Error	Statistic	Std. Error	**α**
AKS1	3.41	1.145	-.520	.145	-.636	.289	0.763
AKS2	3.41	1.030	-.379	.145	-.601	.289	
AKS3	3.51	0.921	-.654	.145	.166	.289	
AKA1	3.50	1.034	-.642	.145	-.300	.289	0.752
AKA2	3.34	0.980	-.392	.145	-.865	.289	
AKA3	3.36	0.979	-.411	.145	-.443	.289	
APT1	3.44	1.001	-.636	.145	-.260	.289	0.751
APT2	3.14	0.998	-.194	.145	-.849	.289	
APT3	3.35	1.097	-.560	.145	-.555	.289	
IFC3	3.23	0.985	-.304	.145	-.677	.289	0.769
IFC4	3.30	1.082	-.615	.145	-.603	.289	
IFC5	3.44	0.931	-.733	.145	-.140	.289	
KA2	3.16	1.045	-.429	.145	-.639	.289	0.761
KA3	3.26	1.013	-.586	.145	-.364	.289	
KA4	3.29	0.930	-.532	.145	-.323	.290	
INNG1	4.27	1.712	-.305	.145	-.916	.289	0.901
INNG2	3.96	1.866	-.108	.145	-1.168	.289	
INNG3	4.27	1.738	-.316	.145	-.942	.289	
INNG4	4.18	1.757	-.294	.145	-.984	.289	
INNG5	4.32	1.672	-.381	.145	-.745	.289	
INNG6	4.68	1.547	-.610	.145	-.307	.289	

Source: Author's Field Data (2020)

We also conducted Komogorov-Smirnov tests and Shapiro-Wilk test. The Komogorov-Smirnov test of normality indicated that the significance value is less than 0.05 for all items, meaning that the data significantly deviates from a normal distribution and is therefore, not normal as . Similarly, the Shapiro-Wilk test of normality revealed that the significance value for all the items is less than 0.05. Here again the data significantly deviates from a normal distribution, confirming the non-normality of the data as shown in table 13. These results consequently endorse the suitability of the usage of PLS-SEM.

Table 13: Normality Statistics: Komogorov-Smirnov tests and Shapiro-Wilk test.

Items	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
AKS1	.270	282	.000	.880	282	.000
AKS2	.255	282	.000	.888	282	.000
AKS3	.289	282	.000	.860	282	.000
AKA1	.301	282	.000	.859	282	.000
AKA2	.298	282	.000	.845	282	.000
AKA3	.257	282	.000	.884	282	.000
APT1	.300	282	.000	.857	282	.000

APT2	.235	282	.000	.883	282	.000
APT3	.284	282	.000	.869	282	.000
IFC3	.246	282	.000	.883	282	.000
IFC4	.306	282	.000	.845	282	.000
IFC5	.323	282	.000	.826	282	.000
KA2	.244	282	.000	.882	282	.000
KA3	.267	282	.000	.867	282	.000
KA4	.268	281	.000	.863	281	.000
INNG1	.158	282	.000	.931	282	.000
INNG2	.154	282	.000	.926	282	.000
INNG3	.178	282	.000	.928	282	.000
INNG4	.172	282	.000	.926	282	.000
INNG5	.169	282	.000	.932	282	.000
INNG6	.219	282	.000	.918	282	.000

Source: Author's Field Data (2020)

4.13 Non-response bias

In order to conduct a good research to yield valid and reliable results, many scholars rely on the willingness of people to respond to their questions, and most often, these scholars use questionnaires as the data collection tool to acquire the information they need (Baruch, 1999). Questionnaires are important for collecting data because they can provide insight into peoples' perceptions and attitudes. In organizational research questionnaire are used to provide insight into organizational policies and practices and also assess organizational concerns, observe trends and evaluate progress (Kraut, 1996). It is important to note however, that unless the questionnaire is forcefully administered to the target population, it would be difficult to achieve a hundred percent response rate (also known as return rate). According to Baruch, (1999), the average response rate for questionnaires used for published academic studies is significantly less than a hundred percent. Scholars, however, hope to have a response rate which is as high as possible in order to lead to larger data samples and statistical power as well as smaller confidence intervals for the sample statistics (Rogelberg & Stanton, 2007). Further, higher response rates tend to give more credible findings among key stakeholders (Rogelberg & Stanton, 2007). For this reason it is critical for scholars to study and understand issues concerning response and the reasons why people fail to respond.

The existence of a nonresponse bias can lead to poor and misleading results and conclusions that cannot be generalized (Rogelberg & Luong, 1998). Non response bias results from low response rates of collected data which often undermine the credibility of the data collected. Low response rates can also lead to smaller data samples which

decrease the statistical power of sampled data. A careful preparation and using the right methodology can however, mitigate non-response biases (Hair et al., 2007; Saunders et al., 2006). Not being familiar with the research topic can also reduce the interest of respondents who may not see the importance of the exercise. Educating respondents on the research area can alleviate this bias (Brown et al., 1989). Out of the 400 questionnaires which were prepared for administering to participants, 380 questionnaires were successfully administered with 20 undelivered. A total of 282 responses were received. This represents a 70.5% total response rate. There were no cases of missing data. Table 14 shows information on population and return rates of the questionnaires that were sent to the faculty staff of twenty selected HEIs in the greater Accra region of Ghana

In a bid to mitigate nonresponse bias and achieve valid, dependable and reliable results, this study employed the following response facilitation approaches recommended by Baruch and Holtom, (2008); Rogelberg and Stanton, (2007), which helped to eliminate non response bias.

1. Respondents were given prior notice of the exercise through an introductory letter, spelling out the purpose of the survey, and a subsequent follow up visit by the researcher to personally interact with respondents before the actual exercise and also to remind them of agreed dates.
2. The researcher personally highlighted the saliency of the research topic by giving a brief introduction, definition and insight of the absorptive capacity research to whip the interest of those who were not so familiar with the subject.
3. Respondents were assured of protection for their anonymity in order that they will not be apprehensive in responding freely and sincerely. Names were therefore not required in the survey.
4. Respondents were made to understand how valuable and important their opinions and participation was for the successful completion of the survey.
5. The researcher promised to provide the feedback of the survey results to all interested participants via email.
6. The researcher compared the mean values of the questionnaire scale items between respondents who answered the questionnaires within the first three days (early) and those who did so after follow-up and found no significant difference between the two categories (Lings & Greenly, 2010).

Table 14: **Summary of Response Rates**

Total number of Questionnaires prepared	400
Total number of Questionnaires administered	380
Total number of Questionnaires undelivered	20
Total number of responses	282
Response Rate	282/380
Percentage	70.5%

Source: Author's Field Data (2020)

4.14 Common method variance bias

A method bias refers to a detrimental effect that is produced from the factors of methods. There are two kinds of detrimental effects that have been recognised (Podsakoff et al., 2003). First, detrimental effects can easily bias the estimates of the scale's validity and reliability of constructs, leading to erroneous perception of their adequacy (Podsakoff et al**.,** 2003; Williams et al., 2010). It can also bias the estimated effects of relationships between predictors and criterion variables or between predictors and other predictors (Spector & Brannick. 2009). Second, detrimental effects can easily bias the parameter estimates of different constructs and their relationships by either inflating or deflating these estimates (Podsakoff et al., 2003; Williams et al., 2010).

"Method biases can significantly influence item validities and reliabilities as well as the co-variation between latent constructs. This suggests that researchers must be knowledgeable about the ways to control method biases that might be present in their studies" (Podsakoff, MacKenzie & Podsakoff, 2012 pp 1027). In view of the above this study sought to control method bias by using non-statistical remedies proposed by Podsakoff, MacKenzie, Lee, and Podsakoff (2003). Some of the procedural remedies that were used to reduce potential ambiguities and bias include the following:

1. We made sure to avoid lengthy scales and also kept the items as simple, concise and specific as possible for easy understanding. This was aimed at increasing the respondents' motivation to maintain the cognitive effort to give optimal responses.

2. We also made sure to avoid loaded questions, unfamiliar and ambiguous terminology. This was aimed at avoiding respondents' tendency to develop their own stylistic way of generating satisfactory responses due to their lack of comprehension.
3. We selected respondents who have the necessary experience and level of thinking about and understanding the issues of interest.
4. We did not force or compel people to participate by using higher authority or management compulsion. This would lead to lack of cooperation or even a tendency to rebel by not following instructions. Rather, we sought their permission in a respectful manner for their participation by showing that we appreciate and value their time and efforts.
5. We made sure to protect the anonymity of respondents and also minimize evaluation apprehension. We further sent questions about respondent' demographic details to the back page and not at the front. Demographic information did not include names of faculty staff nor their respective universities.

Other procedural remedies used was employing what Podsakoff et al., (2003 pp 887) refer to as *"Temporal, proximal, psychological, or methodological separation of measurement".* We chose the methodological separation by introducing a separation between the scale end points and formats of our independent variables and that of our dependent variable, in order to avoid commonalities. Items of the independent variables – *Absorptive knowledge search,, Absorptive knowledge accumulation,, Absorptive process transformation* and the mediator variables- *Inter-functional coordination and Knowledge Acquisition* were measured on a 5-point Likert-type scale ranging from the lowest score of 1 (strongly disagree) to the highest score of 5 (strongly agree). The items of our outcome variable – *Innovation performance* were however separately measured using a Likert scale with seven (7) points (1 "very strongly disagree" being the lowest score, and 7 "very strongly agree" being the highest score), based on Wang, Zhao, and Zhou, (2018)'s innovation incentives scale. This separation was believed to reduce the tendency of respondents using previous answers to respond to subsequent questions (Podsakoff et al., 2003). Temporal separation was also used to allow the respondents' previously recalled information to leave their short-term memory before answering subsequent answers. Proximal separation was also used to eliminate the respondent's common retrieval cues. Finally, we used psychological separation to reduce the respondents' perceived importance of the previously remembered information which is embedded in their short-term memory.

4.15 Data preparation

Data preparation is a crucial and fundamental stage in data analysis for identifying quality data. It entails a process of using some techniques to prepare and analyse raw data in order to yield quality data that will yield dependable results. The process also includes the collection of data, integrating the data, transforming the data, cleaning the data, reducing the data and finally making the data discrete for effective quantitative evaluations (Zhang et al., 2003).

This study's model and hypotheses were tested using data from a sample of faculty staff of the tertiary educational industry in the greater Accra region of Ghana. We gathered a sample of twenty (20) private and public universities. An introductory letter from Nobel International Business School (NIBS) was sent to all twenty universities (addressed to the Deans of the Business schools) to properly introduce the researcher as a doctoral student offering a PhD in Business Administration. This was to solicit their willingness to take part in the survey. The purpose of the survey was indicated as purely academic. The letter further detailed the title and objectives of the study and the data collection method to be used. The choice of this industry was motivated by the fact that the university is a knowledge intensive domain. It is a highly competitive industry with investments in knowledge creation and dissemination, technology, design, and a quick response to market needs. One good thing about studying the tertiary educational industry is the fact that most participants are highly educated making it easy for them to deliver responses in fluid English language. As such, standardized structured interview and survey procedures were used. The quantitative survey was conducted by administering printed hard copies of survey questionnaires in-person by the researcher herself, to three hundred and eighty (380) faculty staff.

Out of the 380 questionnaires administered, 282 total responses were received. This represents a 70.5% total response rate. The 282 responses received, representing the raw data, was integrated and entered into the PLS-SEM software. This process was to screen the data for missing variables, and further to transform and clean by correcting errors and removing outliers, so that the resulting quality data will be effectively used for our quantitative analysis. All this was done through Exploratory Factor Analysis (EFA). There were no missing data or errors in any of the responses, resulting in an effective response rate. We further checked for skewness and kurtosis to ascertain the normality of the data and above all, justification for the appropriateness of statistical approach to be used.

4.16 Sample size adequacy

Paper-based questionnaires were administered to 380 respondents, out of which 282 responded. The 282 responses obtained met the very much cited rule of thumb used for robust PLS-SEM estimations, recommended by Barclay, Higgens and Thompson, (1995) known as the "ten times rule". This rule is based on two (2) assumptions. In the first assumption they propose that the sample size in a given study must be greater than 10 times the highest number of indicators that are used to measure one construct. In this study, Inter-functional coordination (IFC) had the highest number of formative indicators: six (6) items, making the minimum sample size 60. The second assumption is that the sample size in a given study must be greater than 10 times the highest number of both outer and inner structural paths that point to any latent variable in the proposed research model (Hair et al., 2011). Given the complex model in this study, with the presence of mediational effects, there are nine (9) outer and inner structural paths pointing to various latent variables, therefore, the minimum sample is 90. The sample size of 282 which was obtained for this study meets and exceeds the minimum sample size requirement for applying the PLS-SEM approach. Moreover, even though some scholars have argued that a minimum sample size must be above 100, a sample size of 200 is recommended for a complex model (Marsh, Balla & MacDonald, 1988), such as the one for this study with mediational effects. Therefore, the sample size of 282 is believed to give sufficient statistical power for this study's data analysis (Hoe, 2008; Kline, 2005).

4.17 Measurement model assessment

In performing the analysis in structural equation modelling (SEM), there are two key stages to examine. These are the measurement model stage and the structural model stage (Hair et al., 2016). Whilst the measurement model examines the underlying relationships between the constructs of the study, the structural model examines the relationships within the context of the hypotheses to be tested. We applied the PLS-SEM to the data by modelling the six constructs in our study which are: Absorptive knowledge search, Absorptive knowledge accumulation, Absorptive process transformation, Inter-functional coordination, Knowledge Acquisition and Innovation performance.

4.17.1 Confirmatory factor analysis (CFA)

When assessing the measurement model, it is important for the scale applied to pass confirmatory factor analysis (CFA) for its latent variables (Hair et al., 2016). And in

order for the scale to pass this CFA test, construct validity must be examined to meet the convergent and discriminant validity conditions. Construct validity refers to the extent to which measured items really reflect the theoretical latent construct they are supposed to measure" (Hair et al., 2006). CFA allows for the provision of measures for the overall degree of fit and model specification. We conducted both first-order and second-order CFA analyses to:

1. Assess the measurement of all the factor loadings for items, construct by construct remove the items that had factor loading lower than 0.5.

2. Examine the convergent validity and discriminant validity to achieve construct validity and also assess model fit.

Confirmatory Factor Analysis (CFA) of each item of all the six constructs in this study was conducted to assess every construct's factor loadings. As a rule of thumb, the factor loading of each item should be at least 0.5 or higher (Hair et al, 2006).

4.17.2 Absorptive knowledge search

The construct, Absorptive Knowledge Search (AKS) was measured using five (5) items. Exploratory factor analysis of the initial loadings revealed that item "AKS 4" (Management always ensures that new opportunities to serve our clients are quickly adopted) and "AKS 5" (Management motivates faculty and administrative staff to quickly analyse and interpret changing market trends) did not reach the ideal minimum threshold of above 0.5 for factor loading. Additionally, they were not unidimensional and therefore cross loaded significantly into other constructs. "AKS 4" and "AKS 5" were therefore deleted and the measurement model was re-run after the deletion. The final retained items achieved a Cronbach's alpha of 0.736, a composite reliability of 0.845 and average variance extracted (AVE) estimate of 0.647. Each of the three (3) remaining item loadings was statistically significant using bootstrap t-values (5000 sub-samples). Convergence validity for the construct; Absorptive Knowledge Search has been met, according to the recommendations of Hair et al. (2016).

4.17.3 Absorptive knowledge accumulation

The construct, Absorptive Knowledge Accumulation (AKA) was measured using four (4) items. Exploratory factor analysis of the initial loadings revealed that item "AKA 4" (Management ensures periodical inter-departmental and inter-faculty meetings to exchange ideas, developments, problems, practical experiences and achievements) did not reach the ideal minimum threshold of above 0.5 for factor loading. Additionally, the item was not unidimensional and therefore cross loaded significantly into other constructs. "AKA 4" was therefore deleted and the measurement model was re-run after the deletion. The final retained items achieved a Cronbach's alpha of 0.752, a composite reliability of 0.856 and average variance extracted (AVE) estimate of 0.665. Each of the three (3) remaining item loadings was statistically significant using bootstrap t-values (5000 sub-samples). Convergence validity for the construct; Absorptive Knowledge Accumulation has been met, according to the recommendations of Hair et al. (2016).

4.17.4 Absorptive process transformation

The construct, Absorptive Process Transformation (APT) was measured using three (3) items. Exploratory factor analysis revealed that all three items reached the ideal minimum threshold of above 0.5 for factor loading, and also loaded in a unidimensional way into the construct. All the three items achieved a Cronbach's alpha of 0.751, a composite reliability of 0.858 and average variance extracted (AVE) estimate of 0.668. Each of the three (3) remaining item loadings was statistically significant using bootstrap t-values (5000 sub-samples). Convergence validity for the construct; Absorptive Process Transformation has been met, according to the recommendations of Hair et al. (2016).

4.17.5 Inter-functional coordination

The construct, Inter-functional Coordination (IFC) was measured using six (6) items. Exploratory factor analysis of the initial loadings revealed that item "IFC I" (The activities of faculties and departments are tightly coordinated through inter-faculty and inter-departmental meetings to ensure better use of our industry knowledge), "IFC 2" (Functions of Quality Assurance, faculties, departments and administration are tightly integrated in cross-functional teams in our curriculum development processes) and "IFC 6" (Management involves faculty and administrative staff of the university in major strategic decisions) did not reach the ideal minimum threshold of above 0.5 for factor

loading. Additionally, they were not unidimensional and therefore cross loaded significantly into other constructs. "IFC 1", "IFC 2" and "IFC 6" and were therefore deleted. As a result, the measurement model was re-run after the deletion. The final retained items achieved a Cronbach's alpha of 0.769, a composite reliability of 0.867 and average variance extracted (AVE) estimate of 0.686. Each of the three (3) remaining item loadings was statistically significant using bootstrap t-values (5000 sub-samples). Convergence validity for the construct; Inter-functional Coordination has been met, according to the recommendations of Hair et al. (2016).

4.17.6 Knowledge Acquisition

The construct, Knowledge Acquisition (KA) was measured using six (6) items. Exploratory factor analysis of the initial loadings revealed that item "KA I" (Management organizes meetings with our students to acquire information on new trends and demands), "KA 5" (We hardly visit our industry regulators for new information and policies) and "KA 6" (Our faculty staff often interact with students to gather relevant feedback) did not reach the ideal minimum threshold of above 0.5 for factor loading. Additionally, they were not unidimensional and therefore cross loaded significantly into other constructs. "KA 1", "KA 5" and "KA 6" and were therefore deleted. As a result, the measurement model was re-run after the deletion. The final retained items achieved a Cronbach's alpha of 0.761, a composite reliability of 0.861 and average variance extracted (AVE) estimate of 0.675. Each of the three (3) remaining item loadings was statistically significant using bootstrap t-values (5000 sub-samples). Convergence validity for the construct; Knowledge Acquisition has been met, according to the recommendations of Hair et al. (2016).

4.17.7 Innovation Generation

The construct, Innovation Generation (INNG) was measured using six (6) items. Exploratory factor analysis revealed that all six items met the ideal minimum threshold of above 0.5 for factor loading and loaded in a unidimensional way into the construct. All the six items achieved a Cronbach's alpha of 0.901, a composite reliability of 0.924 and average variance extracted (AVE) estimate of 0.672. Each of the six (6) item loadings was statistically significant using bootstrap t-values (5000 sub-samples). Convergence validity for the construct; Innovation Generation has been met, according to the recommendations of Hair et al. (2016).

Table 15: Factor Loadings

CONSTRUCT	AKS	APT	INNG	IFC	KA	AKA	α
AKS1	0.826	0.374	0.289	0.330	0.319	0.417	0.736
AKS2	0.876	0.488	0.415	0.452	0.367	0.435	
AKS3	0.701	0.463	0.217	0.313	0.322	0.461	
AKA1	0.460	0.560	0.286	0.374	0.453	0.771	
AKA2	0.387	0.545	0.361	0.480	0.441	0.826	0.752
AKA3	0.461	0.530	0.427	0.421	0.396	0.848	
APT1	0.437	0.782	0.330	0.390	0.376	0.479	
APT2	0.476	0.857	0.375	0.473	0.432	0.561	0.751
APT3	0.424	0.811	0.369	0.417	0.443	0.580	
IFC3	0.356	0.433	0.435	0.820	0.525	0.411	0.769
IFC4	0.428	0.443	0.490	0.893	0.489	0.456	
IFC5	0.369	0.427	0.397	0.766	0.392	0.432	
INNG1	0.322	0.316	0.778	0.382	0.472	0.382	
INNG2	0.280	0.342	0.835	0.420	0.417	0.337	
INNG3	0.338	0.387	0.870	0.504	0.460	0.358	0.901
INNG4	0.332	0.355	0.882	0.472	0.429	0.343	
INNG5	0.349	0.368	0.834	0.421	0.336	0.406	
INNG6	0.345	0.381	0.704	0.415	0.298	0.372	
KA2	0.356	0.444	0.429	0.485	0.835	0.420	
KA3	0.369	0.454	0.462	0.546	0.890	0.492	0.761
KA4	0.297	0.354	0.300	0.339	0.732	0.355	

Note: **AKS**-Absorptive Knowledge Search, **AKA**-Absorptive Knowledge Accumulation, **APT**-Absorptive Process Transformation, **IFC**-Inter-functional Coordination, **INNG**-Innovation Generation, **KA**-Knowledge Acquisition, **CA-**Cronbach's alpha,
Source: Field Data (2020)

The measurement model was assessed by calculating composite reliability, convergent validity and discriminant validity. Table 15 shows that all latent variables are reliable. This is because values of both Cronbach's alpha and composite reliability (see table 16) are higher than the 0.7 threshold set by Henseler *et al.* (2016). Average Variance Extracted (AVE) was used to assess convergent validity and factor loadings of items. Its values must be greater than 0.5 (Henseler, Ringle & Sinkovics, 2009), in order to have satisfactory levels of convergent validity. Again, it can be clearly seen from Table 17 that the AVE values for all the constructs are greater than the 0.5 threshold, therefore the measurement model shows a good convergent validity.

Table 16: Composite Reliability

CONSTRUCT	CA (α)	CR	No of items
Absorptive Knowledge Search	0.736	0.845	3
Absorptive Knowledge Accumulation	0.752	0.856	3
Absorptive Process Transformation	0.751	0.858	3
Inter-functional Coordination	0.769	0.867	3
Knowledge Acquisition	0.761	0.861	3
Innovation Generation	0.901	0.924	6

Note: **CR-**Composite Reliability, **CA-**Cronbach's alpha
Source: Field Data (2020)

4.18 Validity

Validity refers to accuracy (Huck, 2004), in terms of content validity and construct validity for the purpose of research. Content validity is achieved by going through the "expert opinion" exercise. The experts go through the statement items of all constructs to determine and give feedback on the clarity, readability, relevance and redundancy of each item in the questionnaire. The valuable feedback provided by these experts is used to refine and modify the questionnaire to give it a higher level of content validity.

Construct validity is also achieved by assessing convergent and discriminant validity. A construct is a "theoretical explanation of an attribute or characteristic that is created by scholars for purposes of study. Constructs are abstract and, having not been observed directly, are not considered actual behaviours or events" (Merriam & Simpson, 2000, pp. 161). In order to assess construct validity the researcher must initially assess how much these unobservable characteristics are similar as they should theoretically be and represent the construct being investigated, therefore providing one with convergent validity. Second, the researcher needs to assess the extent to which these unobservable characteristics are able to discriminate from other constructs being investigated in order to provide one with discriminant validity.

4.18.1 Convergent validity

In order to attain convergent validity, Hair et al. (2016) recommend a minimum Cronbach's alpha (α) of 0.6, a minimum composite reliability (CR) of 0.7 and a minimum average variance extracted (AVE) of 0.5 per construct to ensure adequate

convergence validity. This means that AVE that is equal to or more than 0.5 has adequate convergent validity. Chin, (2010) also recommend a minimum factor loading of 0.60 and statistical testing using bootstrap t- values (5000 sub-samples) to ensure that each item loading is statistically significant before concluding on adequate convergence validity. The results of convergent validity test are presented in Table 17.

Table 17: Convergent Validity

CONSTRUCT	**CA** (α)	**AVE**	**No of items**
Absorptive Knowledge Search	0.736	0.647	3
Absorptive Knowledge Accumulation	0.752	0.665	3
Absorptive Process Transformation	0.751	0.668	3
Inter-functional Coordination	0.769	0.686	3
Knowledge Acquisition	0.761	0.675	3
Innovation Generation	0.901	0.672	6

Note: **AVE**-Average Variance Extracted, **CA-**Cronbach's alpha,
Source: Field Data (2020)

4.18.2 Assessment of discriminant validity

Discriminant validity is used to test how unique a construct is. This is determined by examining whether the AVE for each construct is greater than construct to construct correlations between the construct and the other constructs in the model (Fornell & Larcker, 1981; Hair et al., 2016; Farrell, 2010). There are three recommended methods for testing discriminant validity (Hair et al. 2016; Hensler et al. 2015). These are (a) the Fornell and Larcker criterion, (b) the item cross loadings and (c) the Heterotrait-Monotrait ratio (HTMT) criterion. The discriminant validity of the six constructs were assessed using Fornell and Larcker criterion which states that the average variance extracted estimates should all be higher than the construct to construct correlations (Fornell & Larcker, 1981; Hair et al., 2016) as shown in Table 18.

Table 18: Testing of Discriminant Validity of constructs using the Fornell and Larcker Criterion, (square root of AVEs in diagonal and in bold).

CONSTRUCT	AKS	AKA	APT	INNG	IFC	KA
AKS	**0.804**					
AKA	0.531	**0.816**				
APT	0.545	0.662	**0.817**			
INNG	0.401	0.448	0.438	**0.820**		
IFC	0.465	0.522	0.523	0.534	**0.828**	
KA	0.417	0.520	0.512	0.493	0.568	**0.822**

Source: Field Data (2020)

As the rule of thumb says AVE for each construct must be bigger than the shared variance of other constructs. AVE for Absorptive knowledge search (0.804) is bigger than shared variance of Absorptive knowledge search with Absorptive knowledge accumulation (0.531), Absorptive process transformation (0.545), innovation generation (0.401), inter-functional coordination (0.465), and Knowledge acquisition (0.417).

AVE for Absorptive knowledge accumulation (0.816) is bigger than shared variance of Absorptive knowledge accumulation with Absorptive knowledge search (0.531), Absorptive process transformation (0.662), innovation generation (0.448), Inter-functional coordination (0.522), and Knowledge acquisition (0.520).

AVE for Absorptive process transformation (0.817) is bigger than shared variance of Absorptive process transformation with Absorptive knowledge search (0.545), Absorptive knowledge accumulation (0.662), innovation generation (0.438), inter-functional coordination (0.523), and Knowledge acquisition (0.512).

AVE for innovation generation (0.820) is bigger than shared variance of innovation generation with Absorptive knowledge search (0.401), Absorptive knowledge accumulation (0.448), absorptive process transformation (0.438), inter-functional coordination (0.534), and Knowledge acquisition (0.493).

AVE for inter-functional coordination (0.828) is bigger than shared variance of inter-functional coordination with Absorptive knowledge search (0.465), Absorptive knowledge accumulation (0.522), absorptive process transformation (0.523), innovation generation (0.534), and Knowledge acquisition (0.568).

Finally, AVE for Knowledge acquisition (0.822) is bigger than shared variance of Knowledge acquisition with Absorptive knowledge search (0.417), Absorptive knowledge accumulation (0.520), absorptive process transformation (0.512), innovation generation (0.493), and inter-functional coordination (0.568). All these reports show that there is an adequate discriminant validity for all the constructs in the model (see table 17).

In addition to the Fornell and Larcker criterion, the discriminant validity of the latent constructs were also assessed using heterotrait-monotrait (HTMT) ratio. The rule of thumb with this criterion is that all construct to construct correlation values of HTMT must be less than 0.85 according to Henseler et al., (2015). The results presented in Table 19 show that all the construct to construct correlations did not exceed 0.85. This shows that each construct was well-defined and different from the other measurement constructs in the model, and as a result the six latent constructs demonstrated a good discriminant validity. We therefore conclude from the results that the model fit shows a good discriminant validity.

Table 19: Testing of Discriminant Validity of constructs using the HTMT Criterion

CONSTRUCT	AKS	AKA	APT	INNG	IFC	KA
AKS						
AKA	0.729					
APT	0.734	0.844				
INNG	0.465	0.532	0.532			
IFC	0.599	0.685	0.689	0.639		
KA	0.55	0.686	0.669	0.582	0.724	

Note: All correlation values of HTMT are less than 0.85 (Henseler et al., 2015).
Source: Field Data (2020)

4.19 Structural model assessment

After verifying the measurement model, the next thing we did was to assess the structural model. We employed the bootstrapping resampling procedure (5000 sub samples drawn to replace the original 282 samples) to ascertain the significance of each estimated path in the structural model. We also assessed the model fit by employing the Standardised Root Mean Square Residual (SRMR). The SRMR value for a good model fit must be below 0.08, and since this study's model of 0.069 (see table 20) falls within the threshold recommended by Hu and Bentler, (1999), the

reliability and validity measures, as well as the R square measures indicate that our model is able to explain the hypothesized path relationships well. Results for the structural model assessment are presented in Table 21.

Table 20: Model Fit

	Saturated Model	**Estimated Model**
SRMR	0.069	0.069
d_ULS	1.911	1.911
d_G	0.812	0.812
Chi-square	1.284	1.284
NFI	0.709	0.709

Source: Field Data (2020)

After examining the model fit, the path coefficient was also examined in order to determine the relationship between the exogenous variable and endogenous variables. The causal paths are then evaluated in terms of statistical significance and magnitude and significance, using standardized path coefficient ranging between -1 and +1.

Table 21: Assessment of Hypotheses

Hypothesis	Definition	Hypothesized Path	Path Coefficient (β)	T-values	P-values	Hypothesis Results
H1	*Absorptive knowledge search is positively related to knowledge acquisition in higher education institutions.*	AKS → KA	0.059	0.837	0.201 0.201	Not Supported
H2	*Absorptive knowledge accumulation is positively related to knowledge acquisition in higher education institutions.*	AKA → KA	0.205	2.620	0.004	Supported
H3	*Absorptive process transformation is positively related to knowledge acquisition in higher education institutions.*	APT → KA	0.158	2.220	0.013	Supported
H4	*The positive relationship between absorptive knowledge search and knowledge acquisition is mediated by Inter-functional coordination in higher education institutions.*	AKS → IFC → KA	0.018	2.511	0.006	Supported

H5	*The positive relationship between absorptive knowledge accumulation and knowledge acquisition is mediated by Inter-functional coordination in higher education institutions.*	AKA → IFC → KA	0.025	2.944	0.002	Supported
H6	*The positive relationship between absorptive process transformation and knowledge acquisition is mediated by Inter-functional coordination in higher education institutions.*	APT → IFC→ KA	0.097	2.973	0.001	Supported
H7	*Inter-functional coordination is positively related to Knowledge Acquisition in higher education institutions.*	IFC → KA	0.352	5.585	0.000	Supported
H8	*Knowledge acquisition is positively related to innovation generation in higher education institution*s.	KA → INNG	0.276	4.938	0.000	Supported

Source: Field Data (2020)

4.20 Results of hypotheses

The structural model was assessed on the basis of the statistical significance and magnitude of the predicted paths. Results for the structural model show that out of the eight (8) hypotheses, seven (7) are supported in the present context. With the exception of H1, all the hypotheses were supported (see table 19)

Hypothesis 1: *Absorptive knowledge search is positively related to knowledge acquisition in higher education institutions*

Absorptive knowledge search was not found to directly affect knowledge acquisition in the tertiary institution ($\beta = 0.059$, $t = 0.837$, $p = 0.201$). This means that the absorptive knowledge search of the tertiary educational institution does not necessarily drive the acquisition of knowledge. However, it was found to have an indirect effect on Knowledge acquisition through the mediating role of Inter-functional coordination ($\beta = 0.018$, $t = 2.511$, $p = 0.006$). This means that all the intensive efforts of universities to acquire knowledge can only be successful when different functional units come together to synergistically search for valuable external knowledge. Hypothesis 1 was not supported in this present context.

Hypothesis 2: *Absorptive knowledge accumulation is positively related to knowledge acquisition in higher education institutions.*

Absorptive knowledge accumulation was found to positively and significantly predict knowledge acquisition in the tertiary institution ($\beta = 0.205$, $t = 2.620$, $p = 0.004$). This means that the prior knowledge within the university is very important as learning is associative, and this prior knowledge will help to understand the new external knowledge and be able to link it with the existing. This obviously will facilitate the acquisition of new knowledge for the university. Hypothesis 2 is therefore supported in the present context.

Hypothesis 3: *Absorptive process transformation is positively related to knowledge acquisition in higher education institutions.*

Absorptive process transformation was found to positively and significantly predict knowledge acquisition in the tertiary institution ($\beta = 0.158$, $t = 2.220$, $p = 0.013$). This means that efforts made by the university to put in place its own internal procedures and processes and structures for the sharing, dissemination and diffusion

of external knowledge internally at all levels, faculties or departments of the institution will positively promote the acquisition of knowledge within the university. Hypothesis 3 is therefore supported in the present context.

Hypothesis 4: *The positive relationship between absorptive knowledge search and knowledge acquisition is mediated by Inter-functional coordination in higher education institutions.*

Inter-functional coordination was found to positively and significantly mediate the relationship between the absorptive knowledge search and knowledge acquisition in higher education institutions ($\beta = 0.019$, $t = 2.511$, $p = 0.006$). This is a full mediation. According to Baron and Kenny (1986)'s recommendation, if the effects of the independent variable (absorptive knowledge search) on the dependent variable (knowledge acquisition) disappear after mediator (Inter-functional coordination) controlled, it is called a full or complete mediation. Inter-functional coordination accounts for all (and not some) of the observed relationship between absorptive knowledge search and knowledge acquisition in an "indirect only mediation" procedure (Zhao et al., 2010), and the concept of full mediation (Baron & Kenny, 1986). In this recommendations, only the indirect effect of absorptive knowledge search on knowledge acquisition is significant (the direct effect of absorptive knowledge search on knowledge acquisition is not supported in Hypothesis 1). The result above shows that inter-functional coordination is a very essential institutional mechanism in universities through which all the different functional departmental members are able to set aside their individual functional interests and accept differing views so that they can operate from varying perspectives and disciplines in their quest for detecting and acquiring new knowledge for the university. Hypothesis 4 is therefore supported in the present context. All other non-hypothesized mediation paths (specific and total indirect effects) are presented in Table 21

Hypothesis 5: *The positive relationship between absorptive knowledge accumulation and knowledge acquisition is mediated by Inter-functional coordination in higher education institutions.*

Inter-functional coordination was found to significantly mediate the positive relationship between the absorptive knowledge accumulation and knowledge acquisition in higher education institutions. This is a partial mediation which means that the path from the independent variable to dependent variable (absorptive knowledge accumulation) is reduced but is still significant ($\beta = 0.025$, $t = 2.944$, $p = 0.002$) when the mediator (Inter-functional coordination) is introduced (Baron & Kenny, 1986). So based on this criterion, the effect of absorptive knowledge accumulation (independent variable) on knowledge acquisition (dependent variable) is reduced but is still significant after introducing Inter-functional coordination (mediator variable). Inter-functional coordination accounts for some (and not all) of the observed relationship between absorptive knowledge accumulation and knowledge acquisition in a complementary mediation procedure (Zhao et al., 2010), and the concept of partial mediation (Baron & Kenny, 1986). In both recommendations, there are both direct and indirect effects of absorptive knowledge accumulation on knowledge acquisition, which are significant and point to the same direction. The result above shows that inter-functional coordination is a very essential institutional mechanism in universities through which all the different functional departmental members are able to set aside their individual functional interests so that they can operate from varying perspectives and disciplines in their quest to integrate in a synergy to continuously stock up and accumulate acquired knowledge for the university to facilitate future innovations. Hypothesis 5 is therefore supported in the present context.

Hypothesis 6: *The positive relationship between absorptive process transformation and knowledge acquisition is mediated by Inter-functional coordination in higher education institutions.*

Inter-functional coordination was found to significantly mediate the positive relationship between the absorptive process transformation and knowledge acquisition in higher education institutions. This is a partial mediation which means that the path from the independent variable (absorptive process transformation) to dependent variable (knowledge acquisition) is reduced but is still significant ($\beta = 0.097$, $t = 2.973$, $p = 0.001$) when the mediator (Inter-functional coordination) is introduced (Baron & Kenny, 1986). Here again, Inter-functional coordination accounts for some (and not all) of the observed relationship between absorptive process transformation

and knowledge acquisition in a complementary mediation procedure (Zhao et al., 2010), and the concept of partial mediation (Baron & Kenny, 1986). In both recommendations, there are both direct and indirect effects of absorptive process transformation on knowledge acquisition, which are significant and point to the same direction. The result above shows that inter-functional coordination is a very essential institutional mechanism in universities through which members of different faculties and departments are able to set aside their individual functional interests and coordinate to put in place the university's own internal procedures, processes and structures for the sharing and diffusion of new knowledge internally at all levels, faculties or departments. Hypothesis 6 is therefore supported in the present context.

Hypothesis 7: *Inter-functional coordination is positively related to Knowledge Acquisition in higher education institutions.*

Inter-functional coordination was found to positively and significantly predict knowledge acquisition in the higher education institution ($\beta = 0.352$, $t = 5.585$, $p = 0.000$). This means that inter-functional coordination is a very essential integration mechanism in universities that will enable all the different functional departmental members to set aside their functional interests and accept varying views, perspectives and disciplines as they integrate to search for, detect and acquire new knowledge for the university. Hypothesis 7 is therefore supported in the present context.

Hypothesis 8: *Knowledge acquisition is positively related to innovation generation in higher education institution*s.

Knowledge acquisition was found to positively and significantly predict innovation in the higher education institution ($\beta = 0.276$, $t = 4.938$, $p = 0.000$). This result shows that when the higher education institution is able to successfully internalize the external knowledge that has been acquired into its operations, this will naturally spur innovation through the development and improvement of academic programs, research output and content for commercialization. This will thereby enhance the innovation drive of the university enabling it to achieve and sustain innovation as a result of its constant search for new and valuable knowledge and ideas from their external environment. Hypothesis 8 is therefore supported in the present context.

Table 22: Non-hypothesized mediation paths of specific and total indirect effects.

PATH	Path coefficient (β)	t-statistics	p values	Result
TOTAL INDIRECT EFFECT				
Absorptive Knowledge Search → Innovation generation	0.016	0.835	0.202	Not supported
Absorptive Knowledge Accumulation → Innovation generation	0.057	2.102	0.018	Supported
Absorptive Transformation Process → Innovation generation	0.044	1.871	0.031	Supported
SPECIFIC INDIRECT EFFECT				
Inter-Functional Coordination → Knowledge Acquisition → Innovation Generation	0.097	3.859	0.000	Supported

Source: Field Data (2020)

4.21 SUMMARY

The results of the hypotheses assessments reveal that inter-functional coordination is a very essential institutional mechanism in higher education institutions that will encourage a culture of teamwork and build strong relationships across faculties and departments to promote knowledge acquisition and transfer for the shared institutional vision. This mechanism enables all the different functional departmental members to set aside their individual functional interests and accept differing views so that they can operate from varying perspectives and disciplines in their quest for detecting and acquiring new knowledge for the university. The absorptive capacity process can therefore not be complete unless we go through an important organizational mechanism; inter-functional coordination, in order to yield innovations for the higher education institution.

This study affirms therefore that inter-functional coordination mediates the absorptive capacity and knowledge acquisition relationship in the higher education institution for innovation generation. The routines of absorptive capacity represent the processes of organizational learning (Lane et al., 2006; Volberda et al., 2010; Yang & Tsai, 2019). These processes may facilitate inter-functional coordination from the organizational

learning perspective. Organizational learning activities of individual faculties and departments will facilitate common knowledge, which will further promote constructive communication and collaboration across departments within the higher education institution (Al-Kurdy et al., 2020; Grant, 2002; Örtenblad & Koris, 2014; Rupcic & Begicevic, 2007; Senge, 1990). Again, since learning new external knowledge can give some insight on market opportunities and threats, absorptive capacity will enable differing functional departments to overcome barriers to collaboration so they can achieve unity of effort (Daft, 2010). Furthermore, the need to assimilate externally acquired knowledge encourages different faculties and departments to share information and ideas, thereby, working closely in a synergy for the transfer of valuable external knowledge (De Luca & Atuahene-Gima, 2007; Peeters et al., 2014).

CHAPTER FIVE

5.0 Summary, conclusions and implications

Chapter synopsis

This final chapter focuses on four key issues. First, the chapter begins by giving a summary of the major findings previously discussed in-depth in chapter four and the implications of the findings. Second, the significance and contribution of this study is explained in terms of managerial implications, theoretical implications and policy implications. Third, the limitations common to the study are outlined to reflect the choices made by the researcher during the study, especially, at the design and methodology stage. Finally, this chapter provides suggestions and recommendations for future research.

5.1 Summary of major findings

The purpose of this study was, first, to contextualize the ACAP capability process for generating innovation in the HEI domain. In order to do so, it was necessary to explore and ascertain the contextual meaning of absorptive capacity in the HEI domain as previous research focused mainly on practitioners within the industry of business organizations. Second, the study sought to theoretically broaden the knowledge-based view to take account of the following three theoretical gaps:

(a) Conceptualization of ACAP dimensions specifically in HEIs. It was necessary to empirically develop a common consensus among users, especially in the framing of meaningful and coherent concepts for developing theory in the HEI.

(b) Identification of the organizational mechanism for ACAP in HEIs. It was necessary to broaden the scope of absorptive capacity beyond its dimensions to include the collaborative mechanism through which knowledge can be holistically exploited.

(c) Highlight of the governance mode for knowledge acquisition in HEIs, to build a more applicable theory for managing knowledge in HEIs.

Consequently, the primary research question 1 (PRQ 1) enquired “What constitutes Absorptive Capacity (ACAP) in Higher Education Institutions (HEIs)?” and this was addressed using qualitative semi-structured interviews. The following secondary

research questions (SRQ 2, 3, and 4) also needed to be addressed using quantitative survey questionnaires:

SRQ 2 – "What is the relationship between Absorptive Capacity dimensions and Knowledge Acquisition in HEIs?"

SRQ 3 – "What is the relationship between Knowledge Acquisition and Innovation Generation in HEIs?"

SRQ 4 - "To what extent does Inter-functional coordination mediate the relationship between Absorptive Capacity dimensions and Knowledge Acquisition in HEIs?"

Thus, the summary of both qualitative and quantitative findings are presented in line with the primary research question 1 (PRQ 1) and secondary research questions (SRQ 2, 3 and 4) respectively.

5.2 Outcomes from study one

A thorough and in-depth understanding of the contextual meaning of absorptive capacity was therefore necessary in order to evaluate the components, properties or dimensions of the process within the higher education institution environment and how this process yields innovative outcomes and consequently enhances the relevance and competitive advantage of the higher education institution in the face of stiff competition. The findings from the qualitative interviews unanimously revealed that new external knowledge brings elements of novelty and diversity as compared to the prior knowledge already available in the university. In addition, acquiring relevant knowledge helps the various faculties and departments of the university to improve their internal operations by adopting new and improved trends in the higher education industry; for example, improved curricula and course combinations, enhanced academic instruction, virtual learning, quality research output and better graduates who are suitable for this competitive global knowledge economy and job market. Universities can also strengthen the business industry by producing highly skilled graduates, stronger business networks and excellent research output that can be practically applied in the business and commercial industry for enhanced innovative performance.

Further, the quality of academics in a given institution reflects the richness of that institution in terms of its overall research/publication level or standards. Although

academic knowledge is often proprietary because of the credit that may be gained by the individual academic when this knowledge is accepted for publication in an academic journal, after comprehensive analysis, every university would like to boast of the highly qualified, skilled or specialized faculty staff it possesses to boost its image. Finally, after conceptually and thematically synthesizing all the responses of the eight heads of departments, the emerging core themes relating to the main functions or dimensions of absorptive capacity as far as the higher education institution context is concerned, were identified as (1) Knowledge Search; (2) Knowledge Accumulation; and (3) Process Transformation. The adapted core functions by Song et al. (2018), following their conceptual distillation were therefore modified to reflect the HEI perspective. The modified components or dimensions from the HEI perspective are as follows:

1. *Absorptive Knowledge Search* represents the knowledge building investments made by the university as a scanner or radar to search for, identify and acquire relevant information from outside its environment.

2. *Absorptive Knowledge Accumulation* represents the current knowledge stock of the university. This current knowledge stock helps to understand and transform the new external knowledge which must be related or associated with into useful outcomes.
3. *Absorptive Process Transformation* represents the university's internal processes and procedures in relation to the dissemination and diffusion of knowledge throughout the faculties and departments of the university for generating innovations such as enhanced academic instruction, virtual learning (with geographic convenience), quality research output and better graduates with a solid pedigree relevant for this competitive and ever changing and demanding job market. Process Transformation also takes into account the technologically advanced online platforms that are used to effectively and efficiently diffuse knowledge throughout the faculties and departments within the academic environment. These technological applications have a major role to play in advancing organizational knowledge capabilities as they empower the workforce with the capacity to share knowledge in a collaborative environment, through the use of interactive tools. Some of these interactive communication tools include the internal mailing systems such as the traditional intranet, e-learning and e-social

(WhatsApp) platforms. It is believed that such technologies have distinct technical features that facilitate engagements for knowledge sharing. They are also believed to remove some of the conventional barriers to sharing knowledge.

5.3 Outcomes from study two

The quantitative study sought to (a) examine the relationship between ACAP dimensions and knowledge acquisition in higher education institutions; (b) examine the relationship between knowledge acquisition and innovation generation in higher education institutions; and (c) determine the mediating effects of Inter-functional coordination in the relationship between ACAP dimensions and Knowledge Acquisition in higher education institution.

The study findings revealed that knowledge acquisition in the higher education institution is the capability of academic staff to search for and identify external knowledge (*absorptive knowledge search*) which is deemed key for its internal operations. Knowledge acquisition is also contingent on the prior accumulated knowledge investments (*absorptive knowledge accumulation*), and also involves the transformation or combination of both the old and new knowledge (*absorptive process transformation*) and shared across departments and faculties to help generate new approaches in terms of academic instruction methods, curriculum development and program offerings as well as planning and administration. These findings are similar to those of Vasconcellos (2019) which explains the different dimensions of ACAP through a process and structure approach that knowledge acquisition, transformation and integration are realized through exploration and exploitation.

This process of knowledge acquisition usually begins at the individual level and shared through teams and groups. But it must be facilitated by some intrinsic motivation through rewards and incentives and management's commitment to learning (Tian & Soo, 2018). It is only when the individually acquired knowledge is shared with teams and groups that it can be translated into institutional knowledge acquisition for a holistic enhancement or improvement in productivity. Finally, acquisition is determined by how fast and intense the university's efforts are to search for, identify and finally acquire essential external knowledge.

The study also revealed that the value creation process of generating innovations in products and services is largely dependent on and equated with the individual employee's experiences, skills and acquisition of knowledge (Wang & Wang, 2012). Acquiring new knowledge is therefore central and a vital strategic resource for innovation (Ahuja & Katila, 2001; Butnariu, 2020; Cabrera & Cabrera, 2002; Cohen & Levinthal, 1990; March, 1991; Hameed, Nisar, & Wu, 2021). Accordingly, any organization or institution that is able to successfully internalize the external knowledge it has acquired into its operations is able to naturally spur innovations and improve overall performance (George et al., 2001). The generation of innovation for higher education institution is examined by their ability to offer new courses, successfully revise their existing programs to match the new contemporaries and enhance research and publications. Since education is all about idea generation, they can achieve and sustain these through the constant search for new knowledge and ideas that have the potential for developing and improving academic programs and content for commercialization. Universities must aim at building capacities that will enable them to respond to the changing needs of the external environment by constantly and continuously searching for and acquiring new knowledge through the "radar" function. This should be followed by attempts to understand and transform the knowledge through the "processor" function (Song et al., 2018). Further, they need to diffuse new knowledge internally at all levels, faculties or departments of the institution through the "transmitter" function. All these routines will facilitate the rolling out of innovative courses, program combinations and improved research output.

Finally, universities must understand that the process of innovation is both an internal and external affair. Thus, knowledge about their clients' current economic trends and external ideas must be monitored. They also require different human capital skills in order to improve or maintain their performance as they will be under pressure from the external environment to innovate especially now with globally competitive graduates on the job market, increased on-line technologies and diverse demographics of students (Voolaid & Ehrlich, 2017). These findings are in line with those of Madbouly, Gupta, and Soundarajan (2020) who emphasize the effects of knowledge management on HEIs' innovation performance.

The study further reveals that inter-functional coordination is a highly essential institutional mechanism in higher education institutions for acquiring, sharing and

transferring knowledge throughout the entire institution. It is essential because it facilitates and promotes a culture of teamwork and it further helps to build strong relationships across faculties and departments to promote knowledge acquisition and transfer for the shared institutional vision. As already indicated by research, relationships are a contingent factor for knowledge sharing among academics as they prefer to share knowledge and ideas with trustworthy colleagues (Huberman, 1983) and very close friends (Lima, 1998) or, better still, with colleagues who share similar interests and experiences (Diriye, 2019; Little, 1982). Learning from one another promotes reciprocity in knowledge acquisition and this is important for the growth of individuals, teams and the institution as a whole. The findings of this study are similar to the findings highlighted in Shina (2020) on the need for academics to share knowledge to enhance their overall work output. Again, IFC aids in the timely distribution and sharing of resources and information to coordinate both the internal and external activities of the HEI to enhance the whole business performance. This finding is also similar to that of Tomaskova (2018), as being updated with new information in a timely manner aids in speeding up work progress especially in this fast-paced and turbulent knowledge era.

This mechanism (IFC) enables all the different functional departmental members with varied specializations and disciplines to work in cohesion. Inter-functional coordination allows all to set aside their individual functional interests and accept differing views so that they can operate from varying perspectives and ideas in their quest for detecting and acquiring new knowledge for the university. For example, when departments such as R&D, Marketing, Finance, Information Technology Management and Communication Studies integrate to explore new trends and technologies for teaching and learning, varying pools of ideas can be integrated to achieve creative products and services that inure to the benefits of the whole university in alignment with their set goals. This will enable them to develop innovative curricula to roll out and produce quality graduates who will grow to become virtuous and transformational leaders for this fast-paced knowledge-based economy. The absorptive capacity process can therefore not be complete unless we go through an important organizational mechanism - inter-functional coordination - in order to yield innovations for the higher education institution.

5.4 Conclusions

Exploring an in-depth understanding of the contextual meaning of absorptive capacity helped to evaluate the dimensions of the ACAP process within the higher education institution environment and how it yields innovative outcomes to improve the relevance and competitive advantage of the higher education institution which is now faced with stiff competition. The qualitative interviews unanimously revealed that new external knowledge brings elements of novelty and diversity as compared to the prior knowledge of the university. Again, acquiring relevant knowledge helps the various faculties and departments of the university to improve their internal operations as they adopt new and improved trends in the HEI industry. It also helps to improve the quality of academics in the institution and reflects the richness of that institution's research and publication standards. Although academic knowledge is often proprietary, every university would like to boast of the highly qualified, skilled or specialized faculty staff it possesses to boost its image. Producing highly skilled graduates, stronger business networks and excellent research output also strengthen the business industry.

The quantitative study also revealed that acquiring new knowledge is a vital strategic resource for innovation for any organization or institution. It is therefore necessary to effectively internalize the external knowledge is acquired so as to facilitate innovation generation and improve overall performance. The generation of innovation for higher education institution is examined by their ability to offer new courses, successfully revise their existing programs to match the new contemporaries and enhance research and publications. Since education is all about idea generation, HEIs can achieve and sustain these through the constant search for new knowledge and ideas that have the potential for developing and improving academic programs and content for commercialization. Universities must aim at building capacities that will enable them to respond to the changing needs of the external environment by constantly and continuously searching for and acquiring new knowledge. Finally, universities must understand that the process of innovation is both an internal and external affair. Thus, knowledge about their clients' current economic trends and external ideas must be monitored. Gupta, and Soundarajan (2020) who emphasize the effects of knowledge management on HEIs' innovation performance.

The quantitative study also established the fact that inter-functional coordination is a highly essential institutional mechanism in higher education institutions for acquiring, sharing and

transferring knowledge throughout the entire institution. This is because it facilitates and promotes a culture of teamwork which helps to build strong relationships across faculties and departments to promote knowledge acquisition and transfer for the shared institutional vision. Learning from one another promotes reciprocity in knowledge acquisition and this is important for the growth of individuals, teams and the institution as a whole.

5.5 Managerial implication of the findings

The findings from this study provide significant managerial implications. First, the study gives guidance concerning inter-functional coordination for higher education institutions. The benefits of enhancing inter-functional coordination in knowledge sharing and transfer among faculties and departments is clear. The findings have revealed that a high level of inter-functional coordination will improve institutional performance by way of innovation generation. Second, managers of universities need to commit to ensuring the management of inter-functional coordination in order to promote knowledge sharing across faculties and departments. Attention should be focused on creating lateral relations among faculty and department members in order to achieve internal social capital (Diriye, 2019). Third, managers of universities should invest resources and efforts in building a culture of teamwork and connectedness through strong informal networking and lateral relationships that facilitate collaboration between faculties and departments while cultivating a shared vision throughout the university (Yang & Tsai, 2019). It will not be easy to persuade university staff to engage in teams if they do not have good relationships with each other. When teamwork efforts coordinate different faculties and departments, strong personal relationships are required, and this can lead to high levels of trust, communication, and interactions among departments to enhance inter-functional knowledge sharing.

Finally, managers must ensure that staff are made to be responsible for their cooperative and integrative teamwork. They must also ensure that faculty and departmental goals are aligned with the overall goals of the university. Staff must also be encouraged to act as partners and not just employees through rewards, incentives and recognition packages. These can promote a holistic knowledge management process throughout the university to enable them respond to critical issues in academia and the broader society.

5.6 Theoretical implication of the findings

The study theoretically advances the knowledge-based view (KBV) research by filling three theoretical gaps in the literature. First, it empirically evaluates the conceptualization of dimensions of ACAP in order to bring coherence and clarity to the ACAP construct specifically in the HEI domain. This is based on the assumption that the incoherence in the definition of ACAP by various authors is probably as a result of a weakness in the knowledge-based view. The study therefore empirically examined the dimensions of ACAP in order to bring coherence and clarity to the ACAP construct specifically in the HEI domain. This process is necessary because there is a need to bring out a clear understanding of the terminologies that are used to represent the dimensions of ACAP in academia in such a way that there are no ambiguities regarding their interpretations or even their measurements in the research. This will help to broaden the knowledge-based view in terms of the creation of new knowledge or the addition of new knowledge to existing knowledge for the generation of innovations specifically in the HEI domain. Empirical findings from this study reveal that ACAP is a multi-dimensional construct in HEIs with three dimensions known as (a) absorptive knowledge search, (b) absorptive knowledge accumulation and (c) process transformation. Fortunately, these dimensions almost correspond with the dimensions arrived at by Song et al. (2018) in their meta-analysis of 193 papers while searching for precision in ACAP research which yielded three dimensions of absorptive effort, absorptive knowledge base, and absorptive process (Song et al., 2018). Again, the findings are similar to those of Vasconcellos (2019) which explain the different dimensions of ACAP through a process and structure approach, that knowledge acquisition, transformation and integration are realized through exploration and exploitation of new knowledge.

Second, the study extends the KBV research by empirically evaluating the organizational mechanism for ACAP in HEIs. In response to multiple calls by many scholars to evaluate the ACAP-innovation link, which is believed to be an indirect link, it has become necessary to specify the organizational mechanism through which new external knowledge can be exploited for innovative outcomes, specifically in HEIs. This study therefore focuses on the coordination mechanism which brings together variable sources of expertise and enhances lateral interactions between differing functional knowledge holders (Jansen et al., 2005). This coordination mechanism is

consistent with the cross-functional interface proposed by Jansen and colleagues (2005). We introduce "inter-functional coordination" (IFC) and highlight the significant intermediary role it plays in leveraging the influence of acquiring new knowledge for innovation generation. The findings, accordingly, demonstrate that inter-functional coordination is an essential institutional mechanism that facilitates and promotes a culture of teamwork and collaboration in HEIs for acquiring, sharing and transferring knowledge throughout the entire institution. We further demonstrate how inter-functional coordination can help to build strong relationships across faculties and departments to promote knowledge acquisition and transfer for the achievement of the shared institutional goals in higher education. Even though new external knowledge brings elements of novelty and diversity as compared to the prior knowledge already available, it will take a coordinated effort by all team players through an integrative mechanism to transform and exploit such novel knowledge for value to be created. The findings throw light on the fact that lateral relations, shared vision and informal networking are important determinants of knowledge sharing across the entire university. This is similar to a work by Diriye (2019) which examines the relationship between knowledge sharing and social capital in the HEI environment. In this regard, the study also contributes to the inter-functional coordination literature by explaining the mediating role of this mechanism in the ACAP process within the context of the HEI. It also demonstrates the complex relationship between the ACAP dimensions, inter-functional coordination, and knowledge acquisition for innovation generation. It also increases the theoretical precision of the ACAP effect on innovation by identifying the underlying mechanism that better explains the ACAP-innovation link.

The study again extends the theory of absorptive capacity beyond its dimensions by incorporating the institutional enabler mechanism - inter-functional coordination into the process. It further empirically examines the intermediary role played by inter-functional coordination in the relationship between absorptive capacity and knowledge acquisition for innovation generation in higher education institutions. These findings are similar to Yang & Tsai (2019 pp 126) who theorize that "absorptive capacity requires cross-functional integration (as an intermediate mechanism) to enhance innovation performance. This insight might imply the "fit as mediation" view by De Luca & Atuahene-Gima (2007) because absorptive capacity and cross-functional integration together constitute the key drivers of innovation performance". The study further affirms social capital theory's ability to explain how coordination facilitates

inter-functional knowledge sharing across faculties and departments of universities. Again, the three dimensions of social capital (Nahapiet & Ghoshal, 1998), i.e., structural social capital, cognitive social capital and relational social capital are all reflected in the concept of inter-functional coordination in HEIs. The whole pattern of connectedness among employees from varying faculties and departments of HEIs depicts the structural social capital in inter-functional coordination whereas the aggregate of shared opinions, mental models and meanings derived from these collaborations and interactions depict the cognitive social capital. Further, the bonds and relationships which are built from these collaborations and communications with people from different functional backgrounds and knowledge base yield commitment, trust, confidence and identification which also depict the relational social capital of inter-functional coordination

Third, the study extends the KBV by highlighting both inter-faculty and intra-faculty relationships as key governance modes for sourcing external knowledge within the HEI community. Although prior literature on governance mode have dominantly focused on the external focal organization, i.e., international alliances as the sources of external knowledge, this study demonstrates that in the HEI perspective, governance mode is not only about focal organizations in the external domain, but also in the internal space, because knowledge can also be sourced internally. HEIs are made up of differentiated faculties and departments with varying disciplines and specializations that are considered to be external to one another but are situated within the same internal space. The local connections among differentiated faculties and departments within the academic community are sources of external knowledge. Governance modes in this instance are likely to offer opportunities for richer interactions and superior access to external knowledge sources, i.e., faculty-to-faculty arrangements which in turn increase knowledge flows and are not likely to incur much coordination costs since all the parties have common institutional goals. In consonance with inter-functional coordination, both inter-faculty and intra-faculty relationships are key governance modes for sourcing external knowledge that can be used to enhance the goals in academia as they foster cohesiveness through the improvement of relationships between people with varying functional skills and specializations, thereby, enhancing the building of trust and commitment. These theoretical developments are warranted to create a comprehensive framework for understanding

the process of how newly acquired knowledge and prior knowledge can be integrated to generate value added products and services in the HEI.

The findings from this study also extend previous literature on absorptive capacity as it looks at it from a new domain, the HEI perspective. Based on the dynamic capability literature, this study empirically proves and theoretically asserts that absorptive capacity and its attendant knowledge management capabilities serve as catalysts that will enhance the innovative activities of higher education institutions (Asiedu et al., 2020). One reason given in the HEI literature about lack of knowledge sharing and culture in universities is the fact that academics consider themselves as creators of knowledge for their individual professions, creating an individualistic and competitive culture instead (Fullwood et al., 2013; Fullwood et al., 2017; Ramjeavon & Rowley, 2020; Tian et al., 2009). They are usually not willing to learn or create knowledge on behalf of their institutions (White & Weathersby, 2005). However, these insights will be helpful for universities seeking to be more proactive in coordinating their faculties and departments in a bid to encourage inter-functional knowledge sharing and transfer. Further, from the lens of social capital theory, which refers to the "goodwill available to individuals or groups" that are generated through social relationships (Adler & Kwon, 2002, pp. 23) and networks of relationships (Inkpen & Tsang, 2005), our study connects inter-functional coordination mechanism to inter-faculty and inter-departmental knowledge sharing in academia as governance modes for sourcing external knowledge internally.

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5.7 Policy implication of the findings

The findings from this study provide significant policy implications. Policymakers, accrediting institutions and quality assurance entities such as National Accreditation Board (NAB) and National Commission on Tertiary Education (NCTE) will also benefit from these findings by ensuring that absorptive capacity learning instruments are included in accreditation documentations as a conditional requirement for quality assurance certifications (Asiedu et al., 2020). Consequently, managers will have to focus on redesigning higher education institutions as "Learning Organizations" (LO) that support the development and involvement of all members of the university community in line with the shared goals of improving curricula, programs and research

output. They must therefore include strategic learning opportunities and collaborative knowledge sharing activities in their staff development agenda as an investment to promote a culture of information sharing. Managers must also outline clear policy frameworks and reward mechanisms for the development of the absorptive capacities of individuals and teams whose acquisition of knowledge promotes the innovative drive of the university. These efforts will promote the building of knowledge management capabilities.

5.8 Limitations and recommendations for future research

Despite the many advantages of the exploratory sequential mixed methods design adopted for this thesis, there are limitations. It is a time-consuming research approach (Creswell & Plano-Clark, 2011; Creswell, 2013) that had to be implemented under a limited time frame and difficult circumstances of the COVID 19 pandemic which impacted on the qualitative component of the study. It was very difficult getting the selected heads of departments (HODs) to confirm interview dates which had to be rescheduled several times due to the partial lockdown that had to be enforced to contain the spread of the corona virus. The HODs who participated were very kind and considerate and the researcher will be forever grateful to them for taking the risk to avail themselves for the interviews especially the face-to-face interviews, under the strict observation of the COVID 19 protocols.

There are some few limitations that must be considered when interpreting and generalizing the quantitative results of this study. Quantitative data was collected from faculty and staff of twenty (20) public and private higher education institutions in the Greater Accra region of Ghana. Although the majority of higher education institutions are clustered in this region, the results may still not be representative of all higher education institutions in Ghana.

This study also offers some directions for future research. First, extensions of our model might consider barriers and enablers of absorptive capacity in HEIs, such as openness in communication and knowledge hoarding among academics in HEIs. In addition, this study used cross-sectional design due to time constraints. Cross-sectional designs are usually not able to account for the potential time lags in cause-and-effect relationships between absorptive capacity components, inter-functional knowledge

acquisition, sharing and transfer and its associated innovative outcomes. It will take a considerable time frame to adapt a successful knowledge management strategy to promote inter-functional knowledge acquisition, sharing and transfer between faculties and departments which aim at generating innovations. Moreover, implementing absorptive capacity strategy might not immediately lead to increased innovative performance. A delayed lead time may be necessary for the university to adapt culturally to these strategies, and the effects of such change may be observable only in the long term (Rodriguez Cano, Carrillat, & Jaramillo, 2004). It would therefore be appropriate to consider longitudinal research designs in future as they may offer more suitable inferences with regard to the causal relationships among absorptive capacity, inter-functional knowledge acquisition, sharing and transfer and subsequent innovative outcomes. Finally, future studies could build on the findings of this study and examine the role of other factors such as leadership styles and funding on innovation generation in HEIs since discovering the best strategies for managing the university in these competitive environments depends to a large extent on leadership involvement and financial commitment.

6.0 References

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7.0 Appendices

Appendix 1: Sample of questionnaire

QUESTIONNAIRE

This questionnaire is designed to gather information on **Absorptive Capacity in Higher Education Institutions.** Your contribution towards completion of this questionnaire is highly appreciated. Please be assured that the information you provide will be used only for academic purposes and given the utmost confidentiality needed. You can receive the results (if you want them) at the end of this research via- maasiedu@phd.nibs.edu.gh / akusid@yahoo.com. Thank you.

SECTION A: Please, state the extent to which you agree or disagree with each of the following statements: 1 – Strongly disagree (SD), 2 – Disagree (D), 3 – Neutral (N), 4 – Agree (A), 5 – Strongly agree (SA).

ABSORPTIVE KNOWLEDGE SEARCH (Jansen et al., 2005)		**SD**	**D**	**N**	**A**	**SA**
AE I	Our university has frequent interactions with sister universities and academic partners to acquire new knowledge.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

AE 2	Our university periodically organizes special meetings with our clients and stakeholders to acquire new ideas and knowledge.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
AE 3	The search for relevant information concerning our tertiary educational industry is done on a regular basis in our university.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
AE 4	Management always ensures that new opportunities to serve our clients are quickly adopted.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
AE 5	Management motivates faculty and administrative staff to quickly analyse and interpret changing market trends.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
ABSORPTIVE KNOWLEDGE ACCUMULATION (Jansen et al., 2005)		**SD**	**D**	**N**	**A**	**SA**
AKB 1	In our university, faculties and departments record and store newly acquired knowledge for future reference.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
AKB 2	In our university, ideas and concepts are transmitted across departments and faculties for usage and storage.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
AKB 3	Our university quickly recognizes the usefulness of new external knowledge to existing stock of prior knowledge.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
AKB 4	Management ensures periodical inter-departmental and inter-faculty meetings to exchange ideas, developments, problems, practical experiences and achievements.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
SECTION A: Please, state the extent to which you agree or disagree with each of the following statements. 1 – Strongly disagree (SD), 2 – Disagree (D), 3 – Neutral (N), 4 – Agree (A), 5 – Strongly agree (SA).						
PROCESS TRANSFORMATION (Liao et al., 2003; Matusik & Heeley, 2005; Zhao & Anand, 2009)		**SD**	**D**	**N**	**A**	**SA**
AP 1	Management ensures that new external knowledge is disseminated across departments at all levels in the university.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
AP 2	We have transfer structures and routines that enable us to apply new knowledge throughout the various faculties and departments.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
AP 3	We have adopted an excellent information infrastructure for both faculty and administrative staff to share and assimilate information and knowledge.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
INTER-FUNCTIONAL COORDINATION (Narver & Slater, 1990; Zahra &Nielson 2002; Atuahene-Gima, 2005)		**SD**	**D**	**N**	**A**	**SA**
IFC 1	The activities of faculties and departments are tightly coordinated through inter-faculty and inter-departmental meetings to ensure better use of our industry knowledge.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
IFC 2	Functions of Quality Assurance, faculties, departments and administration are tightly integrated in cross-functional teams in our curriculum development processes.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

IFC 3	In this university different faculties and departments regularly share information about our clients, technologies and competitors.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
IFC 4	There is a high level of cooperation and coordination among functional departments in setting the goals and priorities for the university to ensure effective response to student conditions.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
IFC 5	Top management promotes communication and cooperation among public relations unit, faculties/departments and finance directorate in information acquisition and use.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
IFC 6	Management involves faculty and administrative staff of the university in major strategic decisions	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
KNOWLEDGE ACQUISITION (Jansen et al., 2005)		**SD**	**D**	**N**	**A**	**SA**
KA 1	Management organizes meetings with our students to acquire information on new trends and demands.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
KA 2	We frequently visit our industry partners to acquire new ideas on curricula/programmes.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
KA 3	We gather industry information through formal meetings with our stakeholders.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
SECTION A: Please, state the extent to which you agree or disagree with each of the following statements. 1 – Strongly disagree (SD), 2 – Disagree (D), 3 – Neutral (N), 4 – Agree (A), 5 – Strongly agree (SA).						
KA 4	We gather industry information through informal meetings with our stakeholders.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
KA 5	We hardly visit our industry regulators for new information and policies.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
KA 6	Our faculty staff often interact with students to gather relevant feedback.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

SECTION A cont'd: Please, state the extent to which you agree or disagree with each of the following statements from the lowest score of 1 –Very Strongly disagree (VSD), to the highest score of 7 – Very Strongly agree (VSA).								
INNOVATION GENERATION (Wang et al., 2018)								
INNG 1	In terms of promotion, our university gives priority to both faculty and administrative staff who actively engage in innovation activities.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐

INNG 2	In terms of salary increase, our university gives priority to both faculty and administrative staff who actively engage in innovation activities	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
INNG 3	Management recognizes both faculty and administrative staff for their knowledge-sharing initiatives.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
INNG 4	Management rewards both faculty and administrative staff for their knowledge-sharing and creativity initiatives	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
INNG 5	There is a policy to give support to faculty staff for their knowledge productions and improvement through publications and research output	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
INNG 6	All faculty staff offer new ideas in their area of expertise that can improve programs and curricula.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐

SECTION B: DEMOGRAPHICS.

Please put a tick [√] in the box next to the answer of your choice or write in the space provided as the case may be. Thank you for your cooperation.

1. Gender: Male [ ] Female [ ]
2. Staff Category: Academic (Faculty) Staff [ ] Administrative Staff [ ]
3. If you are an Academic (Faculty) staff, please indicate your rank?: Research Assistant [ ] Lecturer [ ] Senior Lecturer [ ] Associate Professor [ ] Professor [ ]
4. If you are an Administrative staff please indicate your level: Senior Member [ ] Senior Staff [ ] Junior Staff [ ] Other [ ]
5. How old is your University? 0-5 years [ ] 5-10 years [ ] Over 10 years [ ]
6. What is the size of your Higher Education Institution? Small-size (0 – 500 students) [ ] Medium-size (501 -2000 students) [ ] Large-size (over 2000 students) [ ]
7. Is your institution a Public University or a Private University? Public [ ] Private [ ]
8. How long have you worked in this University? 0-5 years [ ] 5-10 years [ ] Over 10 years [ ]

Appendix 2: Expert Opinion on Questionnaire

EXPERT OPINION ON QUESTIONNAIRE

SECTION A: For Content Validity, Please, state the extent to which you think each of the following statements are relevant to the above-mentioned variables.

1 – Not relevant at all (NRA), 2 – Not Relevant (NR), 3 – Not Sure (NS), 4 – Relevant (R), 5 – Very Relevant (VR).

ABSORPTIVE KNOWLEDGE SEARCH		**NRA**	**NR**	**NS**	**R**	**VR**
AE I	Our university has frequent interactions with sister universities and academic partners to acquire new knowledge.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
AE 2	Our university periodically organizes special meetings with our clients and stakeholders to acquire new ideas and knowledge.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
AE 3	The search for relevant information concerning our tertiary educational industry is done on a regular basis in our university.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
AE 4	Management always ensures that new opportunities to serve our clients are quickly understood.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
AE 5	Management motivates faculty and administrative staff to quickly analyse and interpret changing market demands.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
ABSORPTIVE KNOWLEDGE ACCUMULATION		**NRA**	**NR**	**NS**	**R**	**VR**
AKB 1	In our university, faculties and departments record and store newly acquired knowledge for future reference.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
AKB 2	In our university, ideas and concepts are transmitted across departments and faculties for usage and storage.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
AKB 3	Our university quickly recognizes the usefulness of new external knowledge to existing stock of prior knowledge.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
AKB 4	Management ensures periodical inter-departmental and inter-faculty meetings to exchange ideas, developments, problems, practical experiences and achievements.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
PROCESS TRANSFORMATION		**NRA**	**NR**	**NS**	**R**	**VR**

AP 1	Management ensures that new external knowledge is disseminated across departments at all levels in the university.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
AP 2	We have transfer structures and routines that enable us to apply new knowledge throughout the various faculties and departments.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
AP 3	We have adopted an excellent information infrastructure for both faculty and administrative staff to share and assimilate information and knowledge.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
INTER-FUNCTIONAL COORDINATION		**NRA**	**NR**	**NS**	**R**	**VR**
IFC 1	The activities of faculties and departments are tightly coordinated through inter-faculty and inter-departmental meetings to ensure better use of our industry knowledge.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
IFC 2	Functions such as public relations unit, faculties, departments and administration are tightly integrated in cross-functional teams in our curriculum development processes.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
IFC 3	In this university different faculties and departments regularly share information about our clients, technologies and competitors.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
IFC 4	There is a high level of cooperation and coordination among functional departments in setting the goals and priorities for the university to ensure effective response to student conditions.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
IFC 5	Top management promotes communication and cooperation among public relations, and finance departments in information acquisition and use.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
IFC 6	Management involves faculty and administrative staff of the university in major strategic decisions	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
KNOWLEDGE ACQUISITION		**NRA**	**NR**	**NS**	**R**	**VR**
KA 1	Management organizes meetings with our students to acquire information on new trends and demands.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
KA 2	We frequently visit our industry partners to acquire new ideas on curricula/programmes.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
KA 3	We gather industry information through formal meetings with our stakeholders.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

KA 4	We gather industry information through informal meetings with our stakeholders.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
KA 5	We hardly visit our industry regulators for information (reverse-coded).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
KA 6	Our faculty staff often interact with students to gather relevant feedback.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

INNOVATION GENERATION		**NRA**	**NR**		**NS**		**R**	**VR**
INNG 1	In terms of promotion, our university gives priority to both faculty and administrative staff who actively engage in innovation activities.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
INNG 2	In terms of salary raises, our university gives priority to both faculty and administrative staff who actively engage in innovation activities	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
INNG 3	Management recognizes both faculty and administrative staff for their knowledge-sharing initiatives.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
INNG 4	Management rewards both faculty and administrative staff for their knowledge-sharing initiatives	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
INNG 5	There is a policy to give support to faculty staff for their knowledge productions and improvement through publications and research output	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
INNG 6	All faculty and departmental staff offer new ideas in their area of expertise that can benefit the university's overall work.	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐

SECTION B: DEMOGRAPHICS. Please put a tick [√] in the box next to the answer of your choice or write in the space provided as the case may be. Thank you for your cooperation.

1. Gender: Male [ ] Female [ ]
2. Staff Category: Academic (Faculty) Staff [ ] Administrative Staff [ ]

3. If you are an Academic (Faculty) staff, please indicate your rank?: Research Assistant [ ] Lecturer [ ] Senior Lecturer [ ] Associate Professor [ ] Professor [ ]

4. If you are an Administrative staff please indicate your level: Senior Member [ ] Senior Staff [ ] Junior Staff [ ] Other [ ]

5. How old is your University? 0-5 years [ ] 5-10 years [ ] Over 10 years [ ]

6. What is the size of your University? Small-size [ ] Medium-size [ ] Large-size [ ]

7. How long have you worked in this University? 0-5 years [ ] 5-10 years [ ] Over 10 years [ ]