

# Absorptive capacity and innovation generation in higher education institutions: the mediating role of inter-functional coordination

Absorptive  
capacity

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## Abstract

**Purpose** – The purpose of this paper is to theoretically broaden the knowledge-based view (KBV) by examining the significant intermediary role that inter-functional coordination (IFC) plays in acquiring new knowledge and exploiting it throughout the entire higher education institution (HEI) community for innovation generation (INNG).

**Design/methodology/approach** – Data collected from a survey of 282 lecturers purposively selected from the business schools of 20 HEIs in the Greater Accra region of Ghana was analyzed using partial least squares structural equation model to test the hypotheses proposed for the study.

**Findings** – The results revealed that IFC significantly predicts teamwork and strong relationships across faculties, departments and units, and has a positive effect on the generation of innovations such as improved curricula, enhanced academic instruction and quality research output. Practically, the findings advise HEI managers to invest resources and efforts at building strong relationships that facilitate collaboration, trust and interactions among varying faculties, departments and units. This will enhance inter-functional knowledge sharing in academia to sustain a competitive advantage and continued relevance.

**Research limitations/implications** – There are limitations that must be considered when interpreting and generalizing the quantitative results of this study. Data were collected from faculty staff of 20 public and private HEIs in the Greater Accra region of Ghana. Although the majority of HEIs are clustered in this region, the results may still not be representative of all HEIs in Ghana.

**Practical implications** – Managers of HEIs are advised to commit to ensuring the management of IFC to promote knowledge sharing across faculties and departments. Managers are also advised to ensure that staff are made to be responsible for their cooperative and integrative teamwork. They are also advised to ensure that faculty and departmental goals are aligned with the overall goals of the university. Staff may also be encouraged to act as partners and not just employees through rewards, incentives and recognition packages.

**Social implications** – Attention should be focused on creating lateral relations among faculty and department members to achieve internal social capital. They are advised to invest resources and efforts in building a culture of teamwork and connectedness through strong informal networking that facilitate collaboration between faculties and departments while cultivating a shared vision throughout the university.



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**Originality/value** – The main contribution of this paper is that it theoretically extends the KBV by empirically broadening the scope of absorptive capacity (ACAP) beyond its dimensions to include the “collaborative mechanism” (IFC) through which knowledge can be holistically exploited. The paper also contributes to existing literature by examining the intermediary role played by IFC in the relationship between ACAP and INNG in the HEIs domain which has been least discussed in the ACAP literature.

**Keywords** Absorptive capacity, Knowledge acquisition, Inter-functional coordination, Innovation generation, Higher education institution

**Paper type** Research paper

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## Introduction

Globalization and its attendant competition have stimulated innovation generation (INNG) in education, in particular, in higher education institutions (HEIs). Acquiring knowledge is now regarded as an impetus for organizational relevance, as a source of competitive advantage and also as a matter of survival in this fast-paced knowledge-based economy that is characterized by quick technological changes, shorter product life cycles and complex demands (Alnafrah & Mouselli, 2019; Nham et al., 2020; Osobajo & Bjeirmi, 2021). Achieving high performance is no longer contingent on possessing tangible assets, but rather on the interplay of both tangible assets and organizational knowledge (Asiedu et al., 2020). The HEI 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 (Moon et al., 2019). Managing knowledge is therefore crucial, not only in commercial organizations but also in HEIs (Fullwood et al., 2019; Ibrahim & Ali, 2021; Paudel, 2020; Ramjeawon & Rowley, 2020).

Absorptive capacity (ACAP) refers to the ability of any establishment to recognize valuable new external knowledge, assimilate it in addition to its existing internal knowledge and apply it for commercial gains (Cohen & Levinthal, 1990). In spite of the fact that ACAP has been generally accepted and recognized as a crucial antecedent of INNG, only few studies have actually examined the in-depth reasons why and under what circumstances or conditions ACAP is able to affect innovation (Yang & Tsai, 2019). For this reason, organizational mechanisms of ACAP have been consistently overlooked in the literature (Barakat, 2021; Song et al., 2018; Volberda et al., 2010), despite the fact that Cohen and Levinthal (1990) 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). 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; Nguyen et al., 2018; Song et al., 2018). 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 et al., 2005; Volberda et al., 2010; Zou et al., 2018). Given the fact that knowledge resides in the individual (Grant, 1996) and needs to be shared or transferred through an enabling mechanism (Song et al., 2018), an organization cannot create a shared vision and identity without enhancing communication, trust and coordination (Jameson, Barnard, Rumyantseva, Essex & Gkinopoulos, 2022; Yang & Tsai, 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.

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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 functional departments in the accomplishment of the organization’s tasks” (Lawrence & Lorsch, 1967). IFC therefore fosters better collaboration and communication to improve relationships between teams who possess different functional skills, experiences and knowledge (Auh & Menguc, 2005; Narver & Slater, 1990).

Technology also plays a vital role in attaining quality product and service delivery in HEIs (Abass et al., 2021). Knowledge sharing and transfer are activities in HEIs that requires full implementation of information technology (IT) applications to diffuse knowledge from teaching and research through various e-learning and blended e-learning platforms. Knowledge dissemination processes must involve technologies, people and structures to develop strong digital-based learning and innovative digital culture, for effective collaboration that will strengthen their value creation abilities (Rupčić, 2021). In HEIs, a successful knowledge management strategy is contingent, not only on synergies among faculty and administrative members but on software tools and applications (Abass et al., 2021). Again, to boost competitiveness, the successful management of knowledge must also be founded on the availability of efficient and effective knowledge-centered faculty and administrative members.

Even though it is expected that the HEI is a place where knowledge is freely shared among academics because 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 (Ramjeawon & Rowley, 2020; Fullwood et al., 2019). Within the academic environment, academics place a high premium on individual scholarly achievement rather than on the overall goal achievement of the university. Most academics are rather interested in their self-preservation instincts as they see knowledge as being too valuable to be parted with freely (Asiedu et al., 2020; Fullwood et al., 2019). The lack of zeal to share knowledge is even deepened when academics possess certain “specialized knowledge” that others do not possess. It is advisable to successfully integrate faculties and departments to remain innovative without compromising the benefits of specialization (Lee & Kapoor, 2017).

The main contribution of this paper is that it broadens the scope of ACAP beyond its dimensions to include the “collaborative mechanism” (IFC) through which knowledge can be holistically exploited. It then examines the intermediary role played by IFC in the relationship between ACAP and INNG in HEIs. This is necessary to advance both theory and practice, because it is fundamentally important to know how and why an effect occurs to understand any phenomenon. As a mediator, IFC will play the role of revealing the true relationship between the independent and dependent variables (Hair et al., 2022). This mediation is important because IFC will serve as a conduit through which identified knowledge can be acquired holistically and exploited for the desired innovative results in the HEI space.

### **Literature review and hypotheses development**

ACAP is a strategic function that enables organizations to identify new knowledge for efficient usage to accrue long-term benefits (Cohen & Levinthal, 1990). From the theory of ACAP, Cohen & Levinthal (1990) and Zahra & George (2002) propose that an organization’s strength of ACAP is dependent on its prior knowledge and diversity. This prior knowledge helps the organization to understand the usefulness of new external knowledge to recombine it with the existing knowledge and transform them to suit its purposes such as finding new ways to solve problems. This is the reason why ACAP positively impacts essential organizational outcomes like innovation. Extant conceptual research has been done on ACAP to reflect its positive relationship with innovation (Lane et al., 2006; Volberda et al., 2010; Zahra & George, 2002). Further other findings from two meta-analyses have

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supported the positive link between ACAP and innovation although they posit it is an indirect link (Song et al., 2018; Zou et al., 2018). ACAP is closely related to knowledge management as well as organizational learning (Gao et al., 2017).

External knowledge which is deemed valuable is identified after great efforts at searching and scanning the environment (Cohen & Levinthal, 1990; Song et al., 2018). This core function is known as *Knowledge Search* in the HEI domain (Asiedu & Doe, 2022). 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. The organization then stocks up and accumulates knowledge continuously to understand and transform external knowledge for use internally (Song et al., 2018). This core function is known as *knowledge accumulation* in the HEI domain (Asiedu & Doe, 2022). Finally, the organization puts in place its own internal procedures and processes to enable the sharing and diffusion of external knowledge internally (Reus et al., 2009; Song et al., 2018). This core function is known as *process transformation* in the HEI domain (Asiedu & Doe, 2022). These three functions come together to activate the ACAP process within the university space.

IFC 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; Tomášková, 2018). 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. In this regard, IFC enhances the achievement of common goals in an organization when integrated functional units synergistically strive to attain holistic team success (Atuahene-Gima, 2005). When the organizational culture exhibits an appreciable level of inter-departmental teamwork within the organization, its goals are easily executed and achieved (Atuahene-Gima, 2005). Organizations can therefore achieve internal sources of social capital through the collaboration of different functional units (Auh & Menguc, 2005; Tsai & Ghoshal, 1998). As an integration mechanism, IFC likely to play a key role in translating externally absorbed knowledge into INNG as different functions within an organization coordinate interact, communicate, share information (Narver & Slater, 1990) in an environment of trust and cooperation which also reflects the mutual alignment of inter-functional interdependencies (Swink & Schoenherr, 2015). This mechanism ensures 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 (Yang & Tsai, 2019). Internal knowledge acquisition is also facilitated through the existence of the connections and relationships among different faculties or functions (Tomášková, 2018) whose members show willingness to share or exchange knowledge and ideas, based on mutual trust.

INNG is a process which involves developing and adopting new methods, ideas, policies and programs for the achievement of organizational goal (Butnariu, 2020; Cohen & Levinthal, 1990; Hameed et al., 2021; Yang & Tsai, 2019). It is seen to be a dominant factor for consolidating global competitiveness (Butnariu, 2020; Liu et al., 2021) 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).

The "absorptive knowledge search" of HEIs 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

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acquired to enhance the university's overall performance output (Choi & Park, 2017; Cohen & Levinthal, 1990). HEIs 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 that require "intensity of effort" as a critical element (Song et al., 2018) 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). Additionally, the absorptive knowledge search of the HEI must be "forward looking" (Song et al., 2018) 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. We therefore hypothesize that:

*H1.* Absorptive knowledge search is positively related to knowledge acquisition in HEIs.

The absorptive knowledge accumulation of HEIs refers to the stock of knowledge that has been previously acquired and stored by the institution, referred to as "prior knowledge." Prior knowledge is very important as learning is associative (Gagne, 1962) and this prior knowledge helps to understand the usefulness of new external knowledge so that the latter can be acquired. This means that prior knowledge helps to link the new knowledge with the existing one. Gagne's (1962) theory of hierarchical learning argued that an individual who has existing or prior knowledge can easily acquire related new knowledge. This prior knowledge helps HEIs to understand the usefulness of external new knowledge and enables them to recombine it with the existing knowledge and transform both together to suit their purposes, such as, finding new ways to solve problems or create new curricula and programs. (As argued by Cohen & Levinthal (1990), Zahra & George (2002) the ACAP of an organization is dependent on its prior knowledge which helps to better understand new knowledge whilst enhancing the stock of knowledge. This presupposes that the absorptive knowledge accumulation of HEIs must be built on foundations that are past oriented, and path dependent and require that newly acquired knowledge is related to facilitate easy comprehension and a smooth transformation process. Knowledge stocks accumulated by the HEI could be in the form of patents and intellectual properties, scientific publications and prior product innovations (Srivastava et al., 2015). Understanding new external knowledge facilitates easy transformation and exploitation of such new knowledge by functioning as a "processor" (Song et al., 2018). As learning is associative, an individual who has existing or prior knowledge can easily acquire related new knowledge (Gagne, 1962). Furthermore, existing knowledge possesses lower-order capabilities that enable an individual to gain higher-order capabilities which are embedded in the new knowledge. We therefore hypothesizes that:

*H2.* Absorptive knowledge accumulation is positively related to knowledge acquisition in HEIs.

The absorptive process transformation (APT) of HEIs, 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" (Song et al., 2018). Cohen and Levinthal (1990) earlier suggested that the ACAP of an organization is contingent on the establishment of knowledge-sharing

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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 et al., 2021). 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 et al., 2021). Equally important are improved IT systems for networking to help create opportunities for knowledge management in the academic environment. It is recommended that managers of HEIs invest in advanced technological infrastructure toward the acquisition of knowledge. This will facilitate the achievement of improved curricula, program content and relevance. Furthermore, it is suggested that they create community-based learning and inter-disciplinary research and teaching and also implement structures and networks to reward people for supporting collaborations (Kezar et al., 2020). APT makes learning more interactive because institutional practices like socialization, integration and collaboration of differing functions are required to share knowledge and its various applications (Jansen et al., 2005). This is also affirmed by Lo and Tian (2020) who propose the promotion of knowledge sharing among different units in universities because synergy could be achieved when colleges, schools or departments collaborate. By so doing, relevant knowledge will be distributed or transmitted to every faculty, department or unit within the HEI (Tomášková, 2018). APT also facilitates the storing and retrieval of knowledge holistically for the institution. We therefore hypothesize that:

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

#### *Mediating role of inter-functional coordination*

A mediator variable plays the role of revealing the true relationship between the independent and dependent variables (Hair et al., 2022). Drawing from knowledge-based perspective, this study hypothesizes that IFC may mediate the relationship between the ACAP dimensions and knowledge acquisition for the generation of innovations in HEIs. When social integration mechanisms are connected to ACAP they can help the university to create a shared identity and mission, which can enhance trust and improve communication and collaboration across differing functional departments (Kezar et al., 2020; Lo & Tian, 2020; Yang & Tsai, 2019). This facilitates the development and implementation of new programs, curricula and research output. Integration differing functional 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, & 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 departments will enable the university to better integrate marketing, R&D and other complementary knowledge resources to create new knowledge which facilitates innovation (Lin et al., 2015). IFC is therefore a necessary mechanism through which externally acquired knowledge can be effectively integrated and transformed into innovation outcomes. Universities with a high ACAP are more likely to develop greater IFC, which will enhance their innovation gains. Apart from reaping external knowledge together through their collective absorptive effort, this collaboration will facilitate the generation of new internal knowledge resources (Tsai & Ghoshal, 1998) through their

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coordination with other functional departments and faculties, thereby creating strength and dynamic capabilities from the synergistic effects of IFC. We therefore hypothesize that:

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

The HEI's storehouse of knowledge represents its most valuable resource, which makes it relevant in this competitive knowledge economy. 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. Moreover, in the process of linking external knowledge to the university's prior knowledge competencies, IFC will facilitate both the reinterpretation of diverse perspectives and the recombination of existing competencies to generate novel ideas (Lin et al., 2015). 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 (Yang & Tsai, 2019). 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; Nonaka, 1994). An integrative mechanism like IFC is therefore required as a conduit for sharing and transmitting both tacit and explicit knowledge to every faculty, department and unit within the university, to facilitate the storing of university-wide knowledge (Jansen et al., 2005). We therefore hypothesize that:

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

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. HEI managers are thus advised to emphasize the need for studying staff behavior to determine the technologies that could foster goal achievement through the development of strong digital-based learning and innovative digital culture, for effective collaboration that strengthen their value creation abilities (Rupčić, 2021). Digital culture refers to the ability of the internet as a dynamic and robust place for collaboration where people can gather to share, participate and coordinate around common interests (Boyd, 2014). This encourages the building of collaborative intentions that will eventually be translated into action (Bartels & Koria, 2014). As Schomaker & 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, ACAP can help differing functional departments to overcome barriers to collaboration and achieve unity of effort through IFC. Additionally, the need to assimilate externally acquired knowledge will encourage different faculties, departments and units to cooperate and

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TLO share information and in the transfer of valuable external knowledge to the university (De Luca & Atuahene-Gima, 2007). We therefore hypothesize that:

*H6.* The positive relationship between APT and knowledge acquisition is mediated by IFC in HEIs.

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). IFC and knowledge sharing will enable the university to develop a knowledge integration capability (Gardner et al., 2012). Even though the academic environment is characterized by individualistic tendencies, the practice of IFC 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, 2005; Narver & Slater, 1990). IFC 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 HEI. We therefore hypothesize that:

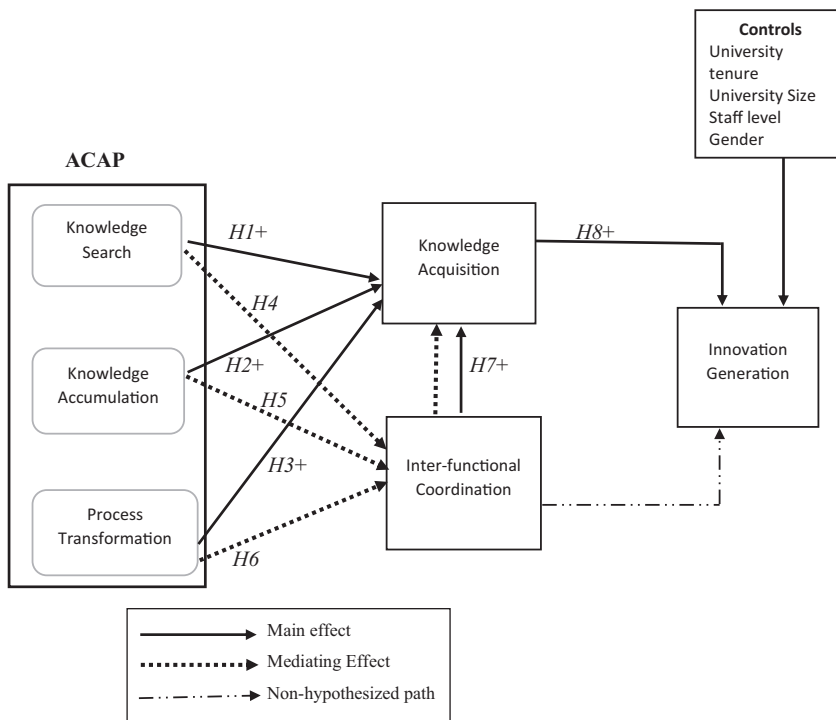
*H7.* IFC is positively related to knowledge acquisition for INNG in HEIs.

The knowledge-based view reiterates that knowledge is a valuable resource of organizations and by implication for HEIs. It is therefore central to institutional innovation (Von Krogh et al., 2012). Acquiring new knowledge has become a key strategic resource for innovation (Butnariu, 2020; Cohen & Levinthal, 1990; Hameed et al., 2021). 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 organizational members to acquire to establish new routines for solving problems (Von Krogh et al., 2012). Innovation is not solely an internal affair so HEIs need to be aware of their clients' current economic trends, external ideas and current research. They also require different human capital skills 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 (Voolaid & Ehrlich, 2017). For this reason, HEIs need to build capacities that will enable them respond to the changing needs of the external environment by continuously searching for and acquiring new knowledge, transforming them and, above all, diffusing new knowledge internally within faculties or departments to churn out innovative program combinations and better research output. We therefore hypothesize that:

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

### **Conceptual framework**

The conceptual framework (Figure 1) has 5 key success factors adapted from the studies of Song et al., (2018) with modifications in line with this study. Innovation generation (INNG) 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



Source: Adapted and modified from Song *et al.*, 2018

Absorptive capacity

**Figure 1.**  
Conceptual framework of ACAP process

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).

## Methodology

### *Measurement instrument*

To improve content validity the measurement items for the latent variables used in this study were obtained from previous studies (Straub *et al.*, 2004). The statements were then reworded and modified to fit our specific context, the HEI industry. Items for measuring the independent variables “absorptive knowledge search” (AKS) and “absorptive knowledge accumulation (AKA) were based on the Potential ACAP and Realized ACAP scales by Jansen *et al.* (2005). This scale was similarly adapted by Zhao *et al.* (2021) who focused on the mediating role of ACAP and individual creativity in the link between knowledge sharing and organizational innovation performance. Respondents were instructed to evaluate the survey items on a five-point Likert-type scale ranging from the lowest score of 1 (strongly disagree) to the highest score of 5 (strongly agree). For “absorptive knowledge search” (AKS) statements by Jansen *et al.* (2005) were modified into the following:

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- Our university has frequent interactions with sister universities and academic partners to acquire new knowledge.
- Our university periodically organizes special meetings with our clients and stakeholders to acquire new ideas and knowledge.
- Management motivates faculty and administrative staff to quickly analyze and interpret changing market trends.

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For “absorptive knowledge accumulation” (AKA), modified statements which were measured included the following:

- In our university, faculties and departments record and store newly acquired knowledge for future reference.
- Ideas and concepts are transmitted across departments and faculties for usage and storage.
- Our university quickly recognizes the usefulness of new external knowledge to the existing stock of prior knowledge.

APT was also developed following the approach by [Liao, Welsch & 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 organization ([Liao et al., 2003](#); [Matusik & Heeley, 2005](#); [Zhao & Anand, 2009](#)). Modified statements which were measured included the following:

- Management ensures that new external knowledge is disseminated across departments at all levels in the university.
- We have transfer structures and routines that enable us to apply new knowledge throughout the various faculties and departments.
- We have adopted an excellent information infrastructure for both faculty and administrative staff to share and assimilate information and knowledge.

For our mediator variable “inter-functional coordination” modified statements, following the approach by [Narver & Slater \(1990\)](#) and [Atuahene-Gima \(2005\)](#) were developed. The modified statements which were measured included the following:

- The activities of faculties and departments are tightly coordinated through inter-faculty and inter-departmental meetings to ensure better use of our industry knowledge.
- Functions of quality assurance, faculties, departments and administration are tightly integrated in cross-functional teams in our curriculum development processes.
- In this university different faculties and departments regularly share information about our clients, technologies and competitors.

Knowledge acquisition, had a two-fold relationship as an independent as well as dependent variable ([Hair et al., 2022](#)). As an independent variable it predicted INNG, and as a dependent variable, it was also predicted by AKS, AKA and APT. Modified statements, following the approach of [Jansen et al. \(2005\)](#) were developed and respondents were instructed to evaluate the following survey items:

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- Management organizes meetings with our students to acquire information on new trends and demands.
  - We frequently visit our industry partners to acquire new ideas on curricula/ programs.
  - We gather industry information through formal meetings with our stakeholders.

Items for measuring the dependent variable “innovation generation” (INNG) were adapted from [Wang, Zhao, & Zhou's \(2018\)](#) innovation incentives scale. Statements which were measured included the following:

- In terms of promotion, our university gives priority to both faculty and administrative staff who actively engage in innovation activities.
- In terms of salary increase, our university gives priority to both faculty and administrative staff who actively engage in innovation activities.
- Management recognizes and rewards both faculty and administrative staff for their knowledge-sharing initiatives.

#### *Sample and data collection*

The study population for the data collection was the HEI industry and the unit of analysis was faculty staff. Data was collected from the business faculties of four public and 16 private universities in the Greater Accra Region of Ghana. According to the *Ghana Tertiary Education Commission* (GTEC) there were four public and 77 private universities in the Greater Accra Region as at the 2019/2020 academic year when we embarked on this research. We used the purposive sampling approach which is a non-probability sampling technique. This technique was the deliberate choice for information gathering because the business faculties of HEIs are highly competitive, with investments in knowledge creation and dissemination and a quick response to market needs. And this method was justified by the interest to include only HEIs which have a mission for research and innovation-driven activities. The overall number of faculty staff in the business schools of these 20 universities was 820. One good thing about studying the HEI industry is the fact that most participants are highly educated making it easy for them to deliver responses in fluid English language. Standardized structured interview and survey procedures were used, administering survey questionnaires in-person to 380 faculty staff out of which 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 resulting in an effective response rate. This sample represents a fairly typical sector in HEIs; however, it is still not representative of all HEIs in Ghana. This number exceeds the minimum sample size requirement of the ten times rule recommended by [Hair et al. \(2022\)](#). Out of the 282 valid responses, 171 (60.6%) were from males, whilst 111 (39.4%) were from females. Permission had been sought and granted from the various deans of the business schools through formal letters. Responses were sought from willing participants who were available and accessible at the time of data gathering through convenient sampling, which was affordable and quick to implement ([Battaglia, 2008](#)).

#### *Data analysis method*

The partial least squares of structural equation model (PLS-SEM) path modeling is a causal-predictive method used to build theories about the factors that lead to a certain

conclusion (Richter *et al.*, 2020). Despite the fact that PLS-SEM technique has been criticized by some authors, it has gained much popularity in recent times. The major advantage is that PLS-SEM is less restrictive regarding sample size and normality assumptions. Preliminary analysis of the survey data suggests that the data was not normally distributed and hence our choice of PLS-SEM. This study applied PLS-SEM in conformity with the guidelines established by Hair *et al.* (2022), which cover a variety of evaluations like reliability, convergent validity, statistical significance and others. The two-step approach recommended by Chin (1998) was adopted for analyzing the data. First, the measurement model was assessed for reliability, convergent validity and discriminant validity. Once the measurement model was found to be adequate, the structural model was tested to ascertain the significance of the hypothesized relationships

*Results and analysis*

The measurement model was assessed for composite reliability, convergent validity and discriminant validity. Table 1 shows that all latent variables are reliable. This is because values of both Cronbach’s alpha and composite reliability are higher than the 0.7 threshold set by Henseler *et al.* (2009). Average variance extracted (AVE) was used to assess convergent validity and factor loadings of items. Again, it can be clearly seen from Table 1 that the AVE values for all the constructs are greater than the 0.5 threshold (Henseler *et al.*, 2009), therefore the measurement model shows a good convergent validity.

CONSTRUCT	AKS	AKA	APT	IFC	INNG	KA	CA ( $\alpha$ )	CR	95% CI		AVE
									LB	UB	
AKS1	0.826	0.417	0.374	0.330	0.289	0.319	0.736	0.845	0.82	0.87	0.647
AKS2	0.876	0.435	0.488	0.452	0.415	0.367					
AKS3	0.701	0.461	0.463	0.313	0.217	0.322					
AKA1	0.460	0.771	0.560	0.374	0.286	0.453	0.752	0.856	0.83	0.88	0.665
AKA2	0.387	0.826	0.545	0.480	0.361	0.441					
AKA3	0.461	0.848	0.530	0.421	0.427	0.396					
APT1	0.437	0.479	0.782	0.390	0.330	0.376	0.751	0.858	0.84	0.88	0.668
APT2	0.476	0.561	0.857	0.473	0.375	0.432					
APT3	0.424	0.580	0.811	0.417	0.369	0.443					
IFC3	0.356	0.411	0.433	0.820	0.435	0.525	0.769	0.867	0.85	0.89	0.686
IFC4	0.428	0.456	0.443	0.893	0.490	0.489					
IFC5	0.369	0.432	0.427	0.766	0.397	0.392					
INNG1	0.322	0.382	0.316	0.382	0.778	0.472	0.901	0.924	0.90	0.94	0.672
INNG2	0.280	0.337	0.342	0.420	0.835	0.417					
INNG3	0.338	0.358	0.387	0.504	0.870	0.460					
INNG4	0.332	0.343	0.355	0.472	0.882	0.429					
INNG5	0.349	0.406	0.368	0.421	0.834	0.336					
INNG6	0.345	0.372	0.381	0.415	0.704	0.298					
KA2	0.356	0.420	0.444	0.485	0.429	0.835	0.761	0.861	0.84	0.88	0.675
KA3	0.369	0.492	0.454	0.546	0.462	0.890					
KA4	0.297	0.355	0.354	0.339	0.300	0.732					

**Table 1.** Factor loadings, cross loadings and reliability statistics

**Notes:** 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, CR = composite reliability, AVE = average variance extracted  
**Source:** Field data (2020)

Validity refers to “the degree to which evidence and theory support the interpretations of test scores for proposed uses of tests” (AERA et al., 2014, p. 11). Different sources are now considered for validity evidence. For example, for validity evidence based on test content, we sought the opinion and judgement of three experts who are seasoned academics (deans of business schools) on the relevance, adequacy and clarity of the interview instrument as a pre-test to determine its appropriateness and how well the items represent the proficiencies intended to be measured (Yaghmaie, 2003). Further, for validity evidence based on relations to other variables, validity is assured when these conditions are met:







- The loadings of each construct is greater than the cross loadings with other constructs (Chin, 1998).
- The square root of the AVE for each construct is greater than the correlation between that construct and any other construct (Fornell & Larcker, 1981).
- The heterotrait–monotrait (HTMT) values of correlations are less than 0.85 (Henseler et al., 2009).

The results in Table 2 shows that the square root of the AVE for each construct is greater than the cross correlation with other constructs. Again, results of the more recent HTMT 0.85 criterion presented in Table 3 also proves that validity has been achieved. The standard provides a logical structure that maps the items of the construct to the content domain, illustrating the relevance of each item and the adequacy with which the set of items represents the content domain (AERA et al., 2014). In all, the results showed that the psychometric properties of the measures used in the study were adequate.

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

**Table 2.** Discriminant validity test using the Fornell and Larcker criterion (square root of AVEs in diagonal and in bold)

Source: Field data (2020)

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	

**Table 3.** Discriminant validity test of constructs using the HTMT criterion

Note: All correlation values of HTMT are less than 0.85 (Henseler et al., 2009)

Source: Field data (2020)

*Structural model assessment*

After verifying the measurement model to be reliable and valid, we assessed the structural model. We used the bootstrapping resampling procedure (5,000 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 using the standardized root mean square residual (SRMR). The SRMR value for a good model fit must be below 0.08, and because this study's model of 0.069 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 4](#).

**Discussion of results**

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 hypotheses, seven are supported in the present context. With the exception of *H1*, all the hypotheses were supported.

Absorptive knowledge search was not found to directly affect knowledge acquisition in the HEI ( $\beta = 0.059, t = 0.837, p < 0.201$ ). This means that the absorptive knowledge search of the HEI 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 IFC ( $\beta = 0.018, t = 2.511, p < 0.006$ ). This means that when different functional units come together synergistically to search for valuable external knowledge, their efforts to acquire knowledge can be successful. *H1* was not supported in this context.

Absorptive knowledge accumulation was found to positively and significantly predict knowledge acquisition in the HEI ( $\beta = 0.205, t = 2.620, p < 0.004$ ). 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 knowledge to facilitate the knowledge acquisition for the HEI. *H2* is supported in this context.

APT 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 knowledge acquisition within the HEI. *H3* is supported in this context. These findings are similar to those of [Vasconcellos \(2019\)](#) which explain the different dimensions of ACAP through a process and

Hypotheses	Hypothesized path	Path coefficient ( $\beta$ )	<i>t</i> -Values	<i>p</i> -Values	Hypothesis results
<i>H1</i>	AKS → KA	0.059	0.837	0.201	Not supported
<i>H2</i>	AKA → KA	0.205	2.620	0.004	Supported
<i>H3</i>	APT → KA	0.158	2.220	0.013	Supported
<i>H4</i>	AKS → IFC → KA	0.018	2.511	0.006	Supported
<i>H5</i>	AKA → IFC → KA	0.025	2.944	0.002	Supported
<i>H6</i>	APT → IFC → KA	0.097	2.973	0.001	Supported
<i>H7</i>	IFC → KA	0.352	5.585	0.000	Supported
<i>H8</i>	KA → INNG	0.276	4.938	0.000	Supported

**Table 4.**  
Assessment of  
hypotheses

**Source:** Field data (2020)

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structure approach, that knowledge acquisition, transformation and integration are realized through exploration and exploitation of new knowledge.

IFC was found to positively and significantly mediate the relationship between the absorptive knowledge search and knowledge acquisition in HEIs ( $\beta = 0.019, t = 2.511, p > 0.006$ ). This is a full mediation. According to Baron & Kenny's (1986) recommendation, if the effects of the independent variable (AKS) on the dependent variable (KA) disappear after mediator (IFC) controlled, it is called a full or complete mediation (Baron & Kenny, 1986). IFC accounts for all (and not some) of the observed relationship between AKS and KA in an "indirect only mediation" procedure. *H4* is supported in this context.

IFC was found to significantly mediate the positive relationship between the AKA and KA in HEIs. This is a partial mediation which means that the path from the independent variable to dependent variable (AKA) is reduced but is still significant ( $\beta = 0.025, t = 2.944, p > 0.002$ ) when the mediator (IFC) is introduced (Baron & Kenny, 1986). So based on this criterion, the effect of AKA (independent variable) on KA (dependent variable) is reduced but is still significant after introducing IFC (mediator variable). *H5* is supported in this context.

IFC was again found to significantly mediate the positive relationship between the APT and KA in HEIs. This is a partial mediation which means that the path from the independent variable (APT) to dependent variable (KA) is reduced but is still significant ( $\beta = 0.097, t = 2.973, p > 0.001$ ) when the mediator (IFC) is introduced (Baron & Kenny, 1986). *H6* is supported in this context.

IFC was found to positively and significantly predict KA in the HEIs ( $\beta = 0.352, t = 5.585, p > 0.000$ ). This means that IFC is an essential integration mechanism in HEIs. *H7* is supported in this context. These findings endorse the findings of Yang & Tsai (2019, p. 126) which reveal that "absorptive capacity requires cross-functional integration (as an intermediate mechanism) to enhance innovation performance. This is also similar to a work by Diriye (2019) which examines the relationship between knowledge sharing and social capital in the HEI environment. This is consistent with another by study Lo & Tian (2020) who propose the promotion of knowledge sharing among different units in universities because synergy could be achieved when colleges, schools or departments collaborate.

Knowledge acquisition was found to positively and significantly predict innovation in the HEI ( $\beta = 0.276, t = 4.938, p > 0.000$ ). This result shows that when the HEI 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.

## Conclusion

The results of the hypotheses assessments reveal that IFC is an essential institutional mechanism in HEIs 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 ACAP process can therefore not be complete unless we go through an important organizational mechanism; IFC, to yield innovations for the HEI. The benefits of enhancing IFC in knowledge sharing and transfer among faculties and departments is clear. The findings have revealed that a high level of IFC will improve institutional performance by way of INNG.

*Theoretical, managerial and policy implications*

The theory of social capital, which is in consonance with the concept of IFC, 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, 2002; Burt, 1997; Coleman, 1988; Inkpen & Tsang, 2005; Lo & Tian, 2020; Nahapiet & Ghoshal, 1998; Nguyen & Ha, 2020; Putnam, 1995). IFC helps to eliminate departmental barriers, paving the way for access to the strategic resources aforementioned.

It is recommended that managers of HEIs commit to ensuring the management of IFC to promote knowledge sharing across faculties and departments. We also suggest that they focus on creating lateral relations among faculty and department members to achieve internal social capital (Diriye, 2019). They could also invest resources and efforts at encouraging the building of teamwork and connectedness through strong informal networking that facilitate collaboration between faculties and departments while cultivating a shared vision throughout the university (Yang & Tsai, 2019). When teamwork efforts coordinate different faculties and departments, strong personal relationships are built, and this can lead to high levels of trust, communication and interactions among departments to enhance inter-functional knowledge sharing. Further, managers are encouraged to ensure that staff are made to be responsible for their cooperative and integrative teamwork. Finally, it is suggested that that faculty and departmental goals are aligned with the overall goals of the university. Staff could also be encouraged to act as partners and not just employees through rewards, incentives and recognition packages.

This paper also theoretically extends the knowledge based view by empirically broadening the scope of ACAP beyond its dimensions by incorporating the institutional enabler mechanism - IFC into the process. It further empirically examines the intermediary role played by IFC in the relationship between ACAP and knowledge acquisition for INNG in HEIs. These findings are similar to Yang & Tsai (2019, p. 126) who theorize that “absorptive capacity requires cross-functional integration (as an intermediate mechanism) to enhance innovation performance.

Policymakers, accrediting institutions and quality assurance entities will also benefit from these findings by ensuring that ACAP 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 HEIs 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. They must therefore include strategic learning opportunities and collaborative knowledge sharing activities in their staff development agenda as an investment to promote teamwork and information sharing. Policymakers 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.

*Limitations and directions for future research*

There are limitations that must be considered when interpreting and generalizing the quantitative results of this study. Data was collected from faculty and staff of 20 public and private HEIs in the Greater Accra region of Ghana. Although the majority of HEIs are clustered in this region, the results may still not be representative of all HEIs in Ghana.

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This study also offers some directions for future research. First, extensions of our model might consider enablers and barriers of ACAP 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 ACAP 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. 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 ACAP, inter-functional knowledge acquisition, sharing and transfer and subsequent innovative outcomes. Finally, future researchers could conduct a study to explore the reasons for non-cooperation among some academics in HEIs, such as trust. They could examine the impact of trust as an essential element for effective functioning of HEIs (Jameson, Barnard, Rumyantseva, Essex & Gkinopoulos (2022), as limited knowledge exists on how trust operates in this domain.

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