



Towards a Framework for Managing Knowledge Assets in Higher Education

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Abstract: *In a fast-changing educational environment that is increasingly being driven by knowledge, higher educational institutions (HEI) are being forced to develop and apply knowledge assets management approaches in order to enhance the provision of academic services by linking knowledge assets management initiatives and processes with the ever-changing higher education needs and goals. The purpose of this paper is to propose a framework for managing knowledge assets in higher education to advance their goals. The development of the framework uses insights from the social character of knowledge and the task-technology fit theory to propose a framework consisting of three knowledge assets management pillars: knowledge assets, knowledge assets enabling ICT and knowledge assets management processes, to constitute the main dimensions of the framework. By using the reflections from the above insights to show the links between knowledge assets, enabling ICT and knowledge assets management processes, this paper does not only give guidance for improved management of knowledge assets in higher education, but also stimulate further discussions and research in the field of study so as to generate additional improved theoretical and practical results.*

Keywords: *Knowledge Assets; Management; Framework; Higher Education*

1. INTRODUCTION

In the present information and knowledge era, knowledge has become a key resource to gain a competitive edge in an increasingly competitive dynamic environment, and organizations are beginning to realize that there is a vast and largely untapped assets diffused around in the organization – knowledge (Gupta, Iyer and Aronson, 2000). The conventional function of higher education is to generate knowledge for teaching, learning, research and provision of outreach services to society through effective knowledge assets management for improved service delivery in higher education. This improvement is achieved through creating an organizational culture of sharing knowledge and expertise within higher education. However, higher education institutions (HEI) face innumerable challenges in nurturing and managing knowledge assets. The challenges occur because only a part of knowledge is internalized by the organization; the other is internalized by individuals (Bhatt, 2002). TFPL (1999) argued that for HEI to compete effectively in the knowledge economy, they need to change their values and establish a new focus on creating and using intellectual assets, as higher education depends on their ability to utilize information and knowledge of all its stakeholders to better serve the needs of the academic community. Lee (2000) pointed out that the knowledge and experiences of higher education stakeholders are the intellectual assets that should be valued and shared.

In the current highly globalized world, competitive advantage and human resource development in higher education will not only depend on access to knowledge at the local, institutional, national, regional and international levels, but also on the strength of the HEI own knowledge assets base through both the ability to generate and locate existing raw knowledge, and to convert the knowledge raw materials into something productive in innovative and creative ways. According to Malhotra (2003), every society owns or controls a number of knowledge assets and the management of this stored knowledge as embodied in individuals, institutions and systems, as well as the potential to enhance existing knowledge assets and generate new knowledge; is very useful and serve as a valuable diagnostic, awareness raising and advocacy tool; pinpoint shortfalls in available knowledge

resources; and mobilize political support for remedial measures to be taken to address knowledge resource challenges in higher education. HEI should therefore rethink and explore ways to improve their services and become learning organizations in which knowledge assets management play key roles in capturing and sharing tacit and explicit knowledge.

In today's knowledge driven economy, higher education managers are faced with the challenge of how to effectively link knowledge assets management initiatives and processes with their ever-changing needs. If knowledge is to be effectively managed and utilized, knowledge assets management researches in higher education should be made to link with institutional goals such as enhanced research, innovations and competitiveness. Blood good and Salisbury (2001) emphasize that every organizations should identify where knowledge resides in the organization due to its importance when designing knowledge assets management strategy so as to ensure that knowledge is being created, transferred and protected with the right individuals using appropriate enabling ICT. This paper develops a framework for managing knowledge assets in higher education by reviewing of relevant background concepts; looks at work related to knowledge assets management in higher education, and makes a presentation on the proposed framework for knowledge assets management. Finally, the implications of the proposed knowledge assets management framework in practice and concluding remarks are made. It is hoped that the development of the framework can contribute to understanding the theories and practices of knowledge assets management in higher education and guide ongoing/future research in the same field as part of a broader strategy to address knowledge assets management challenges in higher education.

2. BACKGROUND CONCEPTS

2.1. Knowledge Assets

In this paper, the terms 'knowledge assets', 'intellectual assets', 'intangible assets' and 'intellectual capital' are used interchangeably to denote a combination of intangibles and activities that allow an organization to transform a bundle of material, financial and human resources into a system capable of creating stakeholder's value and organizational innovation (European Commission, 2006). Green (2007) defines knowledge assets as knowledge-based resources, or manifestations of the existence of knowledge, owned or held by an organization, whose value can be extracted and used to increase organizational effectiveness in accordance with its strategy. Boisot (1998) notes that knowledge assets are manifested in terms of technologies, competences and capabilities. Technology is defined here as a 'socio-physical systems configured so as to produce certain specific types of physical effects'; competences denote 'the organizational and technical skills involved in achieving a certain level of performance in the production of such effects'; and capability refers to the 'strategic skills in the application and integration of competences'. Knowledge assets thus include a set of intangible elements (resources, capabilities and competences) that drive the organizational performance and value creation (Bontis, 1998; Roos et al., 1997).

The significance of management actions and activities related to knowledge assets in higher education is growing rapidly and derives from current practices and the academic community information-seeking behaviors such as using specific online systems and databases, library acquisition practices, document delivery systems and collaborations. The existence as well as the development of knowledge assets thus increases the total value of the assets reported to the balance sheet of higher education. Knowledge assets should therefore be considered as a critical resource that need to be identified, managed, measured and eventually evaluated so that prioritization of critical resources and performance measurements can be made to advance higher education goals. The distinction between the terms data, information, and knowledge is useful in explaining the contrast between physical assets and knowledge assets. According to Malhotra (2003), in contrast to data that can be characterized as a property of things, knowledge is a property of agents predisposing them to act in particular circumstances. Information is that subset of the data residing in things that activates an agent through the perceptual or cognitive filters, and in contrast to information, knowledge cannot be directly observed. Its existence can only be inferred from the actions of agents. Hence, in contrast to the emphasis on tangible input-focused measures of physical assets, knowledge assets require understanding in terms of quality and content of performance outcomes.

2.2. Knowledge Assets and Higher Education

Investment in human resources is at the heart of what all HEI aim to achieve and their contributions at local, national and international level are not new phenomena. Higher education is vital in an increasingly knowledge-driven society as both creators and consumers of knowledge. As creators of knowledge, higher education makes a significant contribution to the intangible assets – knowledge, skills and innovation – that have become a source of comparative advantage for thriving organizations across all sectors in national economies. Higher education also consume knowledge through demanding highly skilled work forces that join high and medium technology firms such as communication and computing services, research and development, financial services, business services and health services (Williams et al., 2008). According to Secundo et al. (2010), higher education systems are today immersed in an intense transformation process triggered by the need to make them more flexible, transparent, competitive and comparable. To face these challenges, they need to consciously manage the processes of creating and managing their knowledge assets and recognize the value of intellectual capital to their continuing role in society (Rowley, 2000). Knowledge assets underpin core competencies of any organization thus playing a key strategic role and need to be managed and measured (Marr et al., 2004).

According to Adhikari (2010), the global environment has changed so drastically that the decision and operation processes of HEI have become more volatile and dynamic than ever before. This new academic environment is characterized by radical and discontinuous changes and demands the needs to carry out new mandate for knowledge creation and implementation in order to get bottom-line benefits. In this volatile and dynamic environment, successful HEI are those that constantly create new knowledge, manage it appropriately, and disseminate it widely through their systems. However, models, frameworks and methodologies for measuring and managing knowledge assets have mostly focused at the firm level in the private sector, with an economic or strategic focus and the increasing cooperation between HEI and private sector has resulted in the demand for similar processes of evaluation for both players (Nonaka et al., 2000b). This requires the development of approaches or framework that can create a good environment for effective knowledge assets management for effective teaching, learning, research and outreach services that takes care of the needs of both sector to advance higher education goals.

2.3. Enhancing Knowledge Assets Management Using ICT

Higher education is facing a competitive environment that is characterized by the globalization of education, increasingly complex higher educational problems, and the acceleration of change phenomena. Consequently, the traditional sources of competitive advantage, such as protected educational markets, and physical and financial assets, have lost importance compared to knowledge assets (Grant, 1996; Johnston and Rolf, 1998). Knowledge management has emerged as a discrete area in the study of higher education and is frequently cited as an antecedent of higher educational performance. If HEI implement knowledge assets management practices successfully, they are able to perform intelligently to sustain their competitive advantage by developing their knowledge assets base (Wigg, 1999). Thus, it is essential to know how to generate knowledge, how to disseminate it in the organization and what factors facilitate these processes (Stewart, 1997; Davenport and Prusak, 1998).

In recent years, several researchers have associated knowledge assets management with the development of information and communication technologies (ICT) (Ruggles, 1997; Scott, 2000; King, 2005). These new technologies are characterized by their capacity to influence the traditional ways of understanding certain organizational phenomena and behaviors and affect how organizations tackle the challenges thrown up by the knowledge society (Duffy, 2001). According to Mathew (2009), ICT plays a crucial role in managing and organizing knowledge by providing the channels for acquiring, storing, sharing, collaboration, categorizing, dissemination and reuse of knowledge in a faster and more convenient ways both within and between organizations. They have become an essential component for knowledge assets management as they enable organizations to exploit knowledge from data and information generated and collected during the process of carrying out teaching, learning, researches and outreach services. In analyzing knowledge work, for examples, Skyrme (2004) points out that ICT support knowledge processes and workers through providing ready

access to organized information, improved communications and interaction with fellow knowledge workers (either individually or in groups), and group decision support systems that facilitate learning and decision making processes. Dougherty (1999) further argues that ICT should be seen as a tool to assist the process of knowledge assets management in organizations.

Jones et al. (2006) throws a light on the development of a web-portal to connect researchers in HEI to fill a perceived gap in knowledge sharing and accessibility by highlighting the roles it can play in facilitating knowledge acquisition, sharing and discovery through allowing people to publish documents, share ideas, work collaboratively and store information and knowledge in easily searchable repositories. Kidwell et al. (2000) stressed the importance of knowledge assets management techniques and technologies in higher education through decision-making capabilities, reduced product development cycle time (curriculum development and research), improved academic and administrative services, and reduced cost of operation. Anurag (2003) on the other hand, asserted the application of knowledge assets management technologies in different areas in higher education such as research management services, curriculum development and its revision, faculty development programs, student services, career placement services, alumni association services and human resources details.

3. RELATED WORK

Knowledge assets are dynamic in nature; interact and depend on each other to create value (Barney, 2001; Roos et al., 1997); are often organization specific; and organizations can employ strategic interventions through developing and implementing programs and procedures to develop, enhance, or protect these knowledge assets (Dierickx and Cool, 1989; McGaughey, 2002). The overall purpose of knowledge assets management is to maximize the enterprise's knowledge-related management effectiveness and to renew and leverage them constantly (Wiig, 1997; Bontis and Fitz-enz, 2002). According to Jones et al. (2009), higher education represents the ultimate knowledge organizations because they embody centers of knowledge creation, knowledge acquisition, sharing and ultimately, application for innovation. Knowledge assets management frameworks and corresponding approaches such as knowledge management architecture and knowledge assets management models are widely used to describe components, design aspects or technical architectures and their interdependencies (Hahn and Subramani, 2000; Heisig, 2009). In many cases, these frameworks are created to achieve a common understanding of the domain (Bhagat et al., 2002; Maier, 2007); to structure approaches and practices (Grover and Davenport, 2001); and to identify research gaps (Alavi and Leidner, 2001) in knowledge assets management.

Many knowledge assets management frameworks have been proposed by various scholars based on knowledge management activities and processes of selected organizations mainly from a business perspective. Wiig's (1995) framework proposes three pillars of knowledge assets management based on a broad understanding of knowledge creation, manifestation, use, and transfer; while Meso and Smith's (2000) framework comprises of technology, function and knowledge. Technology here include computer-mediated collaboration, electronic task management, and messaging; function is supposed to utilize knowledge assets management processes in using, finding, creating and packaging knowledge; and knowledge includes how to answer the questions such as the know-how, know-what, know-why, and know-who. Tiwana (2002) proposes a framework consisting of seven layers including interfaces, access, collaborative, application, transport, integration and repositories; while Choo's (1996) framework argues that an organization can use information strategy for sense making, knowledge creation, and decision making. Mentzas et al. (2001) on the other end, suggests a framework to leverage the value of organizational assets. It is portrayed with the following elements and structure: (i) knowledge assets that need to be managed are at the heart of the framework; (ii) knowledge strategy, process, structure and system, which are needed to facilitate knowledge-related activities, surround the knowledge assets; (iii) knowledge interaction networks at the individual, team, organizational and inter-organizational levels make up the outer periphery of the framework. The examples highlighted above as well as other related frameworks (Heisig, 2009) however, do not cover the aspects of knowledge assets management in higher education. Thus it is necessary to identify how an effective and efficient higher education knowledge assets management framework can be different from other business and intra organizational knowledge assets management.

4. PROPOSED FRAMEWORK

A knowledge assets management framework refers to an integrated set of processes, roles, systems and behavioral interventions aimed at achieving organizational’s knowledge assets management vision and objectives based on previously established observations stemming from the reviewed literature (Hariharan, 2015). Sprague (1980) points out that the development of knowledge systems should be informed by a well-designed framework that links business processes and the needed ICT with the associated function to facilitate the knowledge assets management framework development. This study used the classifications based on the social character of knowledge (Brown and Duguid, 1991), together with the task-technology fit theory (Goodhue and Thompson, 1995) to propose a conceptual framework that links higher education processes to enabling ICT and knowledge assets management processes to arrive at a holistic framework. Brown and Duguid (1991) social character of knowledge classifies knowledge assets into three components namely human assets, structural assets, and relational assets as the key dimensions to managing knowledge assets, while the task-technology fit theory holds that the use of ICT is more likely to have a positive impact on individual performance and should be used if the capabilities of the ICT match the tasks that the user must perform (Goodhue and Thompson, 1995) especially in cases like managing knowledge assets in higher education. In the proposed framework, knowledge assets, knowledge assets enabling ICT, and knowledge assets management processes form the three key elements of the framework while the resulting output is represented by the knowledge assets management outcomes/higher education goals. Figure 1 shows the diagrammatic representation of the proposed framework followed by explanation of the roles and contributions of each of the element.

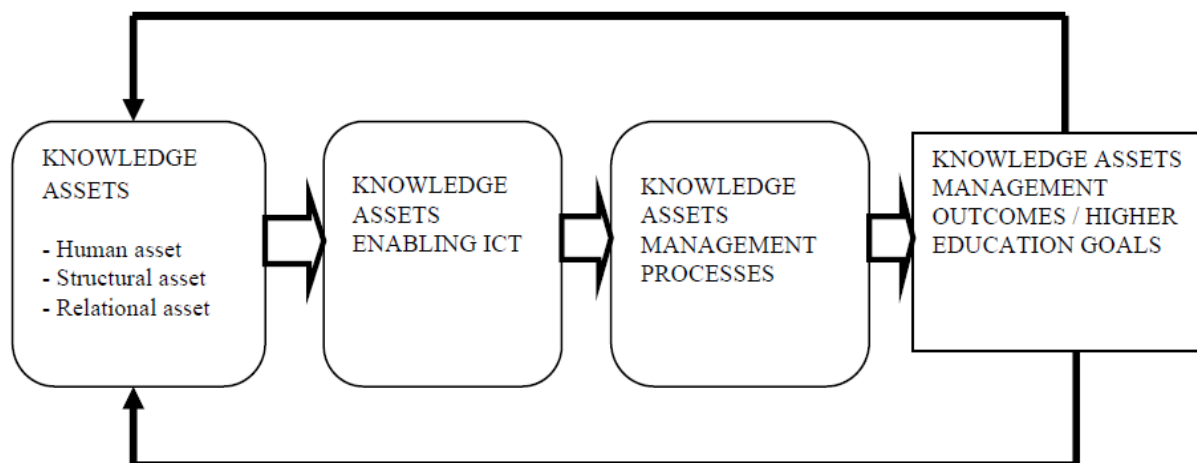


Figure1. Proposed Knowledge Assets Management Framework

4.1. Knowledge Assets

Knowledge assets in the proposed framework are classified into three components namely human assets, structural assets, and relational assets as the key dimensions. This approach of classification has been accepted and used extensively in the works by Edvinsson and Malone (1997), Bontis (2002), and Galego and Rodriguez (2005). Human asset is defined as the knowledge, skills, competencies and creativity that each person who works in a firm or organization has (Edvinsson and Malone, 1997). Examples of the elements embodied in human asset are academic staff, staff with PhD qualification, staff development and training, internationalization, research and supervision, etc. (Omona and van der Weide, 2014). Structural asset are all those things that remain in the organization when the employees have left the building but that you cannot find in the balance sheet (Edvinsson and Malone, 1997). Examples of the elements embodied in structural asset are teaching and learning activities, number of students, academic content and exchanges, quality assurance services, computer-students ratio, communities of practice, printed publications and e-resources, etc. (Omona and van der Weide, 2014). Finally, relational assets refer to the networks or relationships that are developed by organizations with knowledge users, other customers, suppliers, partners and stakeholders (Grasenick and Low, 2004). Examples of elements that are embodied in relational assets include research collaborations, budget allocation for research, cooperation with private sectors, stakeholders’ feedback, and community outreach services (Omona and van der Weide, 2014).

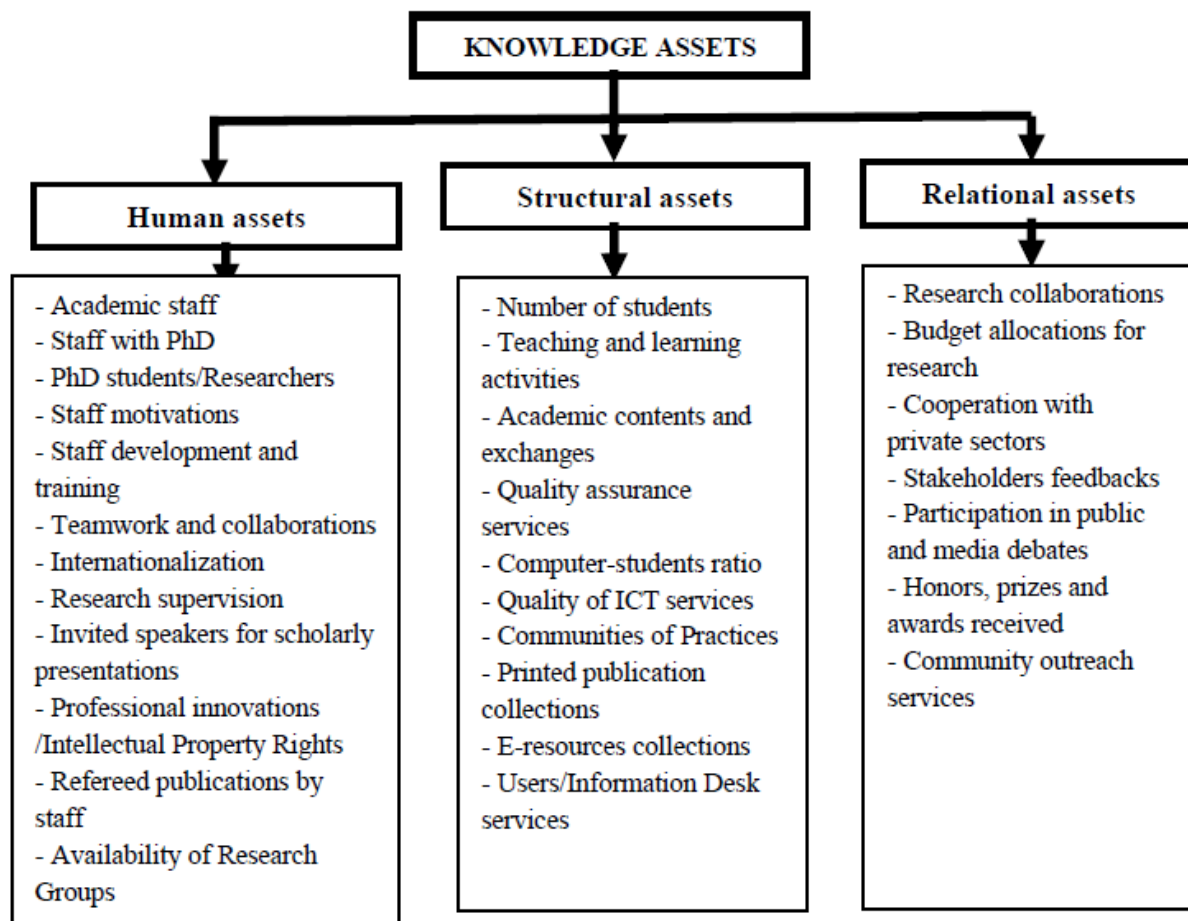


Figure2. Knowledge Assets in Higher Education (Omona and van der Weide, 2014)

4.2. Knowledge Assets Enabling ICT

ICT enables and provides the entire infrastructure and tools to support knowledge assets management processes within an enterprise (Hendriks, 2001). To succeed in knowledge assets management, it is important that assessment and defining of ICT capabilities are done properly as it supports and facilitates knowledge assets management processes such as knowledge capture, storage, retrieval, sharing and collaboration, dissemination, and updates in higher education. In this study, several knowledge assets management enabling ICT tools and networks were identified to be relevant for developing the proposed framework due to their significance in carrying out knowledge assets management roles. These include Knowledge Portals, Electronic Document Management Systems, Academic Publishing, Academic Contents and Exchanges, Groupware, Communities of Practices (CoP), Social Communities of Interests, and Individual Communities of Interests (Perez-Araos et al., 2007). Table 1 gives a description of the roles of each of the identified knowledge assets management enabling ICT tools/networks with examples in the proposed conceptual framework.

Table1. Knowledge Assets Enabling ICT

ICT Tools/Networks	Description of Roles	Examples
Knowledge Portals	Search and provide access to web-based knowledge	Google, Yahoo,
E-Document Management Systems	Knowledge repositories created by individual academic institutions	Digital Library
Academic Publishing	Proprietary digital libraries for electronic access to academic publishing	Emerald, Elsevier
Academic Contents and Exchanges	Electronic collections of course materials and learning objects	JSTOR, MIT Open Courseware
Groupware	Is designed to help people involved in a common task achieve their goals	Knowledge Forum, Synergeia, Wikis
Communities of Practices (CoP)	Groups of practitioners networking in a particular fields of endeavor to define a practice and knowledge domain	Consortia, Educational Research Services

Social Communities of Interests	Social networks drawn together to share knowledge and build relationships	Facebook, MySpace, Flickr
Individual Communities of Interests	Tools for individuals to manage personal knowledge and networks	Blogs, Twitter

4.3. Knowledge Asset Management Processes

Knowledge assets management processes refer to a systematic approach to the identification, capturing, organization and dissemination of the intellectual assets that are critical to higher education’s long term performance (Shukor et al., 2009). Knowledge assets management processes help in turning an organization’s intellectual property (recorded or expert of its members) into a greater productivity, new values and increased competitiveness. The processes can also be viewed as turning data into information and transforming information into knowledge and is a cyclic process involving various activities including knowledge creation, knowledge codification, knowledge transfer, and knowledge application (Nonaka, 1991). To create a comprehensive and working knowledge assets management framework, an organization has to provide for the whole knowledge lifecycle. To achieve this, the paper identifies key knowledge assets management processes with the ultimate stress and goal on optimization of knowledge use to develop the framework. The processes identified can coexist and act simultaneously within a knowledge assets management framework system contributing to effectiveness and efficiencies and include knowledge planning, knowledge capture, knowledge organizing, knowledge distribution, knowledge application, and knowledge maintenance. Table 2 gives a summary of the theoretical models identified by different authors that attempt to explain how organizational knowledge is created, transferred, and crystallized and these were used to guide in identifying key knowledge assets management processes for the framework.

Table2. Knowledge Assets Management Processes

Author/s	Knowledge Assets Management Processes
Patrick and Choi (2009)	Acquisition, Creation, Storage, Distribution, Use, Maintaining
Rollet (2003)	Planning; Creating; Integration; Organizing; Transfer; Maintenance; Assessment
Tyndale (2002)	Creation; Organization; Distribution; Application
Alavi and Leidner (2001)	Creating; Storing/Retrieving; Transferring; Applying
Davenport and Prusak (2000)	Generate; Codify; Transfer
Jackson (1999)	Gathering; Storage; Communication; Synthesis; Dissemination
Holsapple and Joshi (1998)	Acquisition; Selection; Internalization; Use
Ruggles (1997)	Generation; Codification; Transfer
Andersen and APQC (1996)	Share-create; Identify; Collect; Adapt-organize; Apply

In the proposed framework, *knowledge planning* involves matching the context that knowledge is used in (Baets 2005; Raghu and Vinze, 2007) and lays the basis for a knowledge assets management framework by setting knowledge normative, strategic and operational goals; identifying the core business processes and establishing the role that information and knowledge play in them; *knowledge capture* involves the extraction of useful knowledge from vast and diverse sources of information as well as its acquisition directly from users; *knowledge organizing* aims at providing clear and efficient ways of retrieving knowledge, extending it, or acquiring an overview on a certain matter, helping in intelligent and meaningful processing of information, as well as enabling better communication between various parties; *knowledge distribution* refers to the transfer of knowledge within and across settings and consists of search and decoding processes where search is the process by which retained information is selected as relevant to a particular problem or goal, and decoding is the reconstruction of the selected information to satisfy the user's request; *knowledge application* refers to the transformation of knowledge to products and services; and *knowledge maintenance* involves ensuring that knowledge is accessible, correct and updated.

4.4. Higher Education Goals

This is the last element and it constitutes the output component (educational goals) of the proposed framework that eventually generates new knowledge assets that are eventually absorbed as the first element of the framework to advance higher education goals. Knowledge assets management outcomes refer to knowledge behaviors of individuals or groups of individuals that contribute to improve higher education outcomes (Muhammed et al., 2008). A key outcome of effective knowledge

assets management at the individual level is to have the right knowledge at the right time so that appropriate, value-added, and creative actions can be enacted by those accessing the knowledge. This study adopts Yoshioka's et al. (2001) knowledge framework for communicative actions consisting of conceptual, contextual, and operational knowledge to arrive at the knowledge assets management outcomes of the proposed framework. Conceptual knowledge is the individual's understanding of why a person needs to take specific action to complete the task (know-why) (Kim, 1993). Contextual knowledge is an individual's understanding of the contextual factors surrounding the task at hand, such as the knowledge related to the people (know-who), locations (know-where), and timing (know-when) necessary to complete the task (Earl, 2001). Operational knowledge is the individual's understanding of task requirements (know-what) and the processes of how to accomplish the task (Dhaliwal and Benbasat, 1996). In addition to the above, other knowledge assets management outcomes that were identified include innovations, competitiveness, performance enhancement, decision supports, productivity and effectiveness.

The proposed framework as shown in figure 1 shows the links that exist between higher education processes, knowledge assets enabling ICT, knowledge assets management processes and knowledge assets management outcomes/higher educational goals which form the key elements of the framework. To be able to cope better with the challenge of managing knowledge assets, this paper used the knowledge assets classifications based on the social character of knowledge (Brown and Duguid, 1991) where knowledge assets are usually classified in three basic components (Hermans and Kauranen, 2005): human assets, organizational or structural assets, and relational assets. Human assets refer to the knowledge abilities, experiences and attitudes possessed by HEI members; organizational assets includes those pieces of knowledge that provide coherence and guidance for the whole organization; while relational assets emphasize relationship processes that the HEI maintains with the external agents that surround it. The task-technology fit theory (Goodhue and Thompson, 1995; Zigurs and Buckland, 1998) on the other hand provided the theoretical basis for developing a framework that presents the links between higher education process, enabling ICT, knowledge assets management processes, and knowledge assets management outcomes. The elements of the framework and the interplay that exist between them is based on the understanding that technologies must be utilized and should fit the task they support to have a performance impact. Proper alignment should lead to better management and utilization of ICT for knowledge assets management and the subsequent performance improvement as is represented by outcomes in the proposed framework.

5. IMPLICATIONS FOR PRACTICES

In today's knowledge driven world, it is often not the financial and tangible assets that drive higher education success and value, but rather intangible elements such as employee expertise, customer loyalty, operational effectiveness or innovation. These factors depend ultimately on employees, the ability to measure employees' knowledge and skills, and to align them with an organization's mission and goals. Many organizations now view knowledge assets as a measurement of strategic performance (Bontis, 2001). Some argue that effective management of knowledge assets more accurately reflects the true value of a company and provides insights into core competencies which create sustainable competitive advantage. However, there are few scholarly endeavors to understand, audit, and manage the knowledge assets in these institutions, especially in higher education. By understanding and managing their knowledge assets, HEI can better understand where their core competencies lie, thus potentially allowing a better allocation of resources, potential synergies, and ultimately, achievement of higher education strategies and goals. This potentially translates into greater student and faculty acquisition, retention, and achievement of research or teaching goals. Furthermore, by maximizing the efficiency of knowledge assets management via teaching or research, HEI can potentially significantly improve the quality and effectiveness of their endeavors in teaching, learning, research and outreach services. Liu (2007) reported a study showing the relationship of human capital as a value creation indicator that can be used to help formulate organizational strategy, provide some evaluation base, and allocate some resources in the context of HEI.

In order to make use of knowledge assets and to manage knowledge creation and exploitation effectively, HEI must be able to identify and quantify these resources. Hence, an institution has to map its stocks of knowledge assets while keeping in mind that they are dynamic, and new knowledge assets can be created from existing ones (Nonaka et al., 2000). The importance of knowledge assets depends on the goals, objectives and the strategy of the specific HEI. A very important knowledge

asset of one institution may be useless for another one. Therefore, the knowledge assets should be analyzed and managed on the basis of the HEI goals and objectives. Consequently, strategic side of knowledge should not be ignored by organizations. Taking a knowledge (centric) view of an organization can also help in understanding what the organization does; what its core competences are; and where value adding occurs. The balance between knowledge and resources will therefore continue to shift towards knowledge which will not only be the most important factor in creating competitive advantage for higher education but also be the unique asset in determining the competitiveness of HEI.

Although several taxonomies of intangibles have been suggested over the past decade, this study adopted the classifications based on the social character of knowledge (Brown and Duguid, 1991). This way, knowledge assets are usually classified in three basic components (Hermans and Kauranen, 2005): human assets, organizational or structural assets, and relational assets, which represent the most commonly accepted categories of knowledge assets (Pike et al., 2005). The knowledge tied to the people within HEI is critical for educational activities and human resources are usually hired and fired according to the assessment of their knowledge and its usefulness for the institution's tasks. The main characteristic of human assets is the impossibility of separating this kind of intangible assets from the people that develop them and may include individual capital that comes to the institution and remains at it by means of employment contracts, which link the employees with the organization. The second block of intangible elements is organizational assets which is a conglomerate of different communities of practice, or overlapped and interdependent work groups (Brown and Duguid, 1991). The relationships among these groups make possible the development, starting from independent and partial contributions, of a series of knowledge based assets or intangible elements of HEI. Lastly, relational capital gathers those intangible assets that the firm obtains when it maintains successful relationships with agents of its environment as clients, private sector, suppliers and all the other stakeholders. Beyond human capital are the individual knowledge consisting of abilities, experiences and behaviors required to achieve higher education goals. Success should then be achieved through organizational support and institutionalization of knowledge assets management which should help in preserving organizational knowledge and routines, and foster the accumulation, preservation and improvement of collective knowledge needed to advance higher education goals.

6. CONCLUSION

In today's knowledge driven economy, higher education managers are faced with the challenge of how to effectively link knowledge assets management initiatives and processes with their ever-changing needs. The problem arises due to the disconnect between knowledge assets management and the ever-changing organizational needs which is mainly due to having inappropriate knowledge assets management framework development and implementation approaches, and adoption of some quick-fix solutions to knowledge assets management to achieve higher educational goals. If knowledge is to be effectively managed and utilized, knowledge assets management and related researches in higher education should be made to link with institutional goals such as enhanced teaching, learning, research, innovations and competitiveness. This paper developed a framework for knowledge assets management in higher education with a view to enhancing effective and efficient management of knowledge resources in higher education. The proposed framework delineates the links that exist between higher education process, knowledge assets enabling ICT, knowledge assets management processes and knowledge assets management outcomes/higher educational goals which form the key elements of the framework. While there can be no perfect method that captures the true knowledge assets of HEI and how it can be effectively managed, it is hoped that the proposed framework represent a starting point for improving knowledge assets management.

Building on Carlucci et al.'s (2004) attempt to explain the role of knowledge assets management in sustaining a company's competitiveness, this paper proposes the use of intangible assets classifications based on the social character of knowledge combined with the task-technology fit theory to further our understanding of how knowledge assets, if managed effectively and efficiently, can impact higher education performance. Knowledge assets are seen here as a set of intangible resources, i.e. assets and skills, which interact with each other through learning mechanisms. These processes enable the generation of new knowledge, and the development of higher educational routines that form the building blocks of higher education's competencies or the way it performs its

operational processes and activities. These higher educational competencies, hence, condition the efficiency and the effectiveness of higher education processes, and consequently the value of higher education's products and services. The proposed framework shape and reconfigure higher educational competencies, through assimilating new knowledge, and linking, organizing and integrating the generated knowledge into higher educational routines using appropriate ICT.

It is hoped that the insights discussed in this paper represent the theoretical basis for enhancing knowledge assets management in higher education and how it can affect the overall higher education performance and improve the value-generating activities. This can help in the development of a knowledge-based performance management and measurement system, and aims at supporting the pre-implementation phase of enhancing knowledge assets management in higher education and therefore requires empirical assessment and validation through practical implementation. Further research is also encouraged to disentangle the complexities in the relationship between knowledge assets management and higher education performance. Finally, more empirical inquiry and in-depth case studies are needed to define the modalities and procedures that help higher education identify their knowledge assets and implement appropriate knowledge assets management practices that ensure the effectiveness of their processes and in turn the value of higher education products and services.

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