Knowledge Management for Innovation in Academic Library Services

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Doctoral Dissertation

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Abstract

The advent of managing knowledge has positive impact on library services. Creating knowledge, using that knowledge from inside and outside sources, transferring and sharing that knowledge for applying are the core areas of offering innovative services in academic libraries. In 21st century, the nature of libraries & library services are changing in line with the changing of library user behavior, demand, need and want. For change to be effective, libraries as well as library personnel must change. The key to change and growth is awareness, managing knowledge, sharing ideas, coming up with new and innovative ways of offering services with the user involvement. Many studies identified that managing knowledge for both employees and users; inviting users in the service process and applying modern technologies convert the challenges into opportunities. For the present study, we have examined academic libraries readiness to adopt KM, KM tools, user involvement in the service process and KM activities in their libraries. We have focused how KM (and value co-creation) facilitates service innovation activities in academic libraries. For theoretical reasoning, we have come up with comprehensive lists of KM tools in line with KM cycle that academic libraries can apply for their own settings. We have also conceptualized the value co-creation for service innovation in academic libraries. For examining and exploring the effect, we have conducted two Web-based survey as well as one e-mail interview. The methodology employed was a combination of qualitative and quantitative approaches. The survey of perceived usefulness of adopting KM using social media, most of the respondents thought that KM-using-social media would be useful for libraries and but they were not entirely sure if their libraries were ready to adopt KM. For managing user knowledge, most of the librarians manage their user knowledge through face to face meeting, social media, survey, tailoring user needs through inviting feedback. After managing knowledge, we identified that libraries work with their users to co-create value in areas such as project management, makerspaces, information literacy, design of library websites, etc. Despite some concerns, most of the librarians saw value co-creation as critical to the innovation of new services and the continuing success of their library. For investigating the effect of KM (and each phase of the KM cycle) on service innovation, librarians replied that knowledge capture/creation and knowledge application/use both significantly impact on service innovation in academic libraries. The effect of knowledge sharing and transfer on innovation was found to be insignificant. The results show that academic libraries with more capability of knowledge creation are likely to offer more innovative services to their user communities. Similarly, once the

knowledge is created, academic libraries with better-developed knowledge application/use practices are likely to be offering more new services. Finally in the theoretical model, we propose that KM enablers determine the degree to which KM can be implemented in an academic library setting. Knowledge management (different phases of the KM cycle) positively affect to offering innovative services in academic libraries. The positive effect of KM on service innovation is enhanced/expedited when the library employees involve the user in value co-creation. Value co-creation also has a direct effect on service innovation in academic libraries. Lastly, innovation in academic library services refer to new service concept, new/improved user interface, new/improving existing ways of providing services and using technologies to facilitate all of those activities. The study suggests that academic libraries should redefine it's working role by promoting KM activities in their libraries and they should actively think of involving users in the academic library services. Lastly, we put some directions for the extended work for this study.

Keywords: knowledge management, value co-creation, service innovation, library services, academic libraries.

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Chapter 1: Background & Introduction

1.1 Background of the study

To support the research communities, faculties and speed up the students learning abilities and advancing their knowledge by offering many activities in the academic arena, academic libraries have been treated as the "heart" of the institution (Simmonds & Andaleeb, 2001). For higher education, resources of a good quality library can help attract and retain academic high flyers and contribute to the prestige of an institution (Oakleaf, 2010). Academic libraries have been considered as a valuable part of the parent institutions as the store house of knowledge, processing knowledge and serve the society by disseminating this knowledge (Oakleaf, 2010). From this ancient practice, it is obvious that today's libraries will not be the same in the future. Now academic libraries are facing challenges with the changing of global e-future. The incredibly exciting transformation demands that the libraries should re-define their role within traditional but changing environment (Brindley, 2006).

In the 21st century, we are witnessing clear transformations of academic libraries. Lewis (2007) noted that this transformation is leading towards changing the nature of libraries as well as challenges. The undergoing changes occur in the format of information searching, storing, processing, and disseminating with the use of technology. Moreover, the information content is moving towards digital platform. Lewis (2007) also identified that the major driver for change has been an increased shift of focus from the library as a service and a system, to the user as the central focus – especially with the changing habits and needs of the digitally-connected user. With Google and mobile apps on their fingertips, users today can choose the services they want (Islam, Agarwal & Ikeda, 2015b). Apart from these changes, academic libraries around the world are facing many challenges in maintaining usage and ensuring their development amidst unsustainable costs, declining usage, transition into digital services and increased demand for new types of services (Jubb, 2010; Johnson & Lilly, 2012). Jubb (2010) identifies that challenges facing academic libraries right now are MOOCs (Massive Open Online Course) and the rise of online education, budget cuts, e-books,

patron privacy, variations of user requirements, expect to receive information faster than ever, expect to have no impediments to get the information they need, change management issues and so on. So, how can academic libraries address this? To answer this, we have taken managing knowledge using various strategies and value co-creation platform through which academic libraries can overcome these challenges. Firstly, we will focus on KM.

In academic libraries, librarians can drive for changes using the array of tools available to their libraries. Library personnel can embrace a broader view of their professional position and can break the restriction to offering only upon-request services. They can actively manage their (library's explicit and tacit knowledge) resources rather than passively respond to requests (MacWhinnie, 2003). For the academic library to remain relevant to its users, managing employee knowledge, knowing the library users and coming up with strategies for greater user involvement will help in the reshaping of library services (Brindley, 2006). Jantz (2012) suggested that academic libraries must innovate and come up with new modes of services, redefine its role in the digital environment, leverage its strengths, focus on user involvement and close the gap between user expectations and the library's ability to meet them.

In knowledge organizations such as libraries, KM is needed for managing user knowledge (their need, who to contact, information seeking), resource knowledge (sources, services, where these services are available, and other features) and personnel practice knowledge (expertise available, the quality of service they provide) (Agarwal & Islam, 2014). Sutherland and Jordaan (2004) argue that the ability to retain organizational knowledge is a key characteristic for offering innovation in a successful organization. Similarly, new employees joining in the libraries face critical challenges in gathering knowledge relevant to their jobs. With depleting budgets and challenges of viability, retaining and transferring organizational knowledge effectively is necessary for the survival and growth of libraries (Agarwal & Islam, 2015). Libraries need to develop and implement programs for capturing and retaining this knowledge before their employees walk out the door for the last time, and transferring this knowledge to incoming employees. Apart from employee knowledge, utilization of user knowledge in libraries can enhance the service relating capability of libraries. Combining internal and external knowledge of libraries help to increase service performance and innovation in

services (Adams and Lamont, 2003). Moreover, knowledge of employees and users in libraries can improve communication among staff/management, between staff and library user and promote a culture of sharing. It can make libraries more effective by enabling user-focused solutions and eliminating redundant procedures (Islam, Agarwal & Ikeda, 2015a). Finally, it can help improve service efficiency by reducing response time. All these lead to reduced costs, increased performance and a more satisfied library staff, as well as the user.

Like other organizations, changes brought about by technology, increased user expectations and shrinking budgets have led to innovation becoming the lifeblood of academic libraries (Islam, Agarwal & Ikeda, 2015a). It allows libraries to come up with new and improved services for their user communities. However, innovation in services is extremely dependent on the availability of relevant knowledge. A number of studies have reaffirmed the important role that knowledge management (KM) plays in improving innovation and organizational performance (Darroch & McNaughton, 2002; Pyka, 2002; Adams & Lamont, 2003; Du Plessis, 2007). Libraries will need to adopt KM to provide innovative library services. Like other organizations, new service development ability of academic libraries depends on its employee skills/knowledge, availability of tangible and intangible resources, IT adoption, management support, user knowledge and innovation processes (Rowley, 2011). To offer new and innovative services to the user communities, libraries need to generate creative and implementable ideas based on their knowledge from direct customer contact.

Secondly, all these issues of involving and collaborating with user communities (especially in the early phases of creating ideas for new services) are fueling the coming of age of one research discipline, that is, value co-creation (Benson, 2013). In the business world, organizations are embracing consumers as co-creation partners in their approaches to innovation. Yet no work on value co-creation thus far has focused on academic libraries. Brindley (2006) identifies that for understanding library users and coming up with strategies to support greater user involvement will help in the reshaping of library services. Very few works we have been able to expand on this area by Germano 2014; Akanda, Shirahad, & Umemoto (2014) and Siddike, Umemoto & Kohda (2014). These studies look at the role of leadership in value co-creation, value co-creation in reference services and transformation of public libraries using co-creating

platform. While there have been limited studies on innovation in libraries (e.g. Jantz, 2012), value use in libraries (e.g. Moorsel, 2005), write-ups on value co-creation from the British Library user perspective (Baron, 2006), and value creation in the research library system (DEFF, 2009), none have combined value co-creation and service innovation in the context of academic libraries.

However, while there have been studies on KM in libraries (e.g., Maponya, 2004; Wen, 2005; Sarrafzadeh, Martin & Hazeri, 2010) and on innovation in the context of libraries (e.g. Li, 2006; Scupola & Nicolajsen, 2010; Jantz, 2012; Islam, Agarwal, & Ikeda, 2015a), the extant literature is yet to provide empirical evidence linking knowledge management with service innovation in academic libraries (apart from the qualitative data by 17 librarians gathered by Islam *et al.* (2015a) in their study). Similarly, while there have been limited studies on value co-creation in libraries, none have combined value co-creation and service innovation in the context of academic libraries. Considering this, the present study investigates the role of KM (and value co-creation) for the innovation in library services.

1.2 Statement of the problem

From the background of this study, we reveal that academic libraries are facing challenges as changes are happening in the 21st century. Academic libraries are witnessing various competitions routinely for information access, storage and providing services (Murphy, 2012). Libraries are facing challenges to offer wanted services to its user communities. Challenges appear due to varieties of services available, different convenient features of using technology, changes brought about by technology, increased user expectations and shrinking budgets, unsustainable costs, declining usage, transition into digital services, and increased demands for new types of services and changing scholarly communication pattern. Changing users' behaviors, need, want and demand of academic libraries (Johnson and Lilly, 2012; Jubb, 2010). The necessity of user focused services becomes reality to make library users committed to keep coming to libraries for their needs. In other words, academic libraries have felt the pinch from both sides – less budget and more demand (Wen, 2005). Moreover, they have sensed the threat of being marginalized by Internet-based information services and students and faculty's own information gathering efforts. To address these changes, libraries need to be innovative to create responsive and convenient services. Libraries

should think of changes as an opportunity and look for ways of harnessing change to fulfil the mission of libraries (Friend, 1998). Managing the knowledge of both library employees & users, and offering value co-creation practices can address these challenges to offer innovative services. For these purposes, libraries need to adopt KM to provide innovative library services and need to embrace a scenario where knowledge is not just managed by the library (in the form of books or periodicals) but created within the library (Islam, Agarwal &Ikeda, 2015). Apart from KM, libraries need to increase collaboration and interaction both amongst employees and between the employee and the user. We believe that value co-creation practices can lead to a stronger relationship between the library and its users, a more agile way of working, stronger community building and a cycle of continuous innovation in the library. Combining these two constructs, for the present study we frame the problem from theoretical view of applying KM (and value co-creation) can lead to service innovation in academic libraries.

1.3 Purpose of the study

Using knowledge of library employees and users, both actors are made aware that they are contributing towards the development of new ideas/concepts in library services (Islam, Agarwal & Ikeda, 2015b). For offering innovative academic library services, a promising remedy can be to adopt KM (and value co-creation) strategies which can address these changes in academic libraries. Library employees need to generate creative and implementable ideas based on their knowledge from direct user contact using KM tools. Considering these issues, the present study focuses the following major objectives;

- To build a theoretical model of KM (and value co-creation) for service innovation in academic libraries.
- To propose some suggestions for implications of this model in academic libraries

1.4 Research questions

In order to achieve these objectives, One Major Research Question (MRQ) as well as three subsidiary research questions (SRQs) have been formed which will guide the study as well.

MRQ: What is the role of knowledge management (and value co-creation) for facilitating service innovation in academic libraries?

SRQ1: Are academic libraries ready to adopt KM using social media?

SRQ2: How can user knowledge and value co-creation be leveraged to innovate services in academic libraries?

SRQ3: How does knowledge management affect service innovation in academic libraries?

1.5 Significance of the study

The problems of academic libraries are related with limited budget, increased demand from faculty and students and quick changes of the technology. KM in academic libraries can ensure the proper utilization of resources, tailoring needs what academic community want and ensure the agile services by managing knowledge in libraries. Though exploratory and quantitative in nature, the present study has revealed the areas that KM and value co-creation have positive affect on service innovation by theoretically and later empirically. If the libraries capture and make sense of existing knowledge from different sources, identifying the gaps and then creating new knowledge to fill those gaps will lead to offer innovative services in libraries. The outcome refers that academic libraries with more capability of knowledge creation and use are likely to offer more innovative services to their user communities. It also sheds light on how librarians perceive KM, value co-creation and service innovation, and the role of these in bringing about changes in library services. KM can be useful when academic libraries endeavor to co-creating with its users. The proposed value co-creation framework for academic libraries will bring certain benefits and lead to offer innovative services. Even in the process of gathering data, the study helped raise awareness of the role of KM and value co-creation in service innovation. Library practioners may become aware of the international trends of innovation in services and its adoption in academic libraries. A major feature of the present study is to break new ground in an area where relatively few researches have been conducted. It could help both academicians and practioners to advance understanding of the relationships between KM, value co-creation and service innovation in academic libraries. Therefore, this study is of significance to academic library communities for making changes in their library services.

1.6 Research methodology

As a part of the methodology, the study uses mixed methods of research to answer the different research questions – including quantitative questionnaire survey, qualitative email interviews, and theoretical reasoning. For both qualitative and quantitative questionnaires as well as design of the studies were approved by the Institutional Review Board (IRB) of Simmons College, Boston, USA. The methods employed in this study include the following:

1.6.1 Document analysis

The present KM, value co-creation and innovation in services literature was studied and evaluated based on available literature from different databases. A comprehensive review of the literature was performed to identify the key aspects of KM and value co-creation in services. It was done for the theoretical reasoning that leads to shed light on the objectives of the study. Additionally, we reviewed different KM, value co-creation and service innovation theories to come up with theoretical framework for the present study. This analysis is also used to assist in the framing of the survey and the semi-structured interview questions for the present study.

1.6.2 Quantitative

In chapter 3 & 5 (SRQ1 &3), to identify the academic library readiness to adopt KM using social media and to identify how does KM affect service innovation, we relied upon the Web-based survey questionnaire method for collecting data. Measuring perceived usefulness & perception of KM and effect of KM on innovation in services, the survey method is the best suited. It helps to gain insights from the larger population and give a strong ground for testing the arrived hypothesis. Both of these web-based questionnaires are added in appendices (appendix B&D). The first study surveys to determine the perceptions of academic librarians regarding Knowledge Management (KM) and the degree to which the library is ready to adopt KM using social media. After having the readiness assessment of KM, second study focuses on how KM can facilitate service innovation activities in the academic libraries? The target population for both of these studies was academic librarians across the world. However, as it would be difficult to obtain a sampling frame consisting of academic librarians across the world, we utilized convenience sampling to reach out to librarians. The study populations for

both studies were academic libraries worldwide that were accessible using the International Federation of Library Associations and Institutions (IFLA) mailing list and the IFLA KM section mailing list. Apart from these, we also reached out to academic librarians in other countries where universities were found using Web search. The purpose was to reach out to a wide pool of academic libraries from different countries whose contact details were accessible online. This ensured coverage of diverse socioeconomic and educational environments. The librarians reached out to were those who had registered themselves to be part of these mailing lists, as well as those whose email addresses could be obtained from the resources university websites.

1.6.3 Qualitative

Qualitative data can provide rich, in-depth information about the phenomenon under study. In addition, qualitative data such as those collected through interviews are also better for drawing out the tacit dimension of KM compared to quantitative method (Patton, 2005). In chapter 4 (SRQ 2), we relied upon the qualitative method for collecting data, with open-ended questions sent to librarians via e-mail. To obtain a more insightful view on value co-creation for service innovation, personalized individual e-mails with a link to a web-based questionnaire (including informed consent) were sent out to university librarians inviting them to participate in this study. We mostly reached out to head librarians to answer questions on strategic decisions such as value co-creation and service innovation.

Finally, the outcome of the literature review, document analysis, survey and interviews were compiled to address the KM and value co-creation for service innovation in academic libraries. This answered the major research question and was used to draw-up a theoretical framework for this study in chapter 6.

1.7 Definition of research terms

Knowledge: Knowledge has different meanings, depending on the discipline where it is used. A theoretical or practical understanding of a subject with composed of tacit and explicit form refers to Knowledge. In other words, knowledge relates with understanding facts, information, descriptions, or skills, which is acquired through experiences or other ways (Awad &Ghaziri, 2004).

Knowledge management (KM): Knowledge management (KM) is a newly emerging approach aimed at process of capturing/creating, sharing/transfer and effectively using/applying organizational knowledge (Dalkir, 2013). In libraries, several kinds of knowledge need to be managed like user knowledge (their need, who to contact and information seeking); resource knowledge (sources and services, where these services are available and other features of resources); and personnel practice knowledge (expertise available, the quality of service they provide and others).

Value co-creation: The bi-directional interaction between the service provider and the customer in S-D logic forms the root concept of value co-creation (Vargo and Lusch, 2004) popularized by Prahalad and Ramaswamy (2000, 2004a, 2004b). Value co-creation is defined as an interactive process involving at least two willing resource-integrating actors (Payne, Storbacka, & Frow, 2008). The library and its users are no longer separate entities but perform various activities mutually, where the library and the user interact to jointly co-create value.

Innovation: A new idea/existing idea with different thought or process that can be viewed as the application of better solutions that meet new requirements or existing needs more efficiently.

Service: Service is an intangible commodity that supports people or organizations for them to achieve their objectives. It creates value and provides benefits for customer at specific times and places by bringing about a desired change in, or on behalf of, the recipient of the service (Lovelock & Writez, 2005; Kameoka, 2007). By providing professional techniques and satisfying customers need, it achieves these objectives.

Service innovation: Service innovation is essentially about changes and renewal that reflects in practices and offers better value (improved or new services) for both the organization and its customer. The changes in services primarily relates with concept of services, client interface, service delivery and technological application (Hertog, 2000).

Academic library: An academic library is associated with a degree-granting institution of higher education to support institutional curriculum and research activities for the institutional people. Among different categories of academic libraries, for the present, we selected the university libraries as academic library. The goal of a university library

is to be the best in the world at serving the unique teaching, learning and research needs of its home academic institution by being active participants in the creation, transmission and dissemination of knowledge (Jordan, 1998).

User: In academic libraries, the users are those people who are related with educational activities like faculty members, the support staff, students, researchers, and other library users.

1.8 Structure of the dissertation

This dissertation is organized into six chapters. The beginning chapter provides the research background, problem statement, purpose of the study, research questions, significance of the study, research methods, and common terms used in the dissertation. A substantial amount of literature on knowledge management, service innovation, value co-creation and academic library services have been discussed in 2nd chapter of this dissertation. The review proceeds with the KM readiness to libraries, role of KM (and value co-creation) to service innovation in academic libraries. In chapter three, we have showed are academic libraries ready to adopt KM in their activities by different variables we arrived at. This chapter also focused how academic libraries retain and transfer of library employees' knowledge in their organization. In chapter four, we present the result of user knowledge management strategies of academic libraries and showed how they co-create value with their users for offering innovative library services. In chapter 5, we have presented results how does KM affect service innovation. KM for Service Innovation in Libraries (KMSIL) framework was empirically tested by designing survey questions. Finally chapter six summarizes the findings of all research questions and arrived at theoretical model. It is followed by the implications, limitations and future research of this study.

Chapter 2: Literature Review

The purpose of this chapter is to identify the gap in the research and positioning the present study in the context of previous research. The present chapter is going to address, and creating a research space by reviewing the existing literatures on knowledge management, value co-creation and service innovation. Key enabling areas of KM have been discussed for academic libraries and which is followed by services and innovation of services in academic libraries. This review focuses on major concepts, models, frameworks and theories relating to KM, value co-creation and service innovation. The review process will help to come up with proper understanding to shed light on the problem statement of this present dissertation. To draw a conceptual map for the past as well as ongoing studies, present review follows inverted pyramid ways of discussion. The literature review begins with a discussion of the related literature from a broad perspective. It then deals with more and more specific or localized studies which focus increasingly on the specific question at hand.

2.1 Knowledge

Knowledge is the central focus of KM. Knowledge is neither data nor information, although it is related to both. From various studies, it has been common practice to take a hierarchical view of the relationship between data, information and knowledge. Data are unorganized and unprocessed facts which are raw material of information and information as the raw material of knowledge (Zins, 2007; Martin, 2008). This relationship is commonly modelled like a pyramid, with data at the base, information in the middle and knowledge at the apex (Alavi & Leidner 2001). Knowledge is derived from information in the same way information is derived from data. Embracing a wider sphere than information, knowledge includes perception, skills, training, common sense, and experience. It is the sum total of our perceptive processes that helps us to draw meaningful conclusion (Awad & Ghaziri, 2004). For example, a user requires knowledge to evaluate two academic libraries services and satisfaction in order to determine which one is the most important for his research activities. Tiwana (2002) views knowledge as actionable (relevant) information available in the right format, at the right time, and the

at the right place for decision making. Wiig (1999), one of the most influential and most often-cited writers on KM in the business sector, defines knowledge as a set of truths and beliefs, perspectives and concepts, judgments and expectations, methodologies and know-how. Davenport and Prusak's definition of knowledge is the most-cited in KM literature. Davenport and Prusak (1998, p. 5) define knowledge as, "a fluid mix of framed experience, contextual information, values and expert insight that provides a framework for evaluating and incorporating new experiences and information." Nonaka & Takeuchi, (1995, p.58) see knowledge as a "dynamic human process of justifying personal belief towards the truth". Awad &Ghaziri (2004, p.33) define knowledge as "understanding gained through experience or study". These different views of knowledge can lead to different perceptions of KM (Alavi & Leidner 2001). In an LIS context, reviewing Budd's (2001) book, Hjørland (2004) argues that the discourse of knowledge in LIS although extremely important, has still been neglected. Library as an organization, knowledge not only stores but also often embedded in its organizational activities, functions, routines, processes, practices, norms and addressing to user need, want and demand.

2.2 Explicit and tacit knowledge

Knowledge typically refers to one of two types of knowledge – either explicit or tacit (Nonaka and Takeuchi, 1995; Sveiby, 1997; Davenport and Prusak, 1998; Pan and Scarborough, 1999). Explicit knowledge is systematic and has been or can be articulated, codified, and stored in certain media and can be readily transmitted to others (Pan and Scarborough, 1999). Tacit knowledge, however, is created through learning by doing, is difficult to express, formalize, or transfer (Sveiby, 1997). Tacit knowledge is found embedded in action, commitment, and involvement in a specific context and derived from personal experiences (Nonaka, Toyama and Nagata, 2000). In implementing and practicing KM in libraries, these distinctions must be well understood. Only explicit knowledge can be exchanged through documents, while the more important tacit knowledge can only be exchanged through human interaction. Nevertheless, both types of knowledge are important and interdependent. Based on Polanyi's (1966) classification of types of knowledge, KM Models. Nonaka and Takeuchi (1995) propose a model to understand the dynamic nature of knowledge creation, and to manage such a process effectively. There is a spiral of knowledge involved, where the

explicit and tacit knowledge interact with each other in a continuous process. This process leads to the creation of new knowledge (see Figure 2.1). Each quadrant in the figure represents the process of conversion of knowledge between the tacit and explicit forms. The central thought is that knowledge held by individuals is shared with other individuals so it interconnects to form a new knowledge.

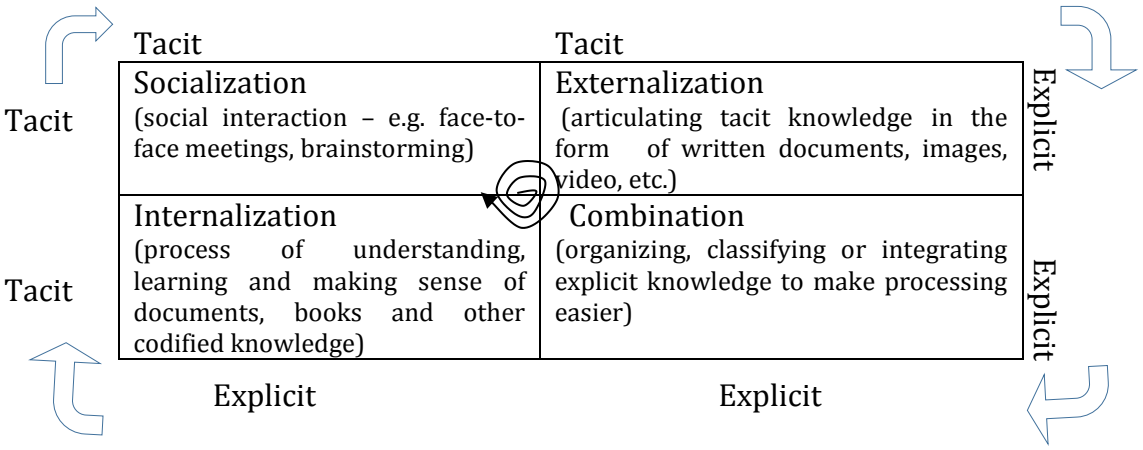


Figure 2.1 Knowledge Creation in Organizations (Nonaka and Takeuchi, 1995)

2.3 Knowledge management (KM)

Knowledge management is a newly emerging, interdisciplinary business model deal with knowledge within the framework of an organization (Awad & Ghaziri, 2004). The concept and name – 'knowledge management' was started and popularized in the business world during the last decade of the twentieth century and received considerable attention from many scholars and practitioners. In recent years, Knowledge Management (KM) practices became more and more important in the world economy. It has been practiced by a number of fields associated with information systems, business and management, Library and Information Science (LIS), computer science, communications, artificial intelligence, cognitive science etc. (Dalkir, 2013). Applications of knowledge management have now spread to other organizations, including government agencies, research and development departments, universities, and others (Lee, 2005). The key steps in the knowledge management process include: generating new knowledge; accessing valuable knowledge from outside sources; using accessible knowledge in decision making; embedding knowledge in processes, products and/or services; representing knowledge in documents, databases, and software; facilitating knowledge growth through culture and incentives; transferring existing knowledge into other parts of the organization; and measuring the value of knowledge

assets and/or impact of KM (Ruggles, 1997; Dalkir, 2013). While there are hundreds of definitions (Dalkir, 2013), a simple definition of KM is a systematic effort to enable information and knowledge to grow, flow and create value (O'Dell and Hubert, 2011). Abell and Oxbrow (2001) focus on KM as creation, which encourage knowledge to be created, shared, learnt, enhanced, organized for the benefit of the organization. Nonaka and Takeuchi (1995, p.3) define KM as the "capability of an organization to create new knowledge, disseminate it throughout the organization, and embody it in products, services and systems". The key steps in the KM process in an organization are often represented in the form of a KM cycle. Agarwal and Islam (2014) combined various frameworks of the KM cycle (see Dalkir, 2013) and identified 8 unique steps comprising phases of the KM cycle: knowledge 1) creation; 2) acquisition or sourcing; 3) compilation or capture; 4) organization, refinement, transformation and storage; 5) dissemination, transfer and access; 6) learning and application; 7) evaluation and value realization; and 8) reuse or divesting. These phases are also applicable to KM in libraries (Agarwal and Islam, 2014). While KM has been adopted in a large number of sectors and organizations ranging from ConocoPhillips, Fluor, IBM and MITRE (O'dell and Hubert, 2011) to the World Bank (Srikantaiah and Koenig, 2008), academic libraries in general, is yet to take full advantage of the possibilities offered by KM.

2.4 KM cycle

While libraries have traditionally managed knowledge created by others, KM is about managing knowledge that originates within the library (Townley, 2001). KM can be seen as a cycle that encompasses various phases, such as the capture, creation, codification, sharing, access, application, and reuse of knowledge within and between libraries. Dalkir (2013) reviews KM cycles identified by different researchers, implemented and validated in real world-settings. Figure 2.2 below summarizes the phase of the KM cycle identified by Wiig (1993), Meyer and Zack (1996), Bukowitz and Williams (2003), McElroy (1999) and Award and Ghaziri (2004). Based on that, table 2.1 provides a different view of the KM cycle phases identified by these researchers.

Across the different phases identified, the ones similar in meaning are listed in a single row.

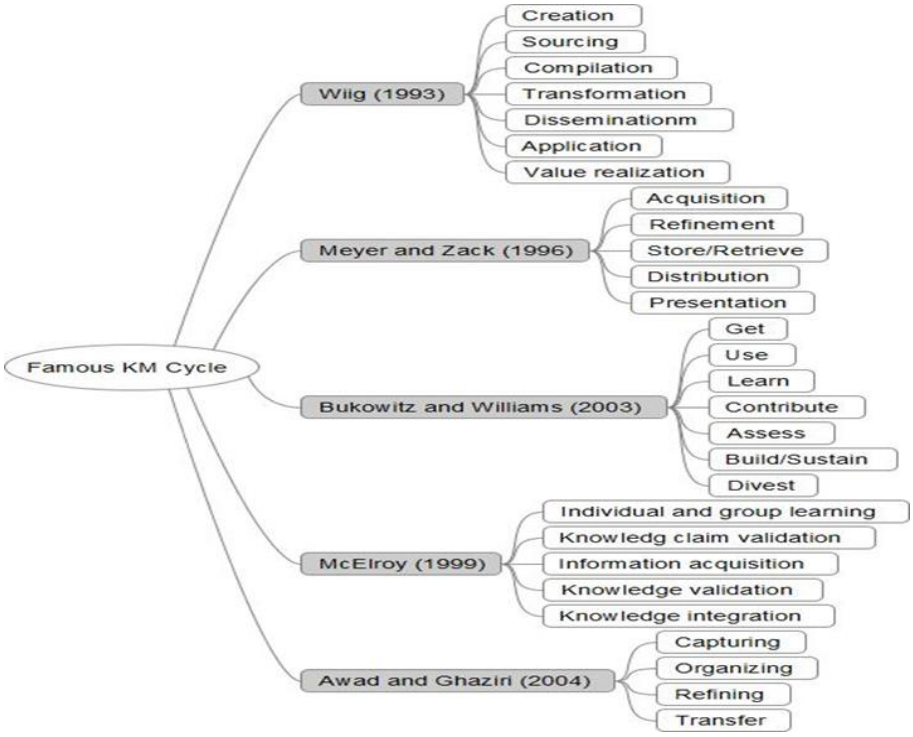


Figure 2.2 Phases of the KM Cycle

Table 2.1 Combining Phases of the KM Cycle

Wiig (1993)	Meyer and Zack (1996)	Bukowitz and Williams (2003)	McElroy (1999)	Award and Ghaziri (2004)
creation				
sourcing	acquisition	Get	Individual and group learning	
compilation	refinement	use learn	knowledge claim validation; information acquisition	capturing
transformation	store/retrieve		knowledge validation; knowledge integration	organizing; refining
dissemination	distribution presentation			transferring
application		Contribute		
value realization		access build / sustain		
		Divest		

Based on these, Agarwal & Islam (2014) conclude that KM is an ongoing process or cycle in an organization which starts with acquiring relevant knowledge resources and continues through their proper utilization. The first part is locating, acquiring and capturing existing knowledge that is relevant to the library and creating new knowledge. The acquired knowledge is organized using taxonomies, codification, indexing, filtering etc (Dalkir, 2013). The knowledge is refined and synthesized or transformed as per the needs of the library. The processed knowledge is preserved for permanent storage, and a retrieval mechanism is used for its easy access. Then knowledge is disseminated to the concerned people for sharing, applying, utilizing and using effectively. Finally, the KM process receives feedbacks from the knowledge users regarding the extent to which it satisfies their knowledge needs. Feedbacks ensure proper utilization of knowledge with necessary modification in the system. Finally, a call is made whether any part of the knowledge is expensive to keep and can be divested (Agarwal and Islam, 2014).

Agarwal & Islam (2014) simplify Table 2.1 to get 8 unique phases that comprise the KM cycle:

1. Knowledge creation
2. Knowledge acquisition or sourcing
3. Knowledge compilation or capture
4. Knowledge organization, refinement, transformation and storage
5. Knowledge dissemination, transfer and access
6. Knowledge learning and application
7. Knowledge evaluation and value realization
8. Knowledge reuse or divesting.

Dalkir (2013)'s integrated KM cycle covers 3 overarching phases: 1) knowledge capture and/or creation; 2) knowledge sharing and dissemination; and 3) knowledge acquisition and application (we revise this to 'knowledge application and use', as acquisition could be construed to be similar to knowledge capture). We adopt these phases of the integrated KM cycle (see Figure 2.3) for mapping to tools in this paper.

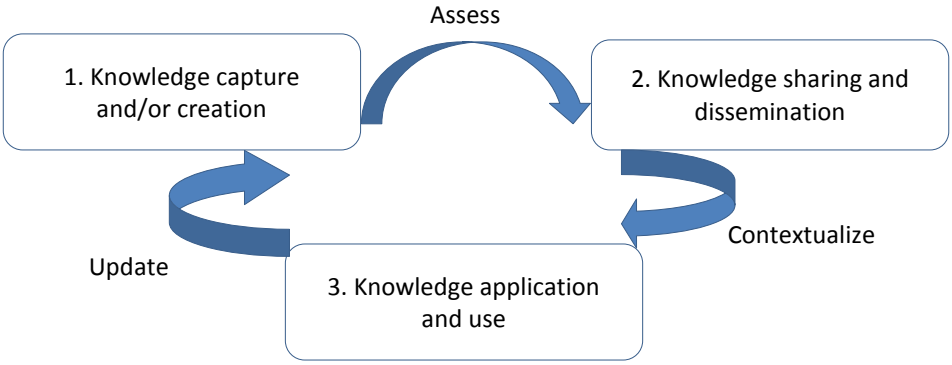


Figure 2.3 A Revised Integrated KM Cycle (adapted from Dalkir, 2013)

2.5 Types of knowledge applicable to libraries

White (2004) sees KM as crucial to providing dynamic and effective services to library users of the 21st century. Two types of knowledge would be of interest to libraries – tacit and explicit. While explicit knowledge is formal, codified and systematic (like books that libraries have always dealt with; and other documents produced within the library), tacit knowledge is personal, experience-based knowledge held by people (Nonaka, 1991) – librarians and library staff, administrators and users.

1. Knowledge capture and/or creation**:** In Figure 2.3 above, in the first phase, tacit knowledge is identified or captured, explicit knowledge is organized or coded, or new knowledge is created. Knowledge creation is typically the outcome of an interactive process that will involve a number of individuals who are brought together in a project team or some other collaborative arrangement (Newell *et al.,* 2002) such as networking with other libraries, attending library events (workshop, seminar, conferences) and connecting with online communities (Shanhong, 2002). That is why, the knowledge of library operations, library users and their needs, library collection, library facilities and technological knowledge needs to be put together. As a result, new knowledge will be created which leads to the improvement and development of service to the users and functioning of the library. However, this diverse knowledge is rather dispersed across all the library sections and up the library hierarchy.

2. This dispersed knowledge captured or created across the library needs to be assessed, then shared and disseminated across the library (Second phase in Figure2.3).

3. Knowledge is then contextualized in each department of the library or to each library employee or user, in order to be understood and used (third phase in Figure 2.3). This stage then feeds back into the first one in order to update the knowledge (Dalkir, 2013).

Integrated Library Systems, while prevalent for a long time, are largely controlled by vendors, and often inadequate due to the growth of electronic and digital resources (Wang and Dawes, 2012), changed expectations regarding interfaces (Andrew, 2009), changing user demand (Breeding, 2006), as well as transformation of libraries in knowledge-based society to capture the range of knowledge needs that different areas of the area have. Thus, along with an integrated library system or a library automation system, libraries will need to supplement and include other technology tools that can capture their knowledge needs adequately.

Agarwal & Islam (2014) use the revised integrated KM cycle adapted from Dalkir (2013), as well as Davis (1989) & Roger (1995) theories on technology adoption/diffusion, as a theoretical lens in their study, and apply it to the context of knowledge management and KM-tool adoption in libraries.

2.6 Knowledge management and academic library

As a business concept, KM emerged during the mid-1990s and received considerable attention from many scholars and practitioners. Knowledge management (KM) is a newly emerging approach aimed at addressing today's business challenges to increase efficiency and efficacy by applying various strategies, techniques and tools in their existing business processes. It has been described as a process or a set of processes (Abell and Oxbrow, 2001; Townley, 2001; White, 2004), a method of management (Shanhong, 2002), a new dimension of strategic information management (Ponelis and Fair-Wessels, 2014), or the use of organizational knowledge through sound practices of information management and organizational learning (Broadbent, 1998). Although the business model of KM is now being adopted by many non-profit organizations such as libraries, it is not as pervasive as in the business sector. As an interdisciplinary approach between KM and LIS, Roknuzzaman & Umemoto (2008) find that many courses of KM originated from LIS and the study explores some areas where both LIS and KM can contribute to each other. Townley (2001) explains in a theory that the

emerging field of knowledge management can offer academic libraries the opportunity to improve effectiveness, both for themselves and their parent institutions. This paper also focuses on the similarities and differences between knowledge management and academic library practices with some issues that academic libraries need to address. In non-profit organizations such as libraries, KM can improve communication among staff and between top management, and can promote a culture of sharing (Teng and Hwamdeh, 2002). As a social organization, libraries have always been involved in the creation of new knowledge by ensuring that the knowledge of the past is collected, organized, made accessible and preserved for coming generations. The digital world provides the opportunity for librarians to be even more actively engaged in the creation process. It can make libraries more effective by enabling user-focused solutions and eliminating redundant procedures. Agarwal & Islam (2014) identified that in knowledge organizations such as libraries, several kinds of knowledge need to be managed: 1) user knowledge (their need, who to contact, information seeking); 2) resource knowledge (sources and services, where these services are available, and other features of resources) and 3) personnel practice knowledge (expertise available, the quality of service they provide, and others). Moreover, KM can help improve communication among library personnel and between users and service providers, between top management and staff, and can promote a culture of knowledge sharing (Teng and Hwamdeh, 2002). Finally, it can help improve efficiency by reducing response time. All these lead to reduced costs, increased performance and a more satisfied library staff, as well as the user. In another study, Roknuzzaman & Umemoto (2009) identified that how library practioners view KM in libraries. It was noted that KM understanding among the practioners were varied but the reason of positive responding to KM in libraries was value of knowledge economy, increasing use of IT and opportunities for improving library services. The few studies on library and KM have focused on KM in academic libraries (Townley, 2001; Maponya, 2004), the need for KM in libraries (Wen, 2005), the relationship between KM and LIS (Sarrafzadeh, Martin and Hazeri, 2010), librarians' awareness or perceptions of KM (Siddike and Islam, 2011), knowledge sharing behavior (Islam, Ikeda and Islam, 2013), developing a theoretical framework of an integrated digital library (DL) system based on knowledge management (KM) process (Roknuzzaman & Umemoto, 2009), KM in state-of-the-art digital libraries (Islam and Ikeda, 2014) and mapping KM tools to KM cycle for libraries (Agarwal and Islam, 2014).

In Islam &Ikeda (2014) study, they find some significant overlaps between digital library (DL) and KM and argues that a generic KM process of acquisition, organization, storage and retrieval, and dissemination of knowledge by receiving feedback can suitably be fitted in DL. It is apparent that an integration of KM can add value to building a knowledge sharing culture, promoting the KM culture, and ultimately increase the organizational output. It helps to improve efficiency, to ensure higher productivity and user satisfaction in the library. Islam &Ikeda (2014) also identified that knowledge management in digital libraries is neither simply a library homepage on the Internet. It is a systematic process of resource acquisition, organization, integration of user knowledge, stored knowledge, dissemination, sharing knowledge and user knowledge base. Based on Yu and Liu (2004)'s framework on knowledge management in university digital libraries, Islam & Ikeda (2014) revised and conceptualized of DL and KM.

Despite varying perceptions of the Library and Information Science (LIS) community towards KM, most researchers view it positively and call for full involvement of LIS practitioners in KM (Abell and Oxbrow, 2001; Southon and Todd, 2001; Agarwal and Islam, 2014). A big hurdle in KM implementation in libraries is a lack of clear knowledge as to how to implement KM. What tools and technologies need to be adopted? What are the set of processes and phases involved? Are the people and processes more important or technology tools and systems? Can we simply implement KM by adopting a particular knowledge management tool or system? Most of the research and case studies of KM implementation, whether in libraries or other business organizations, show that there is no silver bullet to implementing KM (Allee, 1997). Each organization must come up with its own template for what is best suited to its needs. Rather than imposing a process or a tool on an organization, KM is about coming up with strategies, processes and tools that are most likely to be adopted, and used successfully by people in the organization.

2.7 KM enabling environment / readiness

Making effective use of the collective knowledge in an organization is often seen as a challenge that arises mostly at the organisational level. For that reason, organizations need to provide an enabling environment for creating new knowledge within the organization. Knowledge enabling refers to the "overall set of organizational activities that positively affect knowledge creation" (Krogh, Ichijo, and Nonaka, 2000p. 4). Malik and Malik (2008) view that from an organizational standpoint, knowledge is available

both within and outside an entity, thus enabling KM environment becomes important in the quest for organizational knowledge. Kaplan, *et al*., (2001) focus that it is important for organization to capture knowledge as well as employ knowledge management initiatives for quality improvement, innovation, efficiency, improved decision-making, change management, alignment with customer needs, and the like. Agarwal & Marouf (2014) adapt the theoretical lens suggested by O'Dell and Grayson (1998), in addition to the APQC KM model (APQC, 2014; O'Dell and Hubert, 2011) in their analysis to arrive at comprehensive steps for KM planning, design and implementation. They have showed a practical, actionable, step-by-step plan, as well as a diagrammatic, theoretical framework for initiating KM successfully in colleges and universities.

For the present study, we refere to the O'Dell and Grayson (1998)'s framework where they focused KM enabling environment provided by culture, infrastructure, technology and measures. For the present study, we define organizational readiness as the set of factors that need to be in place, and in the right balance at the right point in time, before KM can be adopted in libraries. Many studies have found these to be the most common factors: knowledge sharing culture (Rahman, 2011), top management support (Kamath, Rodrigues and Desai, 2011), funding to set up a KM team and infrastructure (Basu and Sengupta, 2007), and timing – the right time to adopt (Holsapple and Joshi, 2000). These are discussed in the following subsections.

2.7.1 Culture

Morgan (1977) who more recently (1997) describes culture as "an active living phenomenon through which people jointly create and recreate the worlds in which they live" (p. 141). Many studies raise the issue of organizational culture's influence on knowledge management success. Alavi, *et.al.,*(2005) identify that organizational culture often cited as a significant challenge in knowledge management practices. They aim to explore how organizational culture influences knowledge management practices. Findings highlight the influence of culture on the use of knowledge management technologies and the outcomes of such use. Omerzel, Biloslavo and Trnavcevic (2011) define organizational culture as a set of explicit and implicit rules of what is and is not acceptable behavior in an organization, influenced by core values, norms and underlying assumptions. Values and beliefs of university stakeholders i.e. administrators, faculty, staff, students and trustees are thought to greatly influence

decision-making process, and shape individual and organizational behaviors at universities (Bartell, 2003; Omerzel, Biloslavo and Trnavcevic, 2011). The Competing Values Framework (CVF) by Quinn and Rohrbaugh (1981) identifies 4 types of organizational culture - 1) hierarchy (well-structured and formal organization with formalized rules and procedures), 2) market (goal-oriented organization that operates by market rules), 3) clan (tightly connected organization that values teamwork, and people take care of each other; mentorship plays an important role) and 4) adhocracy (creative and dynamic organization that enables innovations, growth and gaining of new resources). Empirical studies have found a positive correlation between the various types of organizational culture and KM processes (Omerzel, Biloslavo and Trnavcevic, 2011). The role of academic libraries is changing to provide the competitive advantage for the parent university (Foo *et al.,* 2002). Academic libraries are part of the university and its organisational culture. Whatever affects universities has an impact on academic libraries. Dalkhir (2013) defines culture is a set of more material elements or artifacts. These are not only the signs and symbols by which the organization is recognized but also the events, behaviors, and people that embody culture. In academic libraries, the medium of culture is social interaction, the web of communications that constitute a community. This can be achieved through creating an organisational culture of sharing knowledge and expertise within the library. Maponya (2004) identifies that for academic libraries, the design team would need to identify the type of culture the university (or the pilot site in question) exhibits, and align its KM approach accordingly. Based on that, library culture can be taught to new members of the library as the "correct" or accepted way to think, perceive, and feel with respect to library work, problems, and so forth.

2.7.2 Infrastructure

Many researchers i.e., (Gold*et al*.2001; Nonaka, 1991; O'Dell *et al*. ,1998) have focused that structure in organizations refers to the formal operation and command structure, as well as the presence of norms and trust mechanisms. Ahmadi and Ahmadi, (2012) identified that KM operates at a few levels – people (competencies and learning abilities of individuals), organization (creation, utilization and development of an organization's collective intelligence) and technology (an efficient and relevant communication and information infrastructure). Gold *et al*. (2001) argued that KM infrastructure and

process capabilities are the firm's predisposition to effectiveness of knowledge management. Gold *et al*. (2001) identified that the infrastructure capabilities consist of three key capabilities (i.e. cultural, structural and technological) and the process capabilities consist of knowledge acquisition, conversion, application and protection refers to the infrastructural capabilities. The literature suggests that structures that can encourage creativity and agility form an effective KM structure (Ruggles, 1998). It is important for leveraging the technological architecture and communication networks (Gold *et al.* , 2001). However, Peachey (2006, p. 81) pointed out that people in organizations can avoid structural barriers by developing their own processes. For academic libraries, having a standard infrastructure is important for the KM process in their daily activities. To leverage upon the knowledge infrastructure capability (culture, structure and technology), KM processes need to be properly in place so that knowledge can be captured, stored, shared and applied effectively in academic libraries. Libraries without KM infrastructures are impossible to get the benefit of KM in libraries. Library management need to understand that all infrastructural capabilities work in close collaboration with each other and not in isolation in achieving KM excellence.

2.7.3 Measures

After having the proper infrastructure, the next step is to measuring the value of knowledge and KM practices to the libraries. While working to foster a cooperative culture, infrastructure and creating mechanisms to foster KM, library management keeps a sharp eye on the rewards of these endeavors. The results of KM activities must translate into real business value (Dalkir, 2013). In academic libraries, the bottom line is the measure of success to the library performance in system and services. The O'Dell and Hubert (2011, p. 152) identified that "a measurement system provides a framework to present a common understanding of the current situation, what needs to be done to improve, and how progress is going to be measured and rewarded." In academic libraries, the involvement of all faculties, staff and other library users with library personnel is crucial in this process, as they are best enabled to determine what success would mean to them and the library. These measures must be aligned to the KM goals to the academic library. Based on the O'Dell and Hubert (2011)'s KM measures categories, for academic libraries we can divided into three categories i.e., activity

measures, process efficiency measures and library performance measures and outputs. Finally, the library performance measures and outputs evaluate the performance of the pilot site's operations and activities. They will provide the link from the KM program efforts to the organizational results (O'Dell and Hubert, 2011). However, a list of measures alone won't do the library any good. "It will need processes and accountability for collecting, organizing, reporting, and acting on the measures to improve the KM activities, as well as to provide the basis for funding" (O'Dell and Hubert, 2011, p. 152). For example, Dalkir (2013, p. 307) identified "at Dow Chemical, managers believe there should be a common set of financial processes around the world to create common measures of financial performance, whereas IBM relies on more traditional measures such as customer satisfaction, time to market, and cost evaluation". The organizational context will thus affect KM implementation and the evaluation of how successful this implementation was.

2.7. 4 KM tools

A number of researchers have looked at KM tools in the context of knowledge management. Tyndale (2002) classifies technology tools in 17 areas - intranets, push technologies, etc. He classifies the tools as new versus old, and maps them to knowledge creation, organization, distribution and application. Ruggles (1997, 2009) classifies KM technologies, focusing on KM uses such as enhancing and enabling knowledge generation, coding knowledge, and transferring knowledge. Rao (2005) compiles case studies of KM tools, techniques and strategies used across organizations. Rollet (2003) classifies technologies in the areas of communication, collaboration, content creation, content management, adaptation, eLearning, personal tools, artificial intelligence, networking, standards and hardware. He also makes a case for what can, and what cannot, be achieved through technology. Janz (2001) discusses a tool called common knowledge database (CKDB) for managing and using informal knowledge in university libraries. Dieng and Corby (1998) provide an approach to understanding the core tools and techniques widely used in undertaking KM in an organization. Tiwana (2002) includes technologies and KM best practices of KM. Lindvall, Rus and Sinha (2003) survey the tools available to support different KM activities. However, the above-mentioned studies are mainly for the software industry, and not easily understandable and directly applicable to libraries. The mapping of the tools/technologies to phases of

the KM cycle is important to ensure that technology is not the primary driver, and that technology does not drive the KM phases (Agarwal & Islam, 2014). Depending on the KM phase being implemented in the library and the unique library context, it can pick the right tools and technologies from a suite of options. By having the possibilities of KM tools and technologies currently available, and having them mapped to phases of the KM cycle, we hope libraries will be in a better position to make the choices required when implementing KM.

Without providing a one-size-fits-all solution, it is an attempt to help libraries make informed decisions as they venture out to implement KM. (Agarwal & Islam, 2014) put together the various tools and technologies available for KM implementation, and map them to different phases of the KM cycle – ranging from knowledge capture or creation, knowledge sharing or dissemination, and knowledge acquisition and application (Dalkir, 2013). These cycles encompass the different ways in which knowledge is managed, from capturing to transferring knowledge (Awad & Ghaziri, 2004). In Appendix A, Agarwal & Islam (2014) review a wide-range of technology (IT-based) and non-technology tools and techniques currently in use in KM or across disciplines, that would be applicable to the three phases of the KM cycle identified in Figure 2.3 (see Table 2.2). The choice of tools for each phase must be specific to the library or department implementing KM, and must be consistent with its goals and strategy. Of the tools listed, most of them are free or open source, while some are paid or have paid features. In helping to identify the tools and the categories within them (both IT and non-IT based), Good (2012, 2013), Young (2010), Dalkir (2011), Leask *et al*. (2008) were important studies, supplemented by other websites and blogs. In table 2.2, the six tables below are classified into the 3 phases of the integrated KM cycle and each phase has 2 tables – one for non-IT-based tools, and the other for IT or technology based tools. The 3 tables on non-IT-based tools list the tool or method, what it does and how it applies to KM in libraries. The 3 tables on IT-based tables list the overarching technology category, what it does, examples of current tools in that category, as well as how those apply to KM in libraries. Agarwal & Islam (2014) have looked at tools and techniques for knowledge creation/capture, sharing/dissemination, and application/use – both technology-based solutions, as well as those that don't necessarily rely on technology.

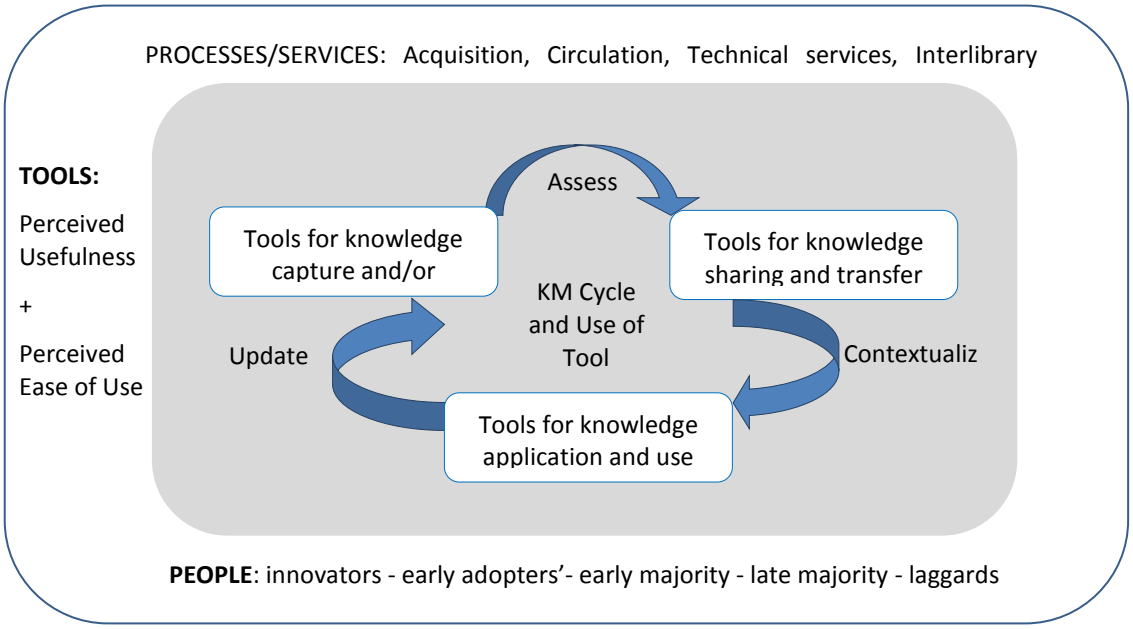
A few findings emerge:

1) It was found that there is no single set of tools that would be applicable to everyone or across libraries. Depending on technology adoption (Davis, 1989) and diffusion (Rogers, 1995), and individual personalities, people will use the information created, captured or shared differently. Tools such as MBTI (see Table 2.2.5) help individuals assess their own behavior when accessing and using information.
2) Also, technology is just an enabler for KM. Only technology tools are not enough. A combination of physical environment and technology-enabled tools is necessary. For each phase of the KM cycle, Agarwal & Islam (2014) have provided a comprehensive summary of both technology and non-technology based tools.
3) Technology changes rapidly. While specific examples of tools would change over time, the broader technology categories, as well as the non-IT tools will remain relevant for many years.
4) Even among the technology tools listed, the ways to access them are changing. More and more of the tools will be used in mobile and tablet environments (Apple iOS, Google Android or Windows-based devices). Agarwal & Islam (2014) recommend librarians to pick tools that have mobile support, as they are more likely to be adopted and used in different ways.
5) Some tools are applicable to more than one phase of the KM cycle. Therefore, Agarwal & Islam (2014) choose the KM cycle phase that a particular tool would be best suited for.
6) Agarwal & Islam (2014) recommend librarians to pick 1-3 technology tools from each phase. The more tools that a library adopts, more would be the learning required for all employees. Additional support would also be needed. Therefore, a smaller number is recommended – whether this number is 1, 2, 3 or 4 will depend on individual library needs. This is because, tools, after all, are only enablers. The library would not want its employees to get mired in the learning curve of too many tools. To arrive at chosen tools, the library needs to survey its employees to ascertain their comfort level, preferences and the tools they might already be using.
7) Libraries will need to decide between free versus paid tools. Free or open source does not mean free. Libraries need to consider maintenance and training

costs. After that, they would need to decide (based on budgets or human resources) whether they would go with proprietary (paid; supported by other companies) or free, open-source tools, where in-house manpower will have greater role.

More generally, the results of this study reinforce the recently accumulated evidence (Tyndale, 2002; Ruggles 1997, 2009) that KM cycle and its tools can be applied in libraries. Findings of this study contribute to fill the gap existing in the literature by bringing together a comprehensive listing of tools and their possible application in libraries in a single paper.

To summarize the findings, Agarwal & Islam (2014) present below a model for KM tools and their adoption in libraries (see Figure 2.4).



2.4 Model for KM Tools and Their Adoption in Libraries

Agarwal & Islam (2014) capture the key features of the integrated knowledge cycle model by Dalkir (2013). The tools for knowledge capture and/or creation (Table 2.2.1 & 2.2.2), the tools for knowledge sharing and transfer (Table 2.2.3 & 2.2.4), and the tools for knowledge application and use (Table 2.2.5 & 2.2.6) form the key pieces of the model. Individuals' perceived usefulness and perceived ease of use of these tools (as per the TAM Model-Davis, 1989) will play a major role whether particular tools are adopted/used and successful, or not. Also, people who self-identify as innovators and early adopters (as per the Diffusion of Innovation theory - Rogers, 1995) are more likely to adopt changes easily, and should be part of the pilot program when adopting KM and

KM tools in libraries. Agarwal & Islam (2014) noted that a librarian or a team assesses and transfers the captured or created knowledge, contextualizes it to one's unique needs, and updates it to form a continuous knowledge cycle, supported by technology. All of this must happen to support the wider organizational functions of the library such as circulation, reference, inter-library loan, customer service, etc., and help enhance its larger goals such as service, survival, growth, innovation and satisfaction.

2.7.5 KM and social media

In a digital environment, knowledge can be transferred through e-mail, social media, websites, online discussion forums, video-conferencing and other collaboration tools (Agarwal & Islam, 2014). Using these tools, librarians can share their knowledge with colleagues and respond more effectively to user needs (Michael & Maria, 2007). Social media can be leveraged to support knowledge sharing, creation and other knowledge processes. Social media applications and tools are important for libraries, especially when they are going through budgetary constraints. This is because many of these social media can be adopted free, or purchased at relatively low prices. Levy (2009) points out that the features of most social media tools have their roots in KM tools. E.g. Wiki as a social media tool is part of the KM toolbox. Wikis can be read and edited simultaneously, helping to improve collaboration amongst library staff, between staff and patrons and even across libraries. "Library Success: A Best Practices Wiki" (www.libsuccess.org) is used by librarians across the world to share their knowledge and successful projects, facilitating collaboration across libraries. Moreover, Levy (2009) stated that the younger generation can be the knowledge catalysts what we are always seeking for in knowledge management. In their book Enabling Knowledge Creation, Von Krogh, Ichijo and Nonaka dedicate a full chapter to one of the five knowledge enablers in organizations: mobilizing knowledge activists, (Von Krogh, *et al*., 2000). The focal point was that the younger adopt changes faster, not only technology changes, and should be considered as potential role players in the change management effort. Organizations make progress where people put their focus and it should be remembered that social media focuses on people, while KM focuses on organizations (Cleaver, 2006). In order to get benefit, both of these elements need to think of how they can get benefit though amalgamation. For the present study, we have taken social media

as KM tool written by Agarwal & Islam (2014) in their theoretical study and further analyzed the perception of academic librarians of using 'KM with social media '.

2.8 Knowledge retention and transfer

2.8.1 Knowledge retention

Knowledge retention or knowledge continuity involves capturing knowledge in the organization so that it can be used later (Levy, 2011). It is a sub-discipline of KM and is concerned with making sure that the organization does not lose the knowledge held by knowledge workers who leave the organization. Baker, Perez and An (2004) suggest that KM systems can offer viable solutions for the retention of knowledge. The Tennessee Valley Authority (TVA) is often listed in case studies where knowledge retention processes were documented and published (Landon and Walker, n.d.; Beazley, Boenisch and Harden, 2002; DeLong, 2004; Patton, 2006). Hayward-Wright (2009) highlights that any knowledge enabling initiative requires three critical organizational elements: focus (vision/strategy), capability (tools and resources) and the will (culture). Distinguishing between technology and human interaction, Hayward-Wright (2009) lists two types of enablers necessary for knowledge retention: 1) systems-based knowledge transfer enablers – document management, procedure repository, contacts database, expert database, social network analysis, and (online) training program; and 2) people-based knowledge transfer enablers – mentoring, coaching, shadowing, joint decision making, interviews, storytelling, networking, think tanks, forums/communities of practice, etc.

A number of researchers have suggested strategies for knowledge retention. Rothwell (2004) suggests 12 strategies, some focused on general KM issues, and others on knowledge retention when personnel leave the organization: job shadowing; communities of practice; process documentation; critical incident interviews or questionnaires; expert systems; electronic performance support systems (EPSS); job aids; storyboards; mentoring programs; storytelling; information exchanges; and best practice studies or meetings. DeLong (2004) suggests eight strategies. Again, some (such as after-action reviews and communities of practice) focus on KM-in-general, while others are specific to knowledge retention when employees leave. Three of the strategies aim at improving the transfer of explicit knowledge – documentation,

interviews and training – and four at transferring implicit and tacit knowledge – storytelling, mentoring/coaching, after-action reviews and communities of practice. Patton (2006) argues that organizations should concentrate on recreating tacit knowledge rather than focusing only on transferring it. Beazley (2003) posits that planning how to retain the knowledge must include defining the technology that will facilitate the process. Hayward-Wright (2009) recommends an information audit (focusing on explicit knowledge) and a knowledge audit (focusing on tacit knowledge) to decide what knowledge is critical to be retained or captured. She advises four types of questions that can be asked to a departing employee: general questions, questions pertaining to specific tasks, questions on facts or information, and questions that will draw out lessons learned, insights, etc. A number of studies (Landon and Walker, n.d.; Beazley, 2003; DeLong, 2004; Baker, Perez and An, 2004; Morgan, Doyle and Albers, 2005; Kalkan, 2006; IAEA, 2006) recommend initiating the knowledge retention process with an assessment project that estimates the risk of knowledge loss. These are similar to the information and knowledge audits recommended by Hayward-Wright (2009). DeLong (2004) and Hofer-Alfeis (2008) emphasize implementation (see Levy, 2011), thus setting the foundations for organizations that actually want to know how to transfer the experts' knowledge across the organization.

2.8.2 Knowledge transfer

Like knowledge retention, knowledge transfer is the means by which expertise, knowledge, skills and capabilities are transferred from the knowledge-base to those in need of that knowledge e.g. from outgoing to current employees, or from current to incoming employees, or from databases and documents to current or incoming employees (Silke and Alan, 2000). It refers to the activities associated with the flow of knowledge including communication, translation, conversion, filtering and rendering (Newman and Conrad, 1999) and making it available for future use. Bou-Liusar and Segarra-Cipres (2006) calls this internal transfer, and highlights that knowledge transfer can also include the external transfer of knowledge between firms. Knowledge transfer is more than just a communication problem due to the complex and tacit nature of organizational knowledge, including knowledge of members, tools, tasks, and types (Argote and Ingram, 2000). Nonaka and Takeuchi (1995) show how knowledge can be transferred between and within tacit and explicit forms (see Figure 2.1). DeLong (2004)

suggest that knowledge can be transferred from individual-to-individual, individual-to-group, group-to-individual and group-to-group. The transfer involves both the transmission of information to a recipient and absorption and transformation of knowledge by that person or group (Davenport and Prusak, 1998). To be of value to the organisation, the transfer of knowledge should lead to changes in behavior, practices and policies, and the development of new ideas, processes, practices and policies. Emadzade et al. (2012) posits that knowledge transfer can be made possible through the process of combining, filtering, integrating, merging, coordinating, distributing, and reconstructing knowledge.

2.8.3 Factors affecting knowledge retention and transfer

While we have looked at various strategies proposed by researchers on how to retain or transfer knowledge between/among employees in organization, none of these will work if a few required elements are not in place. Based on O'Dell & Grayson (1998)'s work, Agarwal and Marouf (2014) list 4 basic areas that must be in place for effective knowledge management. These are people, culture, processes and technology. They list these in the context of colleges and universities as a whole, but these would be equally applicable to knowledge retention and transfer in academic libraries. We could think of these are library capability or readiness for knowledge retention and transfer. People includes factors such as awareness of KM, knowledge retention and transfer, what it means and what it can bring to them; individual intention to be involved in the knowledge management, retention and transfer process; motivation and the degree of effort one is willing to put into it, and top management openness and support, as well as proving resources, rewards and incentives (Bock and Kim, 2002) for new ideas (O'Dell & Grayson, 1998; Agarwal and Marouf, 2014). Culture (Goh, 2002; Mills and Smith, 2011) includes whether the library encourages and facilitates knowledge sharing, retention and transfer, whether a climate of openness and trust (Levin and Cross, 2004) permeates the library; whether flexibility and the desire to innovate drives the learning and work process in the library (Agarwal and Marouf, 2014); whether collaboration and support for collaboration management form a key part of the library's practices; and so on. Processes include determining if any prior KM implementation is in place (Agarwal and Marouf, 2014), or if existing knowledge retention and transfer strategies (discussed

in the sections above - such as mentoring, coaching, shadowing, document management, repositories, databases, etc.) are already in place in the library.

Finally, technology includes having IT-based mechanisms that link library staff and stakeholders to one another, and to public; having an institutional memory that is accessible to the library as a whole; determining whether the library fosters the development of human-centered IT; having an environment where the technology that supports collaboration is rapidly placed in the hands of faculty and staff; and where available information systems are real time, integrated and smart (O'Dell and Grayson, 1998; Agarwal and Marouf, 2014). All these factors enable the phases of the KM cycle, which includes knowledge creation, retention and transfer processes. Before implementing any knowledge retention and transfer strategies, a capability or readiness assessment must be done (Agarwal & Marouf, 2014; Lee *et al*., 2012; Khalifa and Liu, 2003; Gold et al., 2001) to see the state of the library as regards to these 4 areas discussed above. Without a culture of trust (Levin and Cross, 2004) and collaboration management support, or without effective technology, implementing strategies would not be effective. E.g. a library employee would not want to transfer his/her tacit knowledge to an incoming or current employee if there is no mutual trust. Thus, any implemented strategies must align with the state of capability, readiness or maturity of the library for KM, and phases of the KM cycle.

2.9 Service innovation

Services are the key activities in the economy of the 21st century where services generate high values for products in global markets. Kosaka & Shirahada (2014) identified the ratio of service industry in GDP of both advanced and developing countries are increasing in information or knowledge industry. Companies, governments, and universities around the world have recently awakened to the realization that services dominate global economies and economic growth (Bitner, *et.al.,* 2008). The concept of Service Science is becoming a strategic area of scientific study at IBM Research. IBM research is actively working on how to innovate, manage, evaluate and optimize their service businesses (Ostrom, *et.al.,* 2010). The increasing importance of services leads many researchers from various fields to study service activities. Various new concepts or research ideas have recently been proposed in service science such as service dominant logic (SDL) (Vargo & Lusch, 2004); (Lusch & Vargo, 2006);

service as a theatre (Fisk, Grove & john, 2008) and service innovation (Gallouj & Djellal, 2007). Ettlie & Rosenthal (2011) focus that service and manufacturing firms are different when it comes to innovation. Manufacturing is more likely to report the need for new strategies and structures when products are new to the industry or new to the firm. Ettlie & Rosenthal (2011) also identify that services are more likely to convert novelty into success. Services are significantly more likely to have a short beta testing process and to exploit general manager (internally sourced) ideas for new offerings as an alternative to formal innovation structures However, services could be an area for innovation has gained ground slowly and studies on service innovations are relatively new. Recent literature focuses that innovation in services is still low as present research usually focuses on manufacturing which relates to product innovation (Loof, *et.al.,* 2001). Dorner, Gassmann & Gebauer (2011) noted most of the funds of manufacturing companies channeled into product innovation rather than development of new service offers.

Nowadays, innovation in services has become essential for achieving a competitive advantage. Dorner, Gassmann & Gebauer (2011) give the example, energy providers supplement their energy products with services for enhancing energy efficiency, petrol stations have become 24 hour shops, software producers look after their clients' entire range of information technology, and more. Dorner, Gassmann & Gebauer (2011) also mentioned that at present, no car manufacturer is earning much from the actual cars; rather, the profits are earned through financing and insurance services, as well as after-sales services such as spare parts and repairs. Entire industries are recognizing the potential for service innovation, and individual companies regard service innovation as a decisive competitive factor. More recently, Gallouj & Weinstein (1997) discerned a total of six innovation models that could be used for describing services innovation. They distinguish between radical innovation, improvement innovation, incremental innovation, ad hoc innovation, re-combinative innovation and formalization innovation. Hertog & Bilderbeek, (1999) explain that like any product, service innovations are seldom limited to a change in the characteristics of the service product itself. Service innovation may refer to new service design and development, innovation in processes, and organizational innovation (Miles, 1993). It can be related to changes in: the concept of a service, the client interface, the delivery system or technological options (Heskett, 1986; Miles, 1993; Hertog, 2000). It creates value for customers, employees, business

owners, alliance partners, and communities through new and/or improved service offerings/processes/business models (Ostrom *et al.,* 2010). The different approaches to defining and studying innovation in services is categorized unto three groups: 1) an assimilation approach (SI is similar to manufacturing); 2) a demarcation approach (SI is different from manufacturing) and; 3) a synthesis approach (cover both), (Coombs and Miles, 2000; Drejer, 2004). Based on synthesis approach, many authors presented SI model considering the nature of the organizational pattern. In practice, most innovations appear to be a mixture of major and minor changes and adaptations of existing services. Research shows that four dimensions can be used to describe a new service: the service concept, the client interface, the service delivery system and technological options. In practice, innovative services are mixture of these four dimensions (Hertog & Bilderbeek, 1999; Hertog, 2000). These dimensions appear to be useful to describe the diversity of innovation in services. Barras (1986)'s model of the 'reverse innovation cycle' has often been mentioned as the first innovation theory which concentrated specifically on services. But the theory of innovation in services developed by Gallouj and Weinstein (1997) has been widely discussed in service innovation literature. They consider service provider competencies, service provider technology and client competencies as service characteristics of the service innovation. They define a service is set of the characteristics and an innovation is defined as any change affecting one or more of the characteristics. Hertog (2000) identifies four dimensions of service innovation see (Figure 2.5), takes quite a different direction to much standard innovation theorizing.

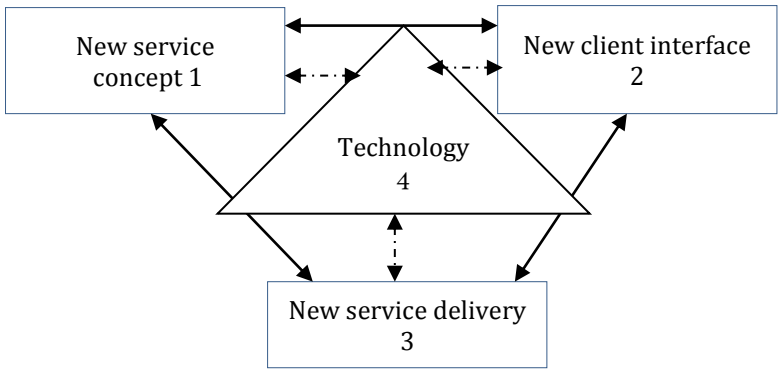


Figure 2.5 Service Innovation Framework (Hertog, 2000)

It is characterized in the framework by changes in: (1) the service concept, (2) client interface, (3) delivery systems and (4) technological options. Any innovation in services can involve a specific combination of the four dimensions of services.

2.10 Service innovation and academic library

Most literature on service innovation relates to business firms and is outside the library context. Most of the researcher argues that better performance in services; competitive advantages as well as satisfying consumers are the areas where innovation brings benefit for the organizations (Kelley& Storey, 2000). A few in depth studies of innovation in academic libraries have contributed significantly to the accumulated knowledge on this area. These are diversification of knowledge and innovation in libraries (Howard, 1977); climate, investment & leadership for innovation (Drake, 1979); shifting approach from book-centric to user centric (Li, 2006); knowledge innovation culture (Sheng & Sun, 2007); innovative community for the service research group (Xiaobin & Jung, 2009); technological application to library services (Cervone, 2010) and customer involvement in the service innovation process (Scupola & Nicolajsen, 2010). Bergart & D'Elia (2010) focus on innovation Boot Camp where library users engaged in playful activities & become more innovative at work. Bell (2011) & Leong & Anderson (2012) explain that for the innovation, libraries need to follow developments within the profession and engaging employee increase the level of innovation in academic libraries. Moreover, organizational size, leadership & well management, service design approach for building customer service systems for libraries lead to innovation in academic libraries (Jantz, 2012 & De Jong, 2014).

Other recent studies on service innovation in academic libraries focus on emerging technologies and innovation in digital library (Cervone, 2010), and leadership, organizational size, complexity, and environmental factors (Jantz, 2012). However, while these studies have looked at organizational aspects, they do not investigate the core concept and dimensions of service innovation adequately. Service innovation in libraries refers to the generation of new ideas and the effort to find ways to implement those ideas in practical ways. It can be new/improved technology or interfaces, improved services, outreach or organization methods, and other continuous work for patron satisfaction. For the present study, we take service innovation in academic libraries as to create user-centric services for library users, user-centered library

interfaces/websites, new outreach/distribution methods, new technology applications to the service process, new ways to organize and manage services, new kinds of services that improve user experience and satisfaction, and continuously working to make the collections/facilities more useful to patrons. Considering the degree of novelty associated with library services, we categorized innovation in academic library services as incremental innovation for this study. In incremental innovation, some innovations employ a high degree of novelty in library services e.g., using RFID in libraries, while others put emphasis for improving changes on existing design e.g., using federated search engine for academic libraries. This distinction between big and small changes innovations has led to incremental innovation (Freeman, 2001).

2.11 Innovation enabling environment in library services

Nowadays, there is an ongoing need for academic libraries to improve their services. Improving services become reality to cope up with the unmet need of library users. Harbo & Hansen (2012) identify strategies to meet with those services. One strategy is to become more aware of the users' needs which libraries are not always able. If libraries want to improve the way they serve their users' needs, they must innovate their services and facilities. There are a number of service characteristics and related management challenges that underlie the need for an innovation technique (Bitner, Ostrom & Morgan, 2008). Some of these are services as process, services as customer experiences, service development and design and finally service blueprint. In the service blueprint, Zeithaml, Bitner and Gremler (2006) focus key components are customer actions, Onstage/visible contact employee actions, backstage /invisible contact employee actions, support process and physical evidence are important. Dorner, Gassmann & Gebauer (2011) identify that managerial deficiencies with failure to protect services hinders investment, lack of clear organizational anchoring, not following the innovation process systematically, poor ideas and lastly less customer involvement in the process make the service innovation harder for the organization. de Jong and Vermeulen (2003) divided service innovation factors can be divided into people-related factors and structural factors. Based on de Jong and Vermeulen (2003)'s people related factors, in libraries it refers to direct user involvement, the involvement of user contact library employees, senior management, and non-contact personnel. User involvement refers to an in-depth understanding of user needs. Also, the involvement of

user contact library employees (frontline employees) is essential because they are the actual deliverers of the service in question. Based on employee's knowledge on customer needs, librarins knowledge of user needs lead the libraries to define innovation in services. Moreover, librarian's impressions of direct user reactions are important because the user may not offer feedback verbally. Contact library employee like circulation or reference librarian can identify obvious satisfaction or dissatisfaction with the given service. Moreover, Dorner, Gassmann and Gebauer (2011) identify that for successful new service development, it is important for senior management to encourage service innovation. Apart from user involvement, unlock the mystery of tacit knowledge of library employees can excel the power of innovation (Von Krogh, Ichijo & Nonaka (2000). Ramus (2001) identifies that by encouraging employees to be creative, organization can launch a powerful in-house think tank that can help organization to achieve its goals. Darroch (2005) points that enabling knowledge through KM, it is empirically supported that a firm with a knowledge management capability will use resources more efficiently and so will be more innovative and perform better. de Jong and Vermeulen (2003)'s structural factors refer to using a systematic new service development process, specific innovation (funnel) tools and multifunctional teams as well as the availability of resources, market testing and market research. de Jong *et al*. (2005) stress that service firms should not refrain from testing new services completely. Service firms should evaluate new services with early adopters and use their feedback to further refine the service concept, delivery system, etc. We have looked at the innovation enabling factors for library services. We found that there is no single bullet point or single factors that would be applicable for service innovation in academic libraries. But most of the studies focus on managing knowledge both employees and users through KM, user involvement, leadership, senior management involvement, technology support, availability of resources , innovation culture, well-defined flexible execution process, strategic innovation agenda, and others. Moreover, Khan,Tsui & Lee (2014) focus various factors like strategic, market related, development process and organizational factors which affect the success of service innovation. Many factors are remaining unexplored in the academic library setting. For the purpose of this study, we have chosen two important factors KM and value co-creation for the innovation in academic library services.

2.12 KM and innovation in academic library services

Innovation allows organizations to come up with new and improved services for their user communities. To enhance the organizational capacity and improving services, KM provides a framework for the management to foster innovation. Cohen and Levinthal (1990) explain that the ability of an organization to recognize internal and external knowledge, and apply them accordingly which leads to innovative result. Extending this idea, Fiol (1996) argued that the potential of an organizations to generate innovation outcomes is dependent on the previous accumulation of knowledge that they have absorbed. Innovation is a process that recombines existing knowledge in new ways. DU Plessis (2007) focused innovation is a process that recombines existing knowledge in new ways and KM can play significant role for recombination of Knowledge into new and innovative ideas. Based on that, DU Plessis (2007) identifies fifth drivers of KM for the innovation. The first driver's role of KM to innovation is to create, build and maintain competitive advantage through utilization of knowledge. The second is managing knowledge as resource which can be used to reduced complexity in the innovation process. The third is the integration of both external and internal knowledges in the organization for making it more available and accessible. The fourth one is managing various activities of innovation using KM lifecycle which finally leads to the innovation environment. Shani *et al*., (2003, p.23) state that "knowledge management and innovation configuration determine how the firm can capitalize and create new knowledge, providing context wherein new product development efforts are designed, developed and completed". Reflecting the role of KM on innovation, Parlby and Taylor (2000) focus that KM is about supporting innovation, the generation of new ideas and the exploitation of the organization's thinking power. Capturing insight and experience to make them available and useable when, where and by whom it is required. Cavusgil *et al*., (2003) point that KM enables the sharing and codification of tacit knowledge which critical for organizations' innovation capability. Furthermore, authors point out that KM is not solely focused on innovation, but it creates an environment conducive for innovation to take place. Cardinal *et al*. (2001) identify that sharing tacit knowledge is important for the innovation but organizations are firstly not aware of the stocks of tacit knowledge available to them, and furthermore have no formalized way to

access it. It is KM that can assist in the accessibility of such tacit knowledge and the codification thereof.

Innovation is very important to libraries as well. User demands are changing, leading to transformation of offerings, especially in the digital environment. An increasing number of authors are highlighting the challenges facing academic libraries and future scenarios (McKnight, 2010; Alvite & Barrionuevo, 2010). To keep pace with the changes in user expectations, libraries need to leverage their strengths such as physical space and collections, and to innovate to provide more responsive and agile services (Li, 2006). This becomes even more pertinent in the age of connectivity, mobile usage, huge digital data, and an increasing mix of digital and physical worlds. Adopting KM will help libraries provide innovative services (Islam, Agarwal, & Ikeda, 2015a). Townley (2001) writes that KM offers academic libraries the opportunity to improve effectiveness, both for themselves, as well their parent institutions/universities. Using the metaphor of knowledge as a pyramid, Townley describes data and unfiltered facts at the bottom, which becomes information with the addition of context from cataloguing and classification. This information then becomes intelligence through the addition of inference through interaction and public services such as reference. This intelligence can then be combined with certitude to become knowledge, and synthesized to become wisdom (Townley, 2001, p.47), that helps in decision-making. While libraries have excelled in creating information and intelligence from data, they have not tended to create knowledge (Townley, 2001). Libraries need to embrace a scenario where knowledge is not just managed by the library (in the form of books or periodicals) but created within the library. Thus, libraries need to leverage employee and user knowledge, along with rapidly evolving technology (Islam, Agarwal, & Ikeda, 2015a). However, while there have been studies on KM in libraries (e.g., Maponya, 2004; Wen, 2005; Sarrafzadeh, Martin & Hazeri, 2010) and on innovation in the context of libraries (e.g. Li, 2006; Scupola & Nicolajsen, 2010; Jantz, 2012; Islam, Agarwal, & Ikeda, 2015a), the extant literature is yet to provide empirical evidence linking knowledge management with service innovation in academic libraries. Considering this factor, the present study aims to clarify the role of KM in innovation of library services.

2.13 Theoretical lens: KM for service innovation in libraries (KMSIL)

Rowley (2011) states that new service development ability of academic libraries depends on its employee skills/knowledge, availability of tangible and intangible resources, IT adoption, management support, user knowledge and innovation processes. To offer new and innovative services to the user communities, libraries need to generate creative and implementable ideas based on their knowledge from direct customer contact. Kim & Abbas (2010) investigate the adoption of Library 2.0 functionalities by academic libraries and users through a KM perspective. They have found that RSS and blogs are widely adopted by academic libraries while users widely utilized the bookmark functions. For example, blogging enables the library to aggregate knowledge from users. However, this needs to be supplemented with the librarians' own knowledge, critical thinking ability, and continuous learning from external and internal sources. The role of KM in innovation and competitiveness (Storey and Kelly, 2002; Du Plessis, 2007) and in providing customer knowledge for service innovation (Xu, 2011) leads us to three viewpoints, which provide the theoretical background for this study.

2.13.1 Looking externally

(1) *Developing knowledge of customer needs through librarian-patron interaction*: Customer knowledge is a major element of KM. Xu (2011) conceptualizes customer KM as the utilization of knowledge for, from and about customers to enhance the customer-related capability of organizations. In academic libraries, knowledge for patrons includes knowledge on services, timing, etc. Knowledge about patrons includes met and unmet user needs.

(2) *Developing librarian's knowledge of innovations and what's out there or what's possible*: Library employees need to generate creative and implementable ideas based on their knowledge from direct customer contact. However, this needs to be supplemented with the librarians' own knowledge, learning orientation (Gray and Meister, 2004), critical thinking ability, and continuous learning from external and internal sources.

2.13.2 Looking internally

(3) Analyzing the pieces (the needs and the possibilities) and synthesizing / bringing them back together in new and innovative ways – service innovation. During interaction with patrons, employees collaboratively co-create value (Echeverri and Skalén, 2011). This knowledge, when combined with the knowledge of possibilities, and analyzed strategically gives rise to innovative solutions and approaches. Hertog (2000) identifies four dimensions of service innovation that help meet patron needs: service concept, client or patron interfaces, service delivery system and technological options. It is likely that the solutions arrived at will be some combination of these four dimensions. Using KM for service innovation, libraries will be able to collaborate more, reduce service complexity and increase innovation possibilities by integrating internal and external knowledge and making it available and accessible to its patrons and all other stakeholders (Islam, Agarwal and Ikeda, 2015a).

2.14 Value co-creation

Nowadays, the principal transitions centre on the use of technology and in services for information searching, storing, processing, and disseminating information. The major driver for change has been an increased shift in focus to the user as the centre of attention from the library as a service and a system, especially to reflect the changing habits and needs of the digitally connected user. Really understanding library users and coming up with strategies to support greater user involvement will help in the reshaping of library services (Brindley, 2006). All these issues of involving and collaborating with user communities (especially in the early phases of creating ideas for new services) are fueling the coming of age of one research discipline, that is, value co-creation. In the business world, organizations are embracing consumers as co-creation partners in their approaches to innovation. Yet no work on value creation thus far has focused on academic libraries. The only work we have been able to find was a recent book chapter by Germano (2014). This looks at the role of leadership in value co-creation, and in the creation and execution of programmes and services that matter most to students and librarian educators alike, and in turning assessment of various library services into actionable data that produce meaningful changes for student library users.

Value creation is a process in service-oriented organizations, whereby services flow from the provider to the customer in a unidirectional, one-way manner (Prahalad and Ramaswamy, 2004a). Organizations have often used the traditional goods-dominant (G-D) logic (value in exchange) where value is created by the firm in the form of the products it manufactures (Vargo and Lusch, 2004; Vargo, Lusch & Morgan, 2006). However, users today have more choice of services than before. Therefore, using an alternate service-dominant (S-D) logic (value in use), value is created jointly by the service providers and customers through the integration of resources and application of competencies (Vargo and Lusch, 2004; Vargo, Lusch & Morgan, 2006). Here, the customer is always the co-creator of value. This bi-directional interaction between the service provider and the customer in S-D logic forms the root concept of value co-creation (Vargo and Lusch, 2004) popularized by Prahalad and Ramaswamy (2000, 2004b). Value co-creation is defined as an interactive process involving at least two willing resource-integrating actors (Payne et al., 2008), focusing on three elements that lead to service innovation – the provider's sphere, the customer's sphere, and the joint sphere (Gronroos, 2008).

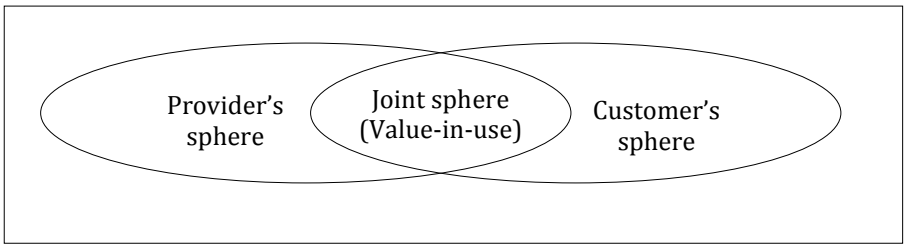


Figure 2.6 Elements of Value Co-creation

Figure 2.6 (based on Payne *et al*., 2008; Prahalad and Ramaswamy, 2004; Skarzˇauskait_e, 2013) illustrates that both the customer and the service provider are important in creating value and in developing new/innovative services. The provider and the customer create value in their respective spheres (utilizing processes, resources, constraints etc.) and co-create value in a shared, joint sphere. The joint sphere is where the most innovative services take root. During the 2006 World Cup soccer tournament, Nike set up a social networking site that invited individuals to film their soccer skills, upload the video, and invited the network community to comment, rate, share the user generated content, and select a winner each month. Nike also sponsored street soccer competitions and created a Web site connecting professional players with fans. This enabled Nike to learn directly from its customers (Ramaswamy, 2008). Nike's online

service called NikeID allowed individuals to personalize and design their own clothing and shoes (Thomas and Wind, 2013). Coca-Cola's Free-Style machine is an innovative soda fountain accessible by touch screen that offers over 125 unique flavors that customers can mix and create to their tastes (Thomas and Wind, 2013). Data gathering in the process allows Coca-Cola to learn about customer preferences, engages customers, and assists the design of future machines. Other often-cited examples of business applications of co-creation include Amazon, Alcatel-Lucent, Aloft, Apple, Cisco, Dell, Disney, eBay, Endemol, Heinken, IKEA, Mazda, Microsoft, Osram, Sony, Steelcase, Tata group, TiVo, and Toyota Scion.

2.14.1 Co-creation models

The shifts in the customer's role in the value-creation process have stimulated many models and frameworks of value co-creation. Prahalad and Ramaswamy (2004b) see co-creation as an initiative of the customers dissatisfied with available choices and who want to co-create value. This is conceptualized in the dialogue; access, risk benefits, and transparency (DART) model (see Figure 2.7).

Dialogue (1)	Access (2)
Risk-return (3)	Transparency (4)

Figure 2.7 DART Model of Value Co-creation (Prahalad and Ramaswamy, 2004b)

Here, dialogue emphasizes that value is co-created in the interaction and engagement between the organization and the customer. Access implies providing facilities and tools for free and accessible information (which includes a mental state of accessibility in the mind of the customer). Risk return implies a careful assessment of the risks and benefits that the customer can get from co-creation. Transparency implies shared information between the organization and the customer.

Payne *et al.*'s (2008) co-creation framework consists of the following three main components (see figure 2.8). They have focused that co-creation is happening in a joint encounter process.

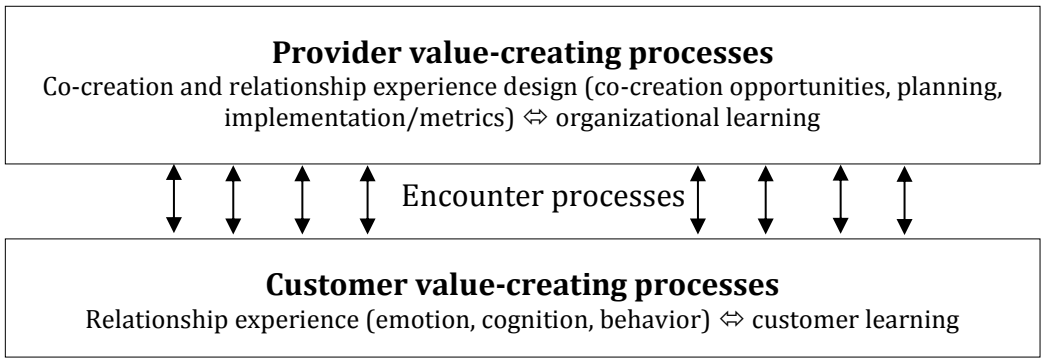


Figure 2.8 Framework of Value Co-creation (Payne, et. al., 2008)

Components of this co-creation are; (1) customer value–creating processes (the processes, resources, and practices that customers use to manage their activities), (2) provider value–creating processes (the processes, resources, and practices that the organization uses to manage its activities and relationships with customers and other stakeholders), and (3) encounter processes (the processes and practices of interaction and exchange between the customer and provider necessary for co-creation). Other models/frameworks of value co-creation include those by Rowley et al. (2007), Gro¨nroos (2008, 2011), Vargo et al. (2008), and Fuller et al. (2009). Most frameworks of value co-creation have focused on characterizing generic and domain-specific needs of co-creation and integrate elements such as encounters, service providers, and customers.

2.14.2 Value co-creation and innovation in academic library services

In the business world, organizations are embracing consumers as co-creation partners in their approaches to innovation. Most literature on value co-creation and service innovation relates to business firms and falls outside the library context. A few studies relate to libraries. Germano (2014) looks at the role of leadership in value co-creation, and in the creation and execution of programmes and services that matter most to students and librarian educators alike, and in turning assessment of various library services into actionable data that produce meaningful changes for student library users. Akanda, Shirahada & Umemoto (2014) developed a theoretical model of reference services through co-creating value between reference librarians and users. They suggested that the proposed framework can be effectively used to analyze value co-creation activities in reference services. Siddike, Umemoto and Kohda (2014) design a value co-creation process model at Multipurpose Community Learning Centres what

they considered as the transformation of public library. They focus how economic as well as social values can be co-created in MCLC's. Moorsel (2005) proposes a client–value model to gauge how library users value library product/service offerings. Fattahi and Afshar (2006) indicate that value is generated through processes such as reproduction, exchange, transfer, refinement, analysis, interpretation, and regeneration in library and information professions. Oakleaf (2010) reviews the literature on the value and performance of academic libraries and posits that the value of an academic library is closely linked to the institutional outcomes of the university as a whole. The library can create value by defining, measuring, and aligning itself to the university-level outcomes in areas of student enrollment, student retention/graduation rates, student success, student achievement, student learning, student engagement, faculty research productivity, faculty teaching, service, and overarching institutional quality. Einasto (2013) concludes that renewing the marketing strategy is important in meeting user needs for value creation in libraries. Kingma and McClure (2014) measured the economic and environmental value of the academic library. Other studies on value in libraries focus on monetary value for the special library (ALIA, 2014; Keyes, 1995), value creation in the research library system (DEFF, 2009), valuing corporate libraries (Gauthier, 1999) and public libraries (Baron 2006; Jaeger et al., 2011), and people's perceptions of the value provided by libraries (FESABID, 2014). While there have been limited studies on innovation in libraries (e.g. Jantz, 2012), value use in libraries (e.g. Moorsel, 2005), write-ups on value co-creation from the British Library user perspective (Baron, 2006), and value creation in the research library system (DEFF, 2009), none have combined value co-creation and service innovation in the context of academic libraries.

While many of these have looked at the value in libraries, they have not investigated the core concept and dimensions of value, value co-creation, and service innovation adequately. There is no literature or template on how this process should be undertaken in an academic library setting. Value co-creation for service innovation in academic libraries can, for instance, be used to create user-centric services for library users, user-centred library interfaces/Web sites, new outreach/distribution methods, new applications technology for the service process, new ways to organize and manage services, new kinds of services that improve user experience and satisfaction, and continuously working to make the collections/facilities more useful to patrons. Co-

creation helps tap into the creative and intellectual potential of library users and increases the innovation capacity of the library. It can help the library with a consistent flow of ideas, service concept, and improved services. A strategic perspective on value co-creation in academic libraries would foster innovation. We hope for a fuller involvement of academic libraries in value co-creation for service innovation. A big hurdle in co-creation is a lack of clear knowledge as to how to apply co-creation activities to library services and the set of processes and phases involved. This is why we have set out to create a new framework for academic libraries that leads to offer innovative services in academic libraries.

2.15 Summary of literature review

The review of the articles focused on the state and progress of current literature on KM, value co-creation and service innovation in libraries by evaluating previously published books and articles. All these studies highlighted how KM, value co-creation and service innovation are related with each other and what have to do academic libraries if they would like to offer innovative services to their user. Reviews identified academic libraries are going beyond being places to merely access knowledge to become hubs to their user communities. To do that academic library needs to adopt KM, involving users in their service process and embracing the changes as opportunities. It has been more vital for academic librarins to ensure libraries offer dialogue and engagement. Along with responding to changes dictated by technological advances, libraries must also offer appropriate strategies for managing available knowledge in their activities. More than ever, academic libraries need to consider as essential as the place where people, knowledge, and research intersect to tackle our world's greatest challenges. Although many studies put focus on these areas, but the review findings some significant areas where this study sheds light on those gap.

Chapter 3: Library Readiness to Adopt KM Using Social Media

3.1 Introduction

Academic libraries are undergoing a period of profound change, with changes in the format of information accessed and provided, and changes in the needs of users, organizational structures, as well as the role of librarians (Islam, Agarwal and Ikeda, 2014). This necessitates libraries to become not just providers of information and periodicals, but knowledge seekers as well – both from their patrons, as well as in-house knowledge of their own employees. Like other organizations, KM can help to address these necessities by creating new knowledge and disseminating knowledge for both employees and improving library services. Apart from KM, the advent of social media has also brought new opportunities for the library, and the increasing role of the patron in its decisions (Kim & Abbas, 2010). In recent years, interest in Web 2.0 has fallen as interest in social media has risen. For the present study, we use social media as many academic libraries are increasingly using social media tools to promote services, communicate and disseminate services to their user communities. It can be an effective method of student outreach in academic libraries. Agarwal & Islam (2014) propose a set of technology and non-technology KM tools that libraries can use to implement KM, and map these to different phases of the KM cycle. Even with these opportunities provided by KM and KM tools like social media, most libraries are yet to fully embrace KM, or to leverage the use of social media for KM goals. Apart from KM and social media, this study investigates how libraries prevent the loss of knowledge with people leaving or resigning, and the strategies they adopt to retain this knowledge and to transfer organizational knowledge to new employees. For that reason, this chapter discusses the perceptions of academic librarins of using KM with social media to libraries, knowledge retention & transfer strategies of libraries.

3.2 Objectives of the study

The objective of the study was to investigate if librarians were aware of KM, if they were comfortable with social media , and whether their libraries were ready to adopt KM and social media in their libraries. However, this would also depend on the right conditions and organizational readiness to adopt KM being prevalent in the library.
The following research questions guide the study:

RQ1. How aware are academic library professionals about KM and knowledge sharing practices?

RQ2. How comfortable are they in using social media tools?

RQ3: How do these impact their perception of KM-using-social media for libraries?

RQ4: Based on their perception, how likely is their library to adopt KM-using-social media?

RQ5: To what extent is this influenced by the library's organizational readiness to adopt KM?

RQ6: How does the library retain the knowledge of people who leave or resign from the library?

RQ7. How does the library provide organizational knowledge to new employees?

Knowing the perceptions of librarians about KM is the first step in determining whether academic libraries are ready to adopt KM or not. The process of participating in the study itself might prompt libraries to start thinking about KM seriously. This is the first time an effort has been made to measure the perception of academic librarians globally to ascertain library readiness to adopt KM-using-social media. Insights gained from the study may trigger more such research in library areas and beyond.

3.3 Research model

A research model is helpful in demonstrating the relationships between the variables of interest in a study. We propose a research model (see Figure 3.1) to study the factors affecting the likelihood of library adoption of KM-using-social media. It has two independent variables – 'lack of awareness about KM' and 'degree of comfort with social

media', and one variable 'perceived usefulness of KM-using-social media for libraries' that mediates the relationship between the independent variables and the dependent variable 'likelihood of library adoption of KM-using-social media'. The 'degree of organizational readiness' is the moderating or interacting variable that moderates the relationship between 'perceived usefulness' and 'likelihood of adoption'. The mediator and the dependent variable are based on the Technology Acceptance Model (TAM) by Davis (1989).

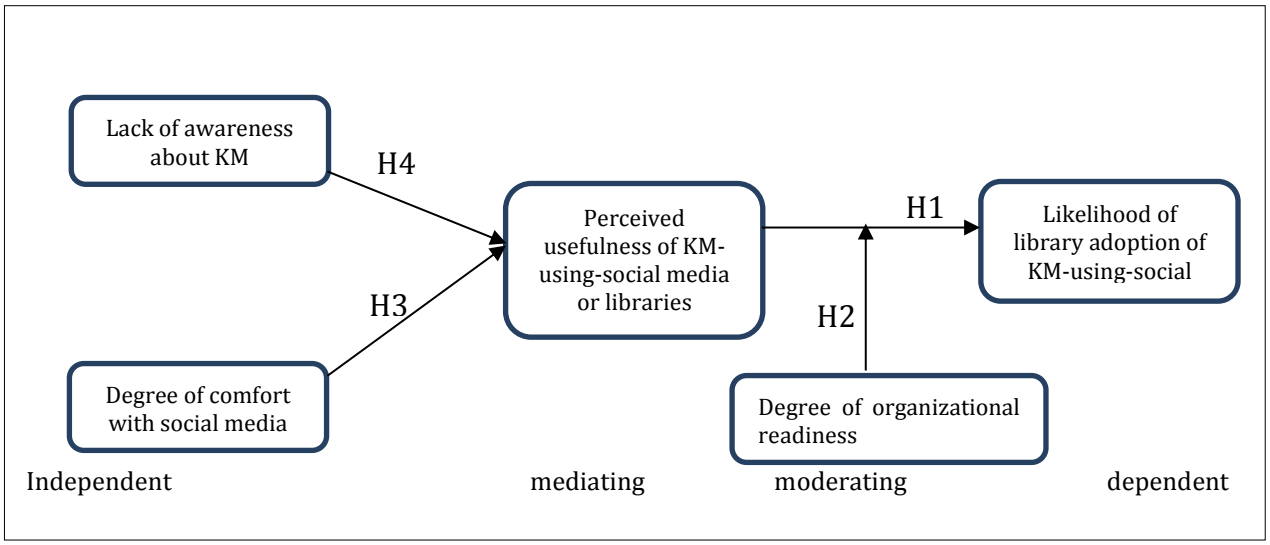


Figure 3.1 Research Model of KM Using Social Media

We arrive at the four hypotheses in the next section.

3.4 Hypotheses

Likelihood of library adoption of KM-using-social media (dependent variable)

Intentions are the active, conscious, future aims we perceive another person to have (Rummel, 1976). The theory of planned behavior (Ajzen, 1991) suggests that perceived or behavioral intention is the most important determinant factor in predicting the decision to take a specific action or not. Past studies have used behavioral intention to forecast specific behavior, given the close relationship between intention and behavior (Ajzen, 1991). We define likelihood of library adoption of KM-using-social media as the perceived intention of the library to adopt KM-using-social media in the point of view of individual librarians.

Perceived usefulness of KM-using-social media for libraries (mediator)

Perceived usefulness is the degree to which the subject believes that the use of a technology will enhance performance (Davis, 1989). We define perceived usefulness of KM-using-social media technologies as the extent to which librarians believe that KM-using-social media will be useful for their libraries. We operationalize this as making library services more effective, making staff feel more valued, leading to increased productivity, helping to create new knowledge in libraries, improving users' satisfaction in libraries and making employee life at work easier. As per the TAM model, which has been validated in numerous studies, perceived usefulness has been found to influence behavioral intention through attitude (Davis, 1989). Therefore, we hypothesize:

Hypothesis 1: *The perception of usefulness of KM-using-social media for libraries will have a positive effect on the likelihood of library adoption of KM-using-social media.*

Degree of organizational readiness (moderating variable)

To operationalize readiness, we include knowledge sharing culture, top management openness to ideas, funding for new initiatives, time taken to approve new initiatives, technology support and librarians' willingness to invest time and effort. We hypothesize:

Hypothesis 2*: Even if a librarian perceives KM-using-social media to be useful for libraries, whether the library is likely to adopt KM-using-social media will depend on the degree of organizational readiness.*

Degree of comfort with social media (independent variable)

Degree of comfort is the degree of fit between the new technology with the individual's existing experiences and job responsibility (Rogers, 1995). We define degree of comfort with social media as the individual ease and experience that librarians feel when using social media technologies. Agarwal, Xu & Poo (2011) posit that one's comfort level in using the system, system-knowledge, or computer-efficacy would affect use of the system/tool. The TAM model (Davis, 1989) posits that external factors affect perceived usefulness. Therefore, we hypothesize;

Hypothesis 3: *The more comfortable a library staff is with social media, the more likely s/he is to perceive KM-using-social media as useful for libraries.*

Lack of awareness about KM (independent variable)

Awareness is focused on an internal state. We define awareness as whether the librarian has heard about KM and the degree to which s/he understands the concept. Social awareness or influence has been found to influence perceived usefulness and usage (Venkatesh & Davis, 2000). Therefore, we hypothesize;

Hypothesis 4: *The more aware a library staff is about KM, the more likely s/he is to perceive KM-using-social media as useful for libraries.*

3.5 Methodology

We relied upon the survey questionnaire method for collecting data for this study, as the questions related to the perceptions of librarians, for which the survey method is the best suited.

3.5.1 Study population and sample

The target population of the study is academic librarians across the world. However, as it would be difficult to obtain a sampling frame consisting of academic librarians across the world, we utilized convenience sampling to reach out to librarians. The study population was academic libraries worldwide that were accessible using the International Federation of Library Associations and Institutions (IFLA) mailing list (IFLA Mailing Lists, 2014) and the IFLA KM section mailing list. Apart from these, we also reached out to academic librarians in the UK (listing maintained by University of Wolverhampton, n.d.), USA (listing maintained by University of Texas, n.d.), Canada (Universities in Canada, n.d.), Australia (Universities in Australia, n.d.) and other countries such as Malaysia, India, Bangladesh, Norway, Denmark, where universities were found using Web search. The purpose was to reach out to a wide pool of academic libraries from different countries whose contact details were accessible online. This ensured coverage of diverse socio-economic and educational environments. The collected data was statistically analyzed using the psychometric procedure to determine support for our hypotheses.

3.5.2 Instrument development

The items developed for the 5 variables of our research model, as well as other control variables on social media experience, knowledge retention and training, and other

variables are listed in Table 3.1 below. The control variables were not of theoretical interest but were included to see if they had any effect on the dependent variable.

Where possible, survey items were taken from prior studies or adapted to suit the needs of this study. For other cases, the items were self-developed. The questionnaire used the 7-point Likert scale (1 = strongly disagree, 7 = strongly agree). An introductory paragraph was included in the survey defining knowledge management in libraries. The face validity of the survey items was ascertained through discussion.

Table 3.1 Variables and Items Included in the Questionnaire

Variable	Coding	Question	Source
Likelihood of library adoption of KM-using-social media (dependent)	INTN1	I expect that I will apply Web 2.0 based KM in my library-based work in the future.	Adapted from Wang & Liu (2009)
	INTN2	I am likely to recommend to my library to adopt KM-using-Web2.0 in the near future.	Self-developed
	INTN3*	It is likely that my library will adopt KM-using-Web2.0 in the short term.	Adapted from Agarwal, Wang, Xu and Poo, (2007); Jarvenpaa, Tractinsky & Saarinen (1999)
	INTN4	It is likely that my library will adopt KM-using-Web2.0 in the longer term.	
	INTN5	It is likely that my library will adopt KM-using-Web2.0.	
Perceived usefulness of KM-using-social media for libraries (mediating)	PU1	Implementing KM-using-Web2.0 in libraries will make library services more effective.	Adapted from Ajjan & Hartshrone (2008)
	PU2	Implementing KM-using-Web2.0 in libraries will make the library staff feel more valued.	Self-developed
	PU3	Implementing KM-using-Web2.0 in libraries will lead to increase in productivity.	Adapted from Ajjan & Hartshrone (2008)
	PU4	Implementing KM-using-Web2.0 will help to create new knowledge in libraries.	Adapted from Panahi, Watson and Partridge (2013)
	PU5	Implementing KM with Web 2.0 will improve users' satisfaction in libraries	Adapted from Ajjan & Hartshrone (2008)
	PU6	Implementing KM with social media will make my life at work easier.	Self-developed
	PU7	Implementing KM-using-Web2.0 is useful for libraries.	

Degree of organizational readiness (moderator)	READY1	In my library, we always ask each other for work-related knowledge.	Adapted from Agarwal, Xu and Poo (2011)
	READY2	Most colleagues in my organization are ready to share their knowledge.	
	READY3	I think my library has a knowledge sharing culture.	
	READY4*	The top management of the library is always open to new ideas.	Self developed
	READY5*	My library usually gets the money for new initiatives it wants to take up.	
	READY6+	In my library, it takes a very long time to get any new initiative approved.	
	READY7	My library is well supported in its technology.	Neches et al (1991)
	READY8*	Once they understand the value of KM, library staff will be ready to invest time and effort for KM in our library.	Adapted from Matschke, Moskaliuk & Cress (2011)
	READY9	If my library were to implement KM, I think we have all the right things in place.	Self developed
Lack of awareness about KM (independent)	AWR1*	I had never heard of KM until now.	Self-developed
	AWR2	I have heard of KM but am not exactly sure of the concept.	
	AWR3	I have heard the term Knowledge Management but it has been a challenge for me to understand the area.	Adapted from Ajiferuke (2003)
	AWR4+	I have good knowledge about KM.	Self-developed
Degree of comfort with social media (independent) (blogs, wikis, social networking sites)	CFT1	I feel comfortable using Web 2.0 technologies.	Adapted from Kumar & Tripathi (2010)
	CFT2	I am able to clearly communicate using social media technologies.	Self developed
	CFT3	I consider myself a heavy user of social media technologies.	
	CFT4*	I think most of my library colleagues are comfortable with Web 2.0 technologies.	Adapted from Kumar & Tripathi (2010)
	CFT5	My library communicates with users using social media tools.	Self-developed
Social media experience (control)	W2LIB_YRS	How long has Social media been around in your library?	Self-developed
	LIB_[]	In what forms have Social media been	

		implemented in your library?	
	PERS_[]	Which Social media tools do you use most frequently?	
Knowledge retention (control)	RETAIN++	How does your library retain the knowledge of people who leave or resign from the library?	Self-developed
Transfer (control)	TRANS ++	How does your library provide organizational knowledge to new employees?	Self-developed
Demographics (control)	EMP_CNT	No of employees in the library	Agarwal, Xu & Poo (2011)
	LOC	Library location – city, country	
	ROLE	Work role / position	
	DEPT	Department working in	Self-developed
	YRS_FLD	No of years in the library field	
	GEN	Gender	Agarwal, Xu & Poo (2011)
	AGE	Birth Year 19 __	
	EDN	Education	

Note: * These items were dropped after factor analysis, + These items were negatively worded, and thus, reverse coded , ++ These items were not part of the model

3.5.3 Data collection and analysis

The survey instrument was pre-tested to check for any question wording issues. The questionnaire and the design of the study was approved by the Institutional Review Board of Simmons College, Boston, USA. Participation was voluntary. Filling out the questionnaire implied consent. A web-based version of the instrument was created using Google form. None of the questions were made compulsory. Thus, a participant could choose not to answer a question s/he was uncomfortable with. In order to protect the identity of the librarians, no names, email addresses or library names were gathered. Based on the names of universities gathered, the respective library websites were searched. From the listing of library staff, email addresses of librarians were gathered and collated. While some library websites listed emails of individual staff members, others had a common contact email for all external mails. We obtained the names and email addresses of 563 librarians in the UK, USA, Australia and Canada. Individual personalized emails were sent to all these. Apart from these, individual librarians were also contacted in other countries such as Malaysia, India, Bangladesh, Norway and Denmark. Mails were also sent to the IFLA and IFLA KM mailing lists. About 600 librarians were individually contacted, with the rest in mailing lists.

In total, 101 librarians from 35 countries in 6 continents filled out the questionnaire. These were after multiple follow-up emails and efforts at reaching to respondents and mailing lists. As the survey was anonymous, it was not easily distinguishable how many of the responses were from the individual emails sent out and how many from the mailing lists. Thus, it would be difficult to arrive a precise number for the response rate. The response rate would be 101 / (600 + those registered in the mailing lists). For the sake of calculation, if we were to disregard the number of people in the mailing lists, the response rate would be 101 / 600 or 16.83 %. However, since there are likely to be hundreds of librarians registered in the mailing lists (some of whom might have been individually contacted), and assuming that one or more responses were from those registered in the mailing lists, the actual response rate would be even less than the 16.83% figure based on our calculation. As the responses were difficult to get, and the response rate not too high, no separate pilot data was gathered. Rather, exploratory factor analysis was done on the main data itself once the responses stopped coming in. Data was gathered between August 2013 and February 2014. PSPP 0.8.2, the open source alternative to SPSS, was used for statistical data analysis. The authors also had access to IBM SPSS 22. The results generated by PSPP were found to be equivalent, and sufficient for the analysis.

For the qualitative data analysis of the two questions on knowledge retention and transfer, all the data was entered in an Excel spreadsheet. The responses for the two questions were each copied to a separate worksheet. As some of the responses were in other languages such as Portuguese, Google translate (http://translate.google.com) was used to decipher the meaning of these. For each question in each worksheet, candidate categories were arrived at to synthesize the findings. Three kinds of coding were carried out – open coding, axial coding and selective coding (Corbin and Strauss, 1990). Open coding included an initial pass through the data to come up with candidate concepts for categories. After an initial level of analysis, categories were combined into major categories (axial coding). Finally, the focus shifted to core categories (selective coding), those that emerged from open and axial coding as the most important. For inter-rater reliability, the authors looked at the analysis carried out by each other and reconciled the categories.

3.6 Findings

3.6.1 Demographics

Table 3.2, 3.3 & 3.4 below show the demographic distribution of the survey respondents where 101 library employees participated in the survey. It shows from table 3.2 that most of the respondents for this survey were female (75.24%) and average age of all the respondents were 44.83. The table 3.3 shows the education, number of years working in the library field and number of people working in the library. Most of the respondents have the Master's degree (68.32%) and the working experience in the library was average 15.58.

Table 3.2 Demographics (Gender and Age) (N=101)

Gender	**Distribution**	**Age(Years)**	
Male	24 (23.76%)	Mean	44.83
Female	76 (75.25%)	SD	11.74
Unspecified	1 (0.99%)	Min	25
		Max	79
		N	90
			(unsp.11)

Table 3.3 Demographics (Education, Experience & No. Employees) (N=101)

Education	**Distribution**	**Years of working**		**No. of employees**	**Distribution**
PhD	9 (8.91%)	Mean	15.58	1-19	42 (41.58%)
Masters	69 (68.32%)	SD	9.68	20-49	14 (13.86%)
Bachelors:	13 (12.87%)	Min	1	50-100	18 (17.82%)
Diploma	10 (9.90%)	Max	37	101-500	27 (26.73%)
Others	0				

The survey was truly international, with respondents coming from 35 countries in all continents excluding Antarctica. The participants were distributed almost equally between Asia and Europe (22 and 20% respectively), with the rest coming from the other 4 continents (see Table 3.4). Along with individual librarians reached out from university libraries in specific countries, this distribution also reflects the international nature of the mailing lists targeted.

Table 3.4 Demographics (Library Location) (N=101)

Continent	Countries & respondent of each country	Distribution
Asia	Bangladesh 6; India 4; Vietnam 3; Pakistan 2; Malaysia, Lebanon, Iran, UAE, China, Philippines & Laos 1 each	22 (21.78%)
Europe	UK 9; Germany 2; Denmark, Belgium, France, Switzerland, Estonia, Slovenia, Italy, Hungary & Romania 1 each	20 (19.80%)
S. America	Brazil 15; Colombia 1	16 (15.84%)
N. America	USA 8; Canada 4; Puerto Rico, Jamaica & Mexico 1 each	15 (14.85%)
Australia	Australia 14	14 (13.86%)
Africa	Zimbabwe 4; Kenya & South Africa 3 each; Ghana 2, Nigeria 1	13 (12.87%)
	unspecified 1	

The work roles or positions specified by the respondents were classified into 3 categories based on hierarchy (see Table 3.5).

Table 3.5 Work Role / Position (N=101)

Category	Distribution	Designation
Director / Head:	20 (20%)	Head Librarian / Head of Library / Branch Head / Department Head 8; Chief Librarian / Librarian-in-chief / BibliotecÃƒÂ¡ria Chefe 4; Library Director 4; Associate Director 2; Acting / Deputy Director 2
Librarian:	65 (65%)	Librarian / BibliotecÃƒÂ¡ria 22; Academic / University / Faculty / Liaison / Research / Subject Librarian 16; Reference Librarian 6; IT / Systems / Technology / Web Applications Librarian 7; Library Services Manager 5; Head / Manager of Scholarly Communication 2; Library Coordinator 2; Senior Librarian 2; School Librarian 1; Serials Librarian 1; Lawyer 1
Library Assistant	15 (15%)	Assistant / Sub Librarian 7; E-Repository / Institutional Repository Administrator 2; Chief Library Assistant 1; Executive 1; Junior Librarian 1; Professional Assistant 1; Returns Assistant 1; Management Support 1
-	-	unspecified 1

43% of the respondents did not specify a specific department but said they worked in the overall library in general (see Table 3.6).

Table 3.6 Department Working in (N=101)

Department	Count (%age)	Other terms used for department
Library	43 (42.57%)	information services
Reference	12 (11.88%)	information / learning / research services
Technical services	11 (10.89%)	serials / resources / collection development
Technology	10 (9.90%)	IT / systems / automation / digital library / institutional repository / media / design
Customer service	8 (7.92%)	service desk / inquiry / reader services
Administration	3 (2.97%)	library administration
Innovation	2 (1.98%)	information management and innovation / planning
Legal	1 (0.99%)	
unspecified	9 (8.91%)	

3.6.2 Descriptive statistics and reliability analysis

Psychometric analysis was performed as per the procedure recommended by Anderson and Gerbing (1988). Exploratory factor analysis (EFA) is a technique within factor analysis used to uncover the underlying structure and relationships between measured variables (Norris & Lecavalier, 2009). EFA with principal component analysis (Hair *et al.*, 1995) was used to extract the factors, followed by Varimax rotation. 6 survey items – CFT4, AWR1, READY4, READY5, READY8 and INTN3 (see Table 3.1) were found to be problematic (both statistically and conceptually), and removed. All items loaded correctly on their respective variables. This indicates a high degree of convergent and discriminant validity, and thus construct validity for the 5 variables.

A reliability analysis was carried out using Cronbach's alpha. Table below shows the descriptive statistics and Cronbach's α for the five variables in the research model. The internal consistency was above 0.8 for comfort, awareness and perceived usefulness, and close to 0.8 for likelihood of adoption. This was lower for organizational readiness as it is a multi-dimensional variable.

Table 3.7 Descriptive Statistics and Cronbach's Alpha

Variables	No. of items	Mean (1-7 scale)	Standard Deviation	Reliability (Cronbach's α)
Degree of comfort with social media	4	5.49	1.16	0.82
Lack of awareness about KM	3	2.95	1.48	0.81
Perceived usefulness of KM-using-social media for libraries	7	5.75	.98	0.93
Degree of organizational readiness	6	4.85	.91	0.70
Likelihood of library adoption of KM-using-social media	4	5.35	1.15	0.79

The participants exhibited a high degree of comfort with social media (5.49 on a scale of 1-7) and disagreed that they were unaware of KM. Thus, they had some exposure of KM. Most participants thought that KM-using-social media would be useful for libraries. While they tended to agree that their organizations were ready for KM, it was a relatively low level of agreement (4.85 on a scale of 1-7). Finally, the participants thought that their libraries were likely to adopt KM-using-social media.

3.6.3 Hypothesis testing

After completing the validity and reliability analysis, hypothesis testing was done using single linear regression. It is a procedure used to attempt the relationship between two or more independent variables and a dependent variable by fitting a linear equation to observed data.

For testing hypotheses 3 and 4, we looked at the effect of the two independent variables (AWR, CFT) on the mediating variable (PU).

Table 3.8 Effect of CFT and AWR on PU

		Standardized Coefficients		
	Coefficients (PU)	**β**	**t**	**Sig.**
	(Constant)	0.00	8.40	0.00
H3 supported	CFT	0.24	2.37	0.02
H4 not supported	AWR	-0.14	-1.38	0.17

Table 3.8 shows the β-coefficients for the effect of CFT and AWR on PU. Hypothesis 4 (effect of AWR on PU) was not supported, while H3 (effect of CFT on PU) was supported

($p < 0.05$). The adjusted R-squared (coefficient of determination) was 0.08 (unadjusted R-squared 0.1).

To test for Hypothesis 4 again, we analyzed the effect on AWR on PU separately (without regressing it with CFT).

Table 3.9 Effect of AWR on PU

		Standardized Coefficients		
	Coefficients (PU)	**β**	**t**	**Sig.**
	(Constant)	0.00	28.36	0.00
H4 supported	AWR	-0.20	-2.03	0.05

When analyzed separately, the effect of AWR was found to be significant ($p = 0.05$). The adjusted R-squared was 0.03 (unadjusted R-squared 0.04).

For testing hypotheses 1 and 2, we found that H1 was strongly supported ($P<0.0001$), while H2 was not supported. The adjusted R-squared was 0.22 (unadjusted R-squared 0.24).

Table 3.10 Effect of PU and PU * READY on INTN

		Standardized Coefficients		
	Coefficients (INTN)	**β**	**t**	**Sig.**
	(Constant)	0.00	2.83	0.01
H1 strongly supported	PU	0.39	3.13	0.00
H2 not supported	PU*READY	0.15	1.19	0.24

We analyzed the effect of the moderator (PU*READY) on the dependent variable (INTN) separately (without regressing with PU).

Table 3.11 Effect of PU*READY on INTN

		Standardized Coefficients		
	Coefficients (INTN)	**β**	**t**	**Sig.**
	(Constant)	0.00	7.76	0.00
H2 supported	PU*READY	0.39	3.80	0.00

When analyzed separately, H2 was found to be strongly supported ($P<0.0001$). The adjusted R-squared was 0.14 (unadjusted R-squared 0.15).

Finally, table 3.12 lists the results of all hypothesis testing. The leftmost column shows the part of the research model (figure 3.1) analyzed in the 4 iterations of the regression analysis. The next two columns show the relationship between the variables in question. The number in the significance (p) column tells what the probability of error is. The hypothesis is supported if the probability of error is less than 5% i.e. $p < 0.05$.

Table 3.12 Results of Hypothesis Testing

Part of research model analyzed	**Independent variable**	**Dependent variable**	**Standardized coefficients**			**Adjusted R square**	**Hypothesis**	
			β	*t*	*Sig. (p)*			
Effect of CFT & AWR on PU	CFT	PU	0.24	2.37	0.02	0.08	H3	*supported
	AWR		-0.14	-1.38	0.17		H4	not supported
Effect of only AWR on PU	AWR	PU	-0.20	-2.03	0.05	0.03		*supported
Effect of PU & PU*READY on INTN	PU	INTN	0.39	3.13	0.00	0.22	H1	***strongly supported
	PU*READY		0.15	1.19	0.24		H2	not supported
Effect of only PU*READY on INTN	PU*READY	INTN	0.39	3.80	0.00	0.14		***supported

* p<0.05 ** p<0.01 *** p<0.0001

First, the left side of the research model was analyzed, looking at the effect of the two independent variables - *lack of awareness about KM* (AWR) and *degree of comfort with social media* (CFT) on the mediating variable *perceived usefulness of KM-using-social media for libraries* (PU). Hypothesis 4 (effect of AWR on PU) was not supported, while H3 (effect of CFT on PU) was supported ($p < 0.05$). To test for Hypothesis 4 again, we analyzed the effect of only AWR on PU. Now, the effect of AWR was found to be significant ($p = 0.05$).

Next, we analyzed the right side of the model. It has two relationships. H1 shows the relationship between the mediating variable *perceived usefulness of KM-using-social media* (PU) on the dependent variable *likelihood of library adoption of KM-using-social media* (INTN). H2 is a moderating effect. It shows the relationship of the interaction between PU and the *degree of organizational readiness* (READY) on the dependent variable INTN. The moderated relationship or the interaction was modeled by including a product term (PU*READY) as an additional independent variable (Irwin and McClelland, 2001), along with PU, to see their effect on the dependent variable INTN. H1

was found to be strongly supported ($p<0.0001$), while H2 was not supported. We analyzed the effect of only the moderator (PU*READY) on the dependent variable (INTN). When analyzed separately, H2 was found to be strongly supported ($p<0.0001$).

After the hypothesis tests, some more additional tests were carried out to see a) any potential effect of the control variables *age*, *gender*, *education*, *no. of employees in the library* and *no. of years in the library field* on the dependent variable INTN; b) the direct effect of READY on both INTN or PU; c) the individual items for specific variables that had been deleted; and d) the 9 individual items of READY on INTN. None of these were found to be significant. The only (strongly) significant effect was of READY4 (the top management of the library is always open to new ideas) on INTN ($\beta = 0.43$, $t = 4.53$, $p < 0.0001$).

3.6.4 Knowledge retention and transfer

The findings based on the qualitative responses of the two open-ended questions on knowledge retention and transfer in libraries are discussed below:

Ways in which the library retains the knowledge of people who leave or resign from the library

Most respondents gave more than one option in the way in which their libraries retain the knowledge of those leaving. These options were coded into separate categories (discussed below), leading to 140 coded responses by the 101 respondents. The numbers within brackets indicate the sum total for all responses in that category.

1) **Through documentation, archiving or history of written policies and procedures, or an after action review (36).** "Files - most official records should be filed, so that the next person who takes over can know what has happened previously." "Through detailed workflow documentation and process explanation documents." "Handing over notes, files" While it was not always clearly indicated, the reference to these documents was in hard-copies or physical files, but could be soft copies as well, or in both formats. Some responses listed the need for an effective finding aid to make the documentation useful. One respondent indicated that the content itself was not useful: "When I came into my position, I had files kept by previous librarians. They were

interesting, although not particularly relevant to my day to day work. I have put them in document boxes and they will be organized as an archive and receive a finding aid to be a history of my branch library."

2) **Through succession or handover training, an exit interview, mentoring by or shadowing the employee who's leaving (28).** "Handover mentoring where possible" "Our library tries to put in place succession planning for the knowledge to be retained in junior librarians." "Exchange of knowledge through a changeover process whereby the new incumbent shadows the old employee." "exit interviews" "departing colleagues often train new ones" "We try to train new people before people retire or leave."
3) **Through a digital repository in the form of a knowledge base, database, intranet, wiki, blogs, digital repository, social networking site or emails (26).** These primarily served as an archiving and sharing mechanism for electronic copies of the documentation referenced to above. "The library has instituted a policy of sharing key documents for workflows and procedures on the intranet." "We utilize TeamSites, which contains important organisational documents and procedures, as well as LibNet, which is a library intranet. The knowledge of previous employees are likely to be partially there,…" "use sharepoint" "we ensure that all documents are in our shared document management system." "I've been developing a KM wiki."

   One respondent said that this was not updated "We haven't done anything on that …. since [the last] 5 years …".
4) **By building in redundancy through communities of practice or team members working on similar areas as the employee who's leaving (9).** "also others that worked with them would have some of their knowledge." "Workforce planning. Aim to have more than one person responsible for areas of knowledge/expertise." "Build communities of practice to minimize expertise residing in only one person" "Through team work" "We are developing some cross-training protocols where appropriate." "I try to train more than one person to perform the same function."

   One response was especially curt: "Replace with younger people"
5) **Through a formal KM program (3).** "The library system has a Knowledge Management Program and throw it we develop many practices: Map of

knowledge: where people put their personal and professional information. It's possible to find the networks.; Congress Report: when someone goes to a congress when comeback it's to share the knowledge with colleagues by writing a report, a meeting or a small conference.; Workflow: libraries seeks to register workflow of the library's activities." "In our case, we document all the processes for any activities being conducted, thus, a post activity report has to be submitted. In this regard, we don't have to worry about the collected knowledge. If the document is in electronic format, since, all the PCs are part of the networked, regularly remote banking and back-upping of documents are conducted, this is to ensure that data are intact and have duplicates. Thus, if somebody resigns and deleted all the documents in his/her PC, the unit has still a copy of the all the documents." "Keep people profiles; Request management reports monthly or at the end of the post; Archive reports performance evaluations; In some cases if possible make the splice; Annually makes backups of information in personal computers; Update procedures manuals"

6) **Oral history/storytelling (1).** "Oral history when appropriate"
7) **By ensuring adequate notice period from the employee who's leaving (1).** "training of other colleagues 6 mos [months] before the employee retires"

Apart from the above strategies outlined for knowledge retention in libraries, there were those who cited cases of poor retention, or gave no response to the answer.

- **Retention is done poorly (employees hoard knowledge; knowledge leaves with them) or the respondent is unaware or unsure of any retention procedure (22).** "Poorly and patchily" "Sadly, the knowledge leaves when people leave." "I don't think it does it very well." "Nothing structured, usually. Not well done." "I'm not aware of any procedure to be honest" "Nothing is done" "It doesn't. There is no formal way to retain like manuals, for example." "no systematic approach" "Though there is no framework to retain tacit knowledge here other than socialization, personal interaction etc."

  Two of these responses indicated planning to keep in touch with the employee who's leaving: "we keep in contact" "i alone try to keeping relationships …by email and sms tools." One employee put the onus on retention to the rank or level of the individual staff leaving: "I think it depends on what level of staff we are talking about. Library assistants for example tend to hoard their knowledge

as it makes them feel more needed. Their tasks however are reasonably basic and can be learnt without too much difficulty. The higher up the organization you go the more awareness there is of KM."

- **No response (16).** 16 out of 101 respondents did not respond to the question.

Ways in which the library provides organizational knowledge to new employees

For this question as well, the respondents gave more than one option in the way in which their libraries provide organizational knowledge to new employees joining the library. These options were coded into separate categories (discussed below), leading to 152 coded responses by the 101 respondents. The numbers within brackets indicate the sum total for all responses in that category.

1) **Through training, staff mentoring, orientation or induction program, lectures or workshops (59).** "…one-on-one as well as group training sessions" "…training opportunities, onboarding process" "induction tours" "By staff inductions - giving them some information about the organisation, in particular the area they will be working in." "…new librarians are assigned a mentor as well as a supervisor to help not with the orientation but work with the librarian up until receiving tenure. New staffs are more dependent on their supervisors." "…mentoring…formal training" "Training…personal coaching" "1. Library Induction program; 2. In house training program; 3.Specific training program; 4. Use social media for training" "Structured induction with schedule of face-to-face and online learning." "New employees participate in company training workshops for orientation activities to consulting the library catalog" "Through pre-orientation activities, campus tour and other related activities. Then, job orientation are also conducted where the new entrants are oriented to his/her work, organizational set-up and all the process involved." "one on one advice…"
2) **Through documentation and written procedures (30).** "…procedural documentation…" "There is a manual for new librarians…" "reference manual" "Handbook of procedures etc." "some paper documents and the other are soft copies" "…a hard copy folder with instructions, and the new employee will go through it at their own pace. They (sic) folder contains web links to the library website and intranet ..." "by Human Resources Rules and Regulations" "You get a

welcome package that includes some leaflets." "…using existing manuals, taking the opportunity to change these manuals whenever displaying a better way for them [there is a better way to present them]."

3) **Through a knowledge base in the form of a Wiki, intranet or shared drive (26).** "by using the intranet and shared drive to access documents and procedures, etc." "Material is provided on the intranet and also using online tools" "All New library users are given access credentials to our Institutional repositories and E-learning platforms" "A lot of intranet, and internet based training modules." "documents on school server and in information center" "Through internal communication and intranet." "Process map"

   A respondent mentioned a mechanism to back up documents: "documentation and procedures are in the library intranet. A copy is in the library's institutional repository"

4) **Through networking, meetings or conversations with current employees, answering any question on the job or over email (18).** "…mostly through an on the job one-on-one question and answer iterative process." "Informally by conversations with current employees…" "…promote [promoting] networking opportunities" "…meeting with supervisors and peers" "…personal meetings, informal communication, email." "face to face meeting" "Through internal communication…" "Education on demand…" "…learning by doing…" "…they can attend work groups that have periodical meetings where they discuss about subjects related to libraries." "The organizational knowledge is provided in conversations and informal instruction." "Through …daily work…" "…Periodic meetings…" "…informal networking" "…and socialization in most cases."
5) **Through storytelling (1).** "….,conversations, storytelling"
6) **Through visit to other libraries (1).** "I like and is a practice that I do from the beginning of my administration, every person who comes new the first week is going to visit the other libraries in the region and meet their peers or colleagues and see how other libraries operate."
7) **Through a KM program (1).** "Identifying the intellectual capital to build a knowledge map; standardizing routines, documentation and procedures; promoting the use of social media tools among employees" (translated from Portuguese)

A few respondents gave no response, or provided examples of poor knowledge transfer strategies.

- **No response (13).** 13 out of 101 respondents chose not to respond to this question.
- **Knowledge is provided poorly or the respondent is unsure of any mechanism (5).** "Again, not very well." "It doesn't yet." "No formal mechanism in place." "All together, there's little communication [apart from some documentation provided]" "Not sure I know what you mean by organizational knowledge."

3.7 Discussion and findings

In this study, we set out to answer a few research questions on the perceptions of academic library professionals about social media and the degree to which the library is ready to adopt KM. The findings addressing the research questions and the results of hypotheses testing were summarized in table 3. 12 & 3.13.

RQ1. *How aware are academic library professionals about KM and knowledge sharing practices?*

More than 71% of the participants strongly disagreed that they had never heard of KM, while another 10% disagreed. Thus, most librarians had heard of KM in some form. More than 31% participants indicated that they had good knowledge of KM. Only about 12% of the respondents indicated that they had heard of KM but were not exactly sure of the concept or found it a challenge to understand. Overall, the mean response for lack of awareness was 2.95 (on a scale of 1-7; standard deviation 1.48). If we reverse *lack of awareness* to awareness, the mean response would be 5.05. The participations agreed that they were aware of KM and knowledge sharing practices, but did not consider it to be a strong agreement. Thus, most participants exhibited a relatively high degree of awareness about KM and KM practices. This is in line with past studies, e.g. by Siddike & Islam (2011), who found that 93% of their respondents had heard about KM in the literature. It is significant that about one-third of librarians internationally claim a good degree of knowledge in KM, which demonstrates that KM is slowly, but surely finding its way in libraries.

To identify the KM awareness in country wise, we have computed the average of KM awareness questions (AWR1, AWR2, AWR3 & AWR4) to arrive at mean scores for overall knowledge management (KM) awareness on a scale of 1-7 as provided by each country respondents. For measuring awareness, we reversed lack of awareness to awareness and strongly disagree to agree in 7 point Likert scale. In Asia, it is significant that Bangladeshi librarians (mean score 4.87, standard deviation 1.47) has more awareness on KM than other Asian country librarians. We found that most of the Western countries have the high degree of awareness on knowledge management. Countries like Australia (mean score 4.59, standard deviation 0.86), Canada (mean score 4.44, standard deviation 1.27) and USA (mean score 4.12, standard deviation 1.86) librarians have more awareness than other country librarins. This is in line with past studies, e.g. by Jelavic & Ogilvie (2010) where they did integrative analysis of KM views in Eastern and Western countries and found that Western societies are more aware of knowledge management.

RQ2. *How comfortable are they in using social media tools?*

More than 43% of the respondents indicated a very high degree of comfort with social media (those who chose 6 or 7 on a scale of 1-7). The mean response for *degree of comfort* was 5.49 with a standard deviation of 1.16. Thus, the participants were largely comfortable with social media. In case of implementing social media to their libraries, 90% of the respondents replied that they have implemented social networking tools (Facebook, Twitter, Linked & academia) in in their libraries. 89% of the respondents replied that SNT's are the most frequently used tools to their libraries. Of the 1.3 billion active Facebook users as of early 2014, many of these would be librarians as well. This individual comfort explains why libraries are embracing social media (as found by Kumar & Tripathi, 2010). Users today expect to get the feeds about a library's service in their Twitter or blog and they expect to get where the library has made content available online.

RQ3. *How do these impact their perception of KM-using-social media for libraries?*

More than 46% of the respondents perceived KM-using-social media to be highly useful for libraries (responses of 6 and 7, on a scale of 1-7). The mean response for perceived usefulness was 5.75 with a standard deviation of .98. The relatively low standard

deviation indicates that the respondents all agreed that KM would be useful for their libraries.

H3 was supported while, H4 found conditional support. The individual degree of comfort with social media (H3) was found to affect the perceived usefulness of KM-using-social media for libraries. This finding is consistent with Agarwal, Xu & Poo (2011) who found an individual's inherent lack of comfort with an information source to negatively affect the amount and order of use of that source. Thus, if a librarian likes using social media technologies, s/he is likely to think it would be useful for libraries overall.

Finally, on its own, lack of awareness about KM (H4) was found to negatively affect the perceived usefulness of KM-using-social media for libraries. If a librarian does not know enough about KM, s/he is unlikely to find KM-using-social media useful for libraries. However, when analyzed along with degree of comfort with Social media, the effect of AWR on PU was found to be insignificant. This might be because comfort with Social media is based on individual experience (which one can more strongly vouch for), while awareness is more subjective. Thus, between social media comfort and KM awareness, the former is a more important factor for the librarians to be perceive KM-using-social media to be useful for libraries.

RQ4. *Based on their perception, how likely is their library to adopt KM-using-social media?*

About 37% of the participants strongly agreed that their library was likely to adopt KM-using-social media (mean 5.35, SD 1.15). About 28% strongly agreed that the library was likely to adopt KM-using-social media in the short term, while most of them only showed a slight agreement (mean 4.46, SD 1.68). Kim & Abbas (2010) had earlier compared academic library and user utilization of Library 2.0 features in the KM perspective and found that the adoption rate greatly differs for each Library 2.0 application. Some of the library-initiated knowledge transfer functions (e.g., RSS feeds, podcast) are widely adopted among academic libraries, while some of the user-initiated functions (e.g., Tagging, Wiki, etc.) are at a burgeoning stage.

H1 was strongly supported. The strong support for H1 is intuitive as libraries are likely to adopt KM-using-social media only if they perceive it to be useful. This finding is

consistent with the Technology Acceptance Model (Davis, 1989) where perceived usefulness has been shown to have a significant effect on intention.

RQ5. *To what extent is this influenced by the library's organizational readiness to adopt KM?*

The mean value for the degree of organizational readiness was 4.85 (with a standard deviation of 0.91). Thus, the participants did not have a strong opinion on whether they thought their library was ready or not to adopt KM-using-social media, though they tended to think that it was.

However, the reliability of this variable was low (0.7) because it consists of multiple dimensions. We operationalized organizational readiness in terms of knowledge sharing culture (READY1-3; Cronbach's $\alpha = 0.82$), top management openness to ideas (READY4), funding (READY5), time to approve new initiatives (READY6), technology support (READY7), willingness to invest time and effort (READY8) and overall readiness (READY9). Analyzing these dimensions separately, 33% strongly agreed that they had a knowledge sharing culture (values of 6 and 7 on a scale of 1-7; mean 5.26, SD 1.21), more than 51% strongly agreed that their top management was open to new ideas (mean 5.4, SD 1.49), only 13% strongly agreed that they usually got funding for new initiatives, with most people disagreeing (mean 3.75, SD 1.62). About 22% strongly agreed that it didn't take very long to get new initiatives approved, though a big percentage thought otherwise (mean 3.91, SD 1.70). These findings reflect that while top management was open to ideas, they didn't always provide the money or approve new initiatives quickly. About 33% strongly agreed that they had technology support (mean 4.85, SD 1.4). More than 33% strongly agreed that library staff would be ready to invest time and effort on KM (mean 5.05, SD 1.19). Finally, in the question for overall readiness, 22.77% strongly agreed that their organization was ready to adopt KM (mean 4.69, SD 1.33).

Comparing the means of the 7 dimensions (on a scale of 1-7, where 1 = not ready at all and 7 = completely ready), the pecking order of readiness is management openness 5.4, knowledge sharing culture 5.26, willingness to invest time and effort 5.05, technology support 4.85, overall readiness 4.69, time taken to approve new initiatives 3.91 and funding for new initiatives 3.75. Many of these readiness factors have been identified in prior studies – knowledge sharing culture, (Rahman, 2011), top management support

(Kamath, Rodrigues & Desai, 2011) and funding to set up a KM team and infrastructure (Basu & Sengupta, 2007).

H2 found conditional support. The moderating effect of READY and PU on INTN (H2) also found strong support. However, this interacting effect (when analyzed along with the effect of PU on INTN) was found to be insignificant. This could be because usefulness was perceived to be a more important factor than readiness. Also, readiness, as a factor, had lower internal consistency as it had multiple dimensions. This finding held even when we considered only 1 dimension – knowledge sharing culture (READY1-3; Cronbach's $\alpha = 0.82$), where the overall effect was insignificant. Thus, perceived usefulness (H1) has a more important role on adoption than readiness (H2). This finding is in accordance with the TAM Model (Davis, 1989) where numerous studies have found perceived usefulness to affect adoption.

RQ6 & RQ7: *How does the library retain and transfer the knowledge of people who leave or resign from the library?*

The three strategies of documentation, training and digital repository form the first three rows in table 3.9 below. Table 3.9 summarizes the key findings on knowledge retention strategies for outgoing employees, and the knowledge transfer strategies for incoming employees. The code in the first column of the table is a term used to represent the findings arrived at through the analysis of the data. E.g. the term documentation includes archiving, written policies and procedures, after action review, etc. The rest of the findings for knowledge retention and transfer strategies are also included in the table.

Table 3.13 Comparing Knowledge Retention and Transfer Strategies for Outgoing and Incoming Employees of the Library

Code	Retaining knowledge of outgoing employees	Transferring knowledge to incoming employees
Documentation	1) Through documentation, archiving or history of written policies and procedures, or an after action review (36)	2) Through documentation and written procedures (30)
Training	2) Through succession or handover training, an exit interview, mentoring by or shadowing the employee who's leaving (28)	1) Through training, staff mentoring, orientation or induction program, lectures or workshops (59)
Digital Repository	3) Through a digital repository in the form of a knowledge base, database, intranet, wiki, blogs, digital repository, social networking site or emails (26)	3) Through a knowledge base in the form of a Wiki, intranet or shared drive (26)
Done poorly	4) Retention is done poorly (employees hoard knowledge; knowledge leaves with them) or the respondent is unaware or unsure of any retention procedure (22)	6) Knowledge is provided poorly or the respondent is unsure of any mechanism (5)
No response	5) No response (16)	5) No response (13)
Networking	6) By building in redundancy through communities of practice or team members working on similar areas as the employee who's leaving (9)	4) Through networking, meetings or conversations with current employees, answering any question on the job or over email (18)
KM program	7) Through a formal KM program (3)	9) Through a KM program (1)
Storytelling	8) Oral history/storytelling (1)	7) Through storytelling (1)
Notice period	9) By ensuring adequate notice period from the employee who's leaving (1)	
Library visit		8) Through visit to other libraries (1)

Based on the findings of the study, a few key strategies emerged as important for both knowledge retention of outgoing employees and transferring knowledge to new employees. These were documentation, training and digital repository. While documentation is a useful method in transferring tacit knowledge to explicit (for the outgoing employee), and to find out what's been documented before (for the incoming employee), a digital repository is a good place to organize and house them. The degree to which documentation is useful is also dependent upon the degree to which it is accessible (see Agarwal, Xu and Poo, 2011 on the role of accessibility versus quality in information seeking). Thus, the role of an accessible and easy to use digital repository becomes pertinent for effective use of the knowledge retained coded in the form of documents. Handover training (for outgoing employees) and induction program, orientation or training (for incoming employees) are both effective ways for the transfer of tacit knowledge. It helps the employee focus on what's important, where to look, and get access to knowledge that is not documented anywhere or one which cannot be easily documented. As Polanyi said, "….we can know more than we can tell." (Polanyi, 1966 p.4).

3.8 Conclusion

The study found that librarians, in general, are comfortable using social media. Thus, libraries can expand their reach in this area, making use of this expertise in their staff. Librarians disagreed that they were unaware of KM. Thus, the study shows that the awareness about KM is increasing in libraries. It is time for KM researchers to help more libraries adopt KM-using-social media, as most librarians agree that it would be useful and that given favorable conditions, the library is likely to adopt KM-using-social media. The part where most work is needed is for libraries to further develop their organizational readiness. While the knowledge sharing culture was found to be strong and the top management open to ideas, they did not always provide the funding or approve new initiatives easily. This is a bottleneck which needs to be addressed. For KM adoption, teams will need to be formed and both people and technology infrastructure developed. Thus, along with the openness of top management, libraries need to secure funds for KM. Other research organizations or universities could also help in this area by seeing it as a priority. Finally, libraries need to further improve their processes. They need to become more agile by responding to change quickly and by providing timely

support to new initiatives. Overall, the study points to a favorable direction for KM-using-social media in libraries. Adopting KM-using-social media would lead to more agile libraries, service innovation, and libraries moving seamlessly towards the libraries of the future, while surviving budget cuts, competition from online sources such as Google and other difficulties. Apart from this library readiness to adopt KM and social media, qualitative data analysis of the two questions on knowledge retention and transfer has shown that the strategies for the retention and transfer of both explicit knowledge (through documentation, digital repositories, etc.) and tacit knowledge (though training and other means) are important. The study also showed that the strategies used by most libraries were not part of a formal KM program, or that retention or transfer was done poorly in some libraries. For knowledge retention and transfer to be truly successful, it needs to be part of a formal KM program and done on an ongoing, organic basis for all current employees, and not just in the last few days or weeks before a particular employee leaves.

Chapter 4: User Knowledge and Value Co-creation for Service Innovation

4.1 Introduction

For the last few decades, academic libraries are facing a number of challenges. These include changes in service pattern from traditional to digital services, rising journal and serials costs, the fast changing needs and behavior of patrons, decreasing usage, and increased demands for new types of services (Johnson and Lilly, 2012). With access to mobile search and countless mobile apps on their fingertips, library users today have more choices to avail services than ever before. To address these challenges, academic libraries must redesign their role in the digital environment, leverage their strengths, reform their services (Jantz, 2012), and innovate to create responsive and convenient services (Li, 2006). However, innovation requires focusing on user involvement (Patricio and Fisk, 2011) and closing the gap between user expectations and the library's ability to meet them. Here, involving the user means not only providing value to the user unidirectionally, but working together with the user in co-creating value for service innovation. While value co-creation has been exploited in the marketing sphere (e.g. Prahalad and Ramaswamy, 2004a), academic libraries are yet to take advantage of it. For the first time in this context, Islam, Agarwal and Ikeda (2015b) came up with a conceptual framework of value co-creation for service innovation in academic libraries. This chapter will discuss how value co-creation framework came up and later test the framework by gathering perceptions of heads of libraries and other librarians on adopting the framework. Innovation on service is the outcome of value co-creation and we did not focus what can be the innovative services except giving few examples. This chapter focuses what are the components of value co-creation and how can value co-creation be leveraged to innovate services in academic libraries? For testing Islam, Agarwal & Ikeda (2015b)'s framework, the present chapter will focus the following research questions.

4.2 Objectives of the study

The objective of the study was to investigate how academic libraries were jointly working with their users, and identify whether their libraries were ready to value co-create with their users not. In order to achieve this objective, we have come up with few research questions (RQs) that guide the study. The research questions are:

RQ1. What services does the library provide that it believes is of value to its users? How does the library gather knowledge about its users, knowledge for its users, and knowledge from its users?

RQ2. How does the library work with their users in jointly creating value? How does it ensure user-library dialogue? What does it think are the risks and benefits of co-creation?

RQ3. What do they think is the role of the user involvement and co-creation in the innovation of library services?

In the next section, we put the theoretical framework and then look at methodology, analysis and findings. This is followed by our discussion and summary of this study.

4.3 Theoretical framework of value co-creation for service innovation in academic libraries

In the traditional value-creation process, libraries and users had concrete roles. The library provided the service and the user received it. This type of value is often called value in exchange (Vargo and Lusch, 2004). Services were sources of value, and this value was exchanged between the library and the user. The problem with this definition of value is that most of the attention is given to the library (resource acquisition, services etc.). The role of the user or the patron is compromised. The recent move from G-D logic to S-D logic in marketing (Vargo and Lusch, 2004) can be applied to libraries. S-D logic minimizes the provider–user distinction. The library and its users are no longer separate entities but perform various activities mutually, thus creating a new form of value – value in use. Islam, Agarwal and Ikeda (2015b) put some examples,

a. Book search

A library online public access catalog could integrate star ratings on a particular book based on feedback from users of Web sites, such as WorldCat, LibraryThing, GoodReads, or Amazon, or gather its own user ratings on a particular book/periodical.

b. Web site design/development

Academic library users (faculty, staff, and students) could be invited to share their knowledge, expertise, and needs when the library designs its Web site. Students on courses such as computer science and user experience research could design and build parts of the library Web site as class prototype projects

c. Patron driven acquisition

Kay (2013) cites examples of patron driven acquisition models (piloted by libraries in Arizona University, Ontario Council of University, etc.), where users help identify 'significant use' of e-books that triggers purchase by the library.

d. Research and reference

Libraries could involve faculty and doctoral students in identifying and creating a reference collection pertinent to their research areas. Librarians could hold research sessions/consultations and more actively help gather literature reviews for articles that faculty/researchers are working on. Academic libraries can also take on the role of a publisher and work with faculty in managing the digital repository of faculty research output and with students in populating the repository

e. Blogging and social media

Libraries can invite users to blog for the library and feature users active in social media or physically in the library as star users. They can also have competitions inviting video and animation entries to be used in marketing campaigns. Users could be involved in the creation of logos, photos in the library, and other projects.

By utilizing such approaches, the user–library relationship is defined through a dialogical, personalized interaction, enabling joint value creation (Prahalad and Ramaswamy, 2004b). We have adopted two models/frameworks from the business literature to serve as a theoretical lens for our study. The first framework, Prahalad and

Ramaswamy's (2004b) DART model, emphasizes four components in value co-creation; and the second framework, Payne *et al*. (2008), sees co-creation as happening in a joint encounter process (distinct from customer/user and provider/library processes). We suggest the combination of these frameworks to propose a value co-creation framework for academic libraries that supports the development of new and innovative library services (see Figure 4.1).

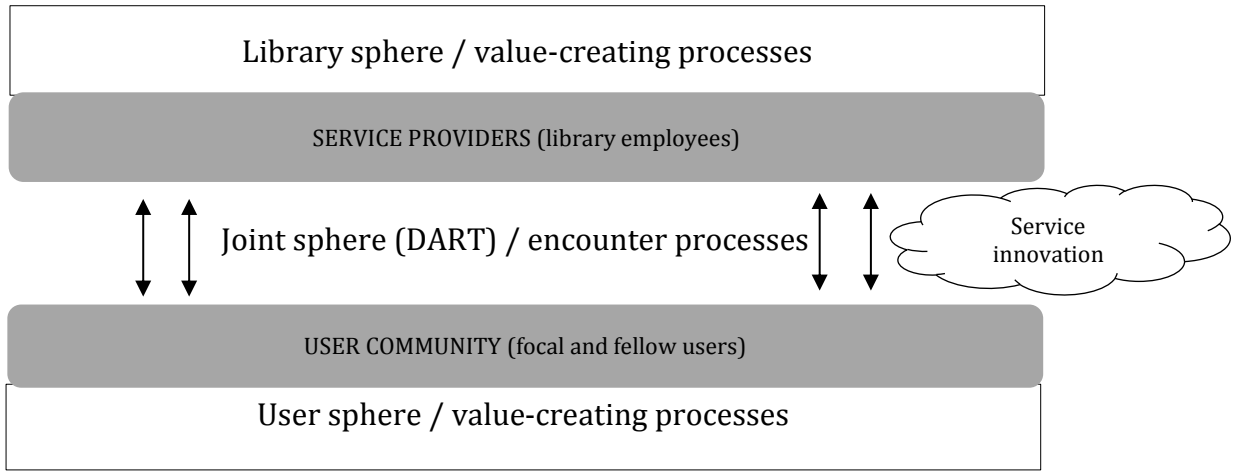


Figure 4.1Value Co-creation for Service Innovation in Academic Libraries.

The framework consists of the following two parts: (1) the library sphere (with library value-creating processes) at the top and (2) the user sphere (with user value creating processes) at the bottom. Co-creation happens in the middle joint sphere, where interaction and encounter processes take place between the library and the user(s).

The library sphere consists of tangible and intangible resources. Tangible resources are facilities, collections (books and periodicals), computers, and so on. Intangible resources are the experience and skills of library employees, services, and so on. All these enable the library to create value for the user (by providing services and working to meet user needs). To prepare for co-creation along with the user, the library needs to plan and design co-creation opportunities and experiences (e.g. utilizing social media). In this, the library would seek to understand the needs and wants of the users, the tasks they need to get done, and the barriers they face. The library would then need to implement its design, measure the degree of success and must regularly learn from the implementation, and revise/improve the co-creation design/experience for the user.

The user sphere consists of the information needs or wants of the user(s) (see Agarwal *et al.,* 2011), for example, the user's past experience or knowledge and his (or her)

loyalty to the library, potential to be engaged, so on, on which value-creating processes can be built. The user contributes to the co-creation process through engagement, their user behavior, feelings/emotions/affect, and cognition/understanding.

The focus of the framework is in the middle joint sphere where the library and the user interact to jointly co-create value. These three main elements (service provider, receiver, and the encounter) form the basis of the framework for co-creation. The interaction or the encounter is only the platform for co-creation. Here, co-creation includes elements from the DART model of Figure 2.7 (dialogue, access, risk return, and transparency). Deep and meaningful dialogue between the library and the user is essential. In order to foster such a dialogue, the library must be willing to listen and provide user access through its resources, employees, workshops, Web site/portal/social networking tools, and other dedicated ways. Users must be made aware of the potential risks and benefits of co-creation and jointly working with the library. The entire process must be transparent to the user. This joint value co-creation between the library and the user creates the conditions for service innovation, where the library and the user are both working together to change, improve, and create something new and valuable.

4.4 Methodology

Since the study seeks to get the perceptions of librarians, we relied upon the qualitative survey method for collecting data, with open-ended questions sent to librarians via e-mail. The questionnaire and study design were approved by the Simmons Institutional Review Board. A web-based version of the instrument was created using Google form. In total, ten open-ended questions were designed. Paragraphs explaining value co-creation with example in the context of libraries were included in the questionnaire. There was a mix of self-developed questions and ones adapted from prior studies such as Ramaswamy (2008); Scupola and Nicolajsen (2010); Jantz (2001, 2012) and Islam, Agarwal and Ikeda (2015a, 2015b).

4.4.1 Study population and sample

The study population was academic libraries and we compiled the e-mail addresses of librarians in the UK, USA, Canada, Australia and in other countries (Bangladesh, India, Singapore, Ghana, Nigeria, Egypt, Serbia and Chile) where universities were found using web search. Sixty-seven personalized individual e-mails with a link to a web-based

questionnaire (including informed consent) were sent out to university librarians inviting them to participate in this study. We mostly reached out to head librarians (as they might be better equipped to answer questions on strategic decisions such as value co-creation and service innovation), but other librarians in senior or other positions were also included in some cases. A mail was also sent out the IFLA mailing list ifla-l@infoserv.inist.fr that reaches out to library practitioners. The purpose here was to reach out to a wide pool of academic librarians from different countries. The method of sampling was purposive.

4.4.2 Data collection

In total, twenty five librarians filled out the survey. Four responses were mostly incomplete so had to be discarded. Of the remaining twenty one, two questionnaires were partially filled out. We decided to retain them as part of the sample, in order to use the data for those questions that they filled out. Thus, our sample size is 21. Counting IFLA mailing list as one email, the response rate was 21/68 = 30.88%. Data were gathered in February, 2015.

4.4.3 Analysis

All the data gathered through the Google form was downloaded as a spreadsheet, with answered organized as per each question. Three kinds of coding were carried out (Corbin and Strauss, 1990). Open coding included an initial pass through the data to come up with candidate concepts for categories. For each answer, we came up candidate categories to synthesize the findings. After an initial level of analysis, categories were combined into major categories (axial coding). Finally, the focus shifted to core categories (selective coding). Categories were reconciled for inter-rater reliability.

4.5 Findings

The following tables 4.1 and 4.2 present the relative percentages of different types of demographic information obtained from the respondents. It is significant to see that most of the respondents were female and majority of the respondents replied from the top position of their libraries. It is noted that most of the respondents replied to this e-mail questionnaire from North America.

Table 4.1 Demographics (No. of Employees, Year, Gender and Age) (N=21)

No. of employees	Distribution	Years of working		Gender	Distribution	Age (Years)	
1-19	3 (14.29%)	Min	8	Female	14 (66.67%)	Min	19
20-49	2 (9.52%)	Max	38	Male	7 (33.33%)	Max	48
50-100	8 (38.10%)	Average	21.05			Average	32.05
101-500	4 (19.05%)						
> 500	4 (19.05%)						

Table 4.2 Demographics (Designation, Education and Location) (N=21)

Work role / Designation	Distribution	Education	Distribution	Location	Distribution
Head / Chief Librarian /Director	11 (52.38%)	Masters	16 (76.19%)	Canada	5 (23.81%)
Senior Librarian	5 (23.81%)	PhD	2 (9.52%)	USA	4 (19.05%)
Librarian	5 (23.81%)	Bachelors	2 (9.52%)	India Singapore	2 (9.52% each)
		Diploma	1(4.76%)	Australia, Chile, Egypt, Ghana, Nigeria, Serbia, UK, Unspecified.	1(4.76% each)

The quality findings for the ten interview questions are discussed in the sections below. For the answer to each question, the categories developed are listed (in bold). Selected responses (in italics) are included on the right.

4.5.1 Research questions (RQ) 1: (Q1-4)

Q1. What services does your library provide that you believe is of value to your users?

The numbers below correspond to the number of times a particular response was chosen by a respondent. Most respondents gave more than one option, which were coded into separate categories, leading to 76 coded responses by the 21 respondents. The numbers within brackets indicate the sum total for all responses in that category.

Access to resources (physical, online, e-books) (20): resources of print, digital and web archives/ collection development policy/cataloguing (7); web OPAC /access / discovery-level search mechanism / information retrieval knowledge (6); periodicals / e-Journals / e-books / electronic resources/databases (5); knowledge repository service / institutional repository (2).

Helping answer questions / instruction / recommendation (in person, virtually) (18): reference services / virtual reference service / ask-a-librarian /enquiry services / bibliographic service (9); instructional services / consultation (4); user education/Information

literacy/lifelong learning (2); prompt expert support service (1); reader services (1); research support: institutional and for heritage (1).

User awareness / disseminating information (12): new arrival alerts / current awareness service / current content services / media alert (5); library website (3); social networking services / library blogs (3); user orientation service (1).

Ease of loaning items (books, technology gadgets) (9): inter-library loan (3); document delivery service (2); self-automated circulation / circulation (1); RFID security system (1); on-line reservation service / online services (1); laptop check out (1).

Evaluation / understanding and responding to user needs (5): user-centric library design (2); patron driven acquisition (2); measuring impact analysis services (1); "We have a user services librarian who regularly conducts focus groups or meets one on one with students to conduct user feedback regarding the discoverability of our resources and services".

Printing / scanning (5): photo-copying / printing and scanning (4); active learning technologies e.g. 3D printing (1).

Specialized services / helping manage research data (4): statistical data services (1); data management (1); publication management / publishing services (1); copyright (1).

Provision of physical space / environment (3): space facilities / provision of private/group study spaces (1); zero-decibel study enclosure (1); multimedia library lab (1).

Q2. How does your library learn about the user (both current and potential users) and his/her needs? (Knowledge about user)

There were 21 coded responses – 1 for each respondent.

Face-to-face / social media / survey (14):

Face-to-face interaction/direct contact/user assessment (7): "Know your library programme, interaction in classroom, ROI, user survey, ask-a-librarian, statistics obtained from circulation desk etc"; "Interactions with faculty, students research attendance at conferences"; "Individual, in-person discussions, email, phone calls and inquires that come in through ask-a-librarian."; "Direct contact (user requests)"; "Day to day interaction, sharing among colleagues and periodic surveys"; "Reader/user assessment program, one-one encounter with users, reader's club."

Social media (4): "Social media, library orientation"; "Social media, direct contact"; "Through social media and Opac".

Survey (3): "With need's surveys, talk[ing] with them, reviews of information by email according [to] the[ir] profile, best practices with the opac and its modifications, etc."; "Service interactions, surveys, focus groups, polls, research on user data."

Getting user feedback / application form (6):

Feedback/meeting/suggestion box/usability testing (5). "Through suggestion boxes, by sending catalogues to the different departments and Faculties of the University so that they can indicate their collection development needs."; "Usability testing, teaching in the classroom provides good feedback regarding students' experience with our services and resources, the reference desk is another opportunity to interact with students and our resources."; "User feedback through questions they ask and user engagement through subject librarian."; "Academic Outreach services , e.g. Feedback systems (Library and University systems), surveys participation in University committees, working groups, focus groups."

No idea (1): "I don't know"

Q3. What mechanisms does the library employ to disseminate relevant information to its users? (Knowledge for user)

This was coded with 1 response for each of the 21 respondents.

Social media / online tools (12): "Library Portal, Utilization of Social Media (e.g. Facebook, YouTube, Blogger etc.), Email Service."; "… digital displays, brochures, in-person presentations."; "Library catalog… other online tools."; "Instruction sessions, library newsletter to the faculty twice a year. Twitter, Instagram…"; "…TV screens posted in the library, announcements when teaching."; "…current awareness services."

User profiles / /workshops/ asynchronous communication (9): "The Library maintains "profiles" for its users. Searching the database with the key/text words collected from such profiles help us a lot to select books/periodicals (specially new entrants). It often happens that users gradually develop a rapport with the Library and as they take up new projects, they inform the Library about their potential requirement. E-mails, Blogs and even Phone Calls or Text Messaging in Mobiles are common ways of communication."; "Library instructional workshops, websites and blogs, research Assistance and service desk."; "News" column on web-site, Twitter, Exhibitions."; "Corporate email"; "Museum website, emails, listservs, in-person one-on-one discussions and small group tours. Workshops focused on library collection material."; "Blog, email, newsletters."; "liaison librarians, social media, website, email, on site posters, displays."

Q4. How does your library make use of the knowledge that your users possess? (Knowledge from user)

18 of 21 respondents answered this question.

Tailoring services to user needs (8): "Inviting feedback, prompting students in improving library services, collaborative assignments through faculty."; "Incorporate student feedback into website and search design."; "Try to keep up with changing needs and continuing programs and providing resources needed for our community."; "To improve user services/needs."

Acquisition of library collection (5): "Implements and purchases the requested items required by library clientelle."; "The library make use of the knowledge that our user possess by acquiring relevant materials suggested by the users, making use of the knowledge provided by user to benefit other users by sharing the knowledge through social media."; "Primarily used to develop collection."

Technology support (2): "Employ as student peers to deliver technology support services to other students Guide improvements in publication and publishing services (scholars and researchers)."; "We draw upon the work of users for describing our collections."

Not sure (3): "I don't think that we do."; "I'm not sure what this question means."; "I don't know how to answer this question."

No response (3)

4.5.2 Research question (RQ) 2: (Q5-8)

Q5. How do you ensure user-library interaction? What are the mechanisms by which you engage your users in a two-way dialogue? What strategies do you employ to foster a sense of community among your users?

20 of 21 respondents answered this question.

Meeting/discussion/consultation /collaboration and library events/online/e-mail/environment/library form/bulletin/service interaction (17)

Meeting/discussion/consultations (4): "We do organize users meeting but the response is usually not very good unfortunately."; "Discussion"; "Research consultations."

Collaboration and library events (4): "Library hosts events - film screenings, lectures, exhibitions."; "We also run promotional events at least twice a year, and all our users are encouraged to join in."; "Working with our students and faculty. Working with advisory

committees. Have a Friend of the Library group who works with us promoting the library. Development and outreach to alumni. Liaising with faculty members and departments."

Online/e-mail (3): "Online services, fast answer for all requirements (no more of 4 minutes to answer as standard), additional services (non-professional searches, confidential information destruction or backup."; "Library orientation programme, user feedback system …live chat."

Good environment (3): "…the users gradually develop a rapport with the Library. They often refer their peers to the Library or ask the Library certain services for their peers. such "informal" procedures opens the channel for a two--way dialogue."

Evaluation form/library bulletin (2): "Use of library bulletin to inform user of activities in the library and also engage user in interactive session and seminars."

Service interaction (1): "Day-to-day service-based interactions focus groups, social media, outreach efforts, student employment."

Voluntary services / coffee (3): "One-on-one conversations, greeting each person that enters the reference room, prompt replies to emails and AskaLibrarian questions, introducing scholars with related research interests to one another; library coffee bar with free tea and coffee and dessert treats."; "Develop community of Practice"

Q6. Are there areas in which your library works jointly with your users to co-create value or to design services and offerings?

19 of 21 respondents answered this question.

Makerspaces/Projects/3D Printing (6):

Makerspaces (3): "We've embedded the Maker Lab in the library, in collaboration with the University's IT and Engineering depts."; "Collaboration with student teams to organise and hold exhibitions in library spaces."

Project Management (2): "Yes. For instance while we were preparing for a Research Project on history of Commercial Advertisements, the Library collected literature, handbills, artifacts (like old match box, labels, Calenders, etc.) The Researchers helped us to identify the calligraphic styles, spelling, nature of illustrations used etc. etc. they enriched our knowledge to prepare the catalogues and indexes in a more viable way."

3D printing (1): "A new 3D printing service will be launched this year. Our intent is to identify students to provide peer supported learning and in turn, use this experience to contribute co-curricula recognition."

User feedback/ information literacy (4):

User feedback (3): "We work with Student Advisory Groups"; "We work through liaison services"; "Feedback from Users"

Information literacy (1): **"**These include: discussing ideas with our users at student/staff panels; working with academics on the planning and delivery of our information literacy teaching; representing the library at committee meetings; etc."

Website design / social media (3):

Website (2): "Website design through the use of focus groups. Overall, this is an area that we are very weak at."; "Website and search design is probably the area where we gather the most feedback from students."

Social Media (1): The library work

jointly with users to co- create value by using social media and also the use of the media resource center.

Collection development (3):

Collection development (2): "Develop the print collection around user needs and requests for titles".

E-books (1): "We are always trying to work with our faculty and students. One example is that we have worked with various units to create online OJS journals or e-books to meet needs in scholarly publishing."

Donate-a-book (1): "We sometimes have a donate a book programme for our users."

No work (3):

No work (3): "No"; "I don't think so."; "Not that I am aware of"

Q7. What do you think are the risks of users participating with the library in value co-creation?

19 of 21 respondents answered this question.

Difficult user expectations /lack of interest and knowledge/ lowering of standards (9)

Difficult to handle user expectations (4): "Unrealistic expectations from users; lack of understanding, e.g. regarding financial restrictions or boundaries of job roles; needs of an

individual being mistaken for needs of a group of users, so that the wrong solution is chosen."; "Difficult to manage user expectations."; "Users demands may not be realistic in relation to the institutions mandate."; "Spreading resources too thin."

Lack of interest and knowledge (3): "Often can't articulate their needs, lack of knowledge of library capacity and capability."; "Difficult to source for willing users. Only able to engage a particular type of user who are more forthcoming."

Lowering of standards (2): "Concerns of de-professionalization by librarians; poor data creation in the case of catalogue interactions."

No risk in user participation (7): "I think there no risk about the use of co-creation, all are active actors."; "Involvement of users in value co-creation is not a risk at all. Users suggestions/participation should be strongly encourage in libraries to enhance quality services. I do not thing any risk associated of users participation."; "There are no risks."; "There are no risks in value co-creation, it strengthens the library weaknesses."; "Have not identified any risks to date"; "None"; "No risk, but it's more like users are busy too--they have no time to create value with library."; "There is no risk at all."

No idea (3): "I have no idea."; "None that I can think of at the moment."; "I'm not sure. "

Q8. What do you think are the benefits? Do you think involving the user in value co-creation helps in the innovation of new services in the library?

19 of 21 respondents answered this question. All of these 19 felt that involving the user helps in creation of new services.

Addressing user needs (13)

Addressing user needs (8): "It is not the only way to design services but helps us to focus on user needs as expressed by students."; "Yes. It is important to be delivering the services that the users want/need."; We gain the benefit of their expertise and contacts."; "Yes, it is useful as the services are what are needed."; "Able to get feedback at an early stage. To some extent it helps. It is often nice to say that a certain service was created together with users. This creates a general perception among people the Library is close to its community."; "Yes. If you analysis the feedback of users, you will able to locate where the gap, and this gap will lead you to be more innovative and creative to provide best services to the end users."

User engagement (5): "Makes the library a valuable part of the community."; "The user will learn more and gain more knowledge.";; "User engagement, sense of belonging and ownership, more targeted service development."; "Certainly. To make a long story short, It is often observed that the knowledge of users start, where the wisdom of a Librarian ends!! the use of search

terms most appropriate and most used in academic community are often made known to us by the academicians themselves."

Gathering user feedback and ideas (6)

User feedback (3): "Yes. It makes sense to get feedback from users."; "Sometimes and students should (must) be part of the conversation. But, librarians as professionals and experts should be providing leadership and overall direction for service innovation. Student feedback has its limits - students' experience with library resources and services is often limited and co-opted by Google."

Exchange ideas and identify gap (3): "New ideas and weaknesses of the library are identified."; Major benefits are the exchange of ideas and the ability for both parties to share information on new topics and research."; "Yes can provide relevant ideas that will enable the institution to use more innovative and new services in the library."

4.5.3 Research question (RQ) 3: (Q9-10)

Q9. How are you bringing about innovation in your library? Which services are the most innovative in your library?

All 21 respondents answered this question

Pilot/ suggestion / follow others/ collaboration / feedback/ ICT (10)

Pilot/suggestions/follow others (6): "Methods include: inviting suggestions and ideas from users; looking for examples of good practice in other libraries, either within the University or outside it; making use of the skills, knowledge and aptitudes of individual members of staff, e.g. an aptitude for library promotion/publicity or social media skills; thinking outside the box."; "Looking to what works at other institutions."; "Trying to pay attention to what other libraries are doing. Encourage staff to try new things. Encourage sabbaticals and research to bring about innovation. Go to library conferences and take in what is happening there with other libraries and vendors. Bring in library school students to do interesting and innovative intern projects."

Collaboration and user feedback (3). "Keeping an open mind about librarian's job scopes which are ever-evolving. Taking the initiative and courage to keep asking users for feedback and inviting potential collaborations when possible."; "1. Maintenance of "profiles" they are users' profiles, experts' profiles and even geographical profiles. 2. Bringing the formally unpublished materials (like working papers; seminar talks, project reports, etc. etc) to the notice of the users. 3. Handy subject bibliographies on various topics of materials available in the library."

Using ICT (1): "Application of Information and Communication tools in the library."

OPAC/ information literacy/ reference/ user-centred design/ scholarly communication (7)

OPAC/information literacy (3): "Most innovative services include: specific tailoring of information literacy teaching sessions to user needs; writing regular "library columns" in student newsletters; etc."; "Opac services, social media services and circulation services."

Reference services and others (2): "Reference services and the use of electronic resources."; "3 key strategies drive innovation: transform engagement with information; open, 24/7; augment student and research success, examples include: 3D printing services; collection digitization initiatives; learning co-op (pilot); exhibitions (inc. virtual exhibitions)";

User-centred design/ (1): "User centered design is probably our most innovative service. We've had some challenges with senior leadership. At the moment we have a returning acting Dean of Libraries and it feels like we've stepped back 5 years. The challenge with many senior library administrative positions is that they are not practitioners. In many cases it has been years, if not decades, since they have actually interacted with students. They are often detached from the day to day reality, and indeed best practices and technology trends."

Scholarly communication (1). : "Scholarly communication services is the most innovative now."

General services / not innovative / unsure (4): "I think that we have normal services using in all libraries. Not innovative."; "There are none in my library branch. Special Collections is doing interesting projects to bring in students to use primary resources, but I am not at all involved in Special Collections."; "I do not know."; "I don't think it's something that can be done by one person. I don't think I have very innovative services that I have contributed."

Q10. What do you think is the role or contribution of users in designing the services you mention above?

16 of 21 respondents answered this question.

Tailoring services to needs/ suggestions on designing services/service improvement (13)

Tailoring user needs (6): "Critical. We involved users, with disabilities, at every step of piloting this new accessible content e-portal."; "The clientelle is the king so by listening to their views the librarian creates a user friendy environment for their users."; Their familiarity with

these systems elsewhere helps."; "We need to keep them involved, so they are a part of it where possible and they feel the library is meeting their needs. It is difficult at times with some faculty who do not want change or innovations, because they don't want to learn new things, tools or ways to do things. Other faculty do, so it is a balancing act."; "Users are aware of themselves as users, that is, the Library exists for them. If they do not continue to use or support the Library, our level of service will decline or become non-existent one day."

Suggestions and design (5): "100% importance in the designing."; "Providing ideas and suggestions; evaluating ideas and suggestions of library staff."; "The role of the users in designing the services is to create relationship among users and library workers and also provide avenue for interaction."

Service improvement (2): "3D printing - monitor user behavior to drive expansion and ongoing improvement of services; respond to and address digital literacies requirements; advocacy."; "Providing regular feedback."

Not important (3): "Low"; "None"; "Little to none."

4.6 Discussion

RQ1. What services does the library provide that it believes is of value to its users? How does the library gather knowledge about its users, knowledge for its users, and knowledge from its users?

The first four interview questions were related to the library sphere from Islam, Agarwal and Ikeda (2015b) framework. Librarians perceived that the important services that they provide (order based on the most frequent services cited) are access to resources, reference & instruction, user awareness, ease of loaning items, evaluation / understanding user needs, printing/scanning, data management and provision of physical space. As we see, there is a big focus on access to library resources. The study respondents believe that providing access to resources is of most value to users. As Levine-Clark (2014) and MacWhinnie (2003) have noted, increasing use of new technology and shift towards digital resources have brought changes in the way students use academic libraries and library resources. Providing access to the resources in both the print and electronic formats is important.

Smith and McKeen (2005) identified three important aspects of customer (or user) knowledge that are important in the process of co-creating knowledge along with users.

These are the knowledge of users, knowledge for users and knowledge from users. The library uses face-to-face meeting, survey and social media as the most common methods to learn about the needs of its current and potential users (knowledge of/about users). Finding out what the user needs is crucial before a library can devise ways to address them. Prior studies such as Cullen (2001) and Dicson and Holley (2010) have alluded to the importance of surveys and social networking activities as yet not fully explored ways for involving users in improving library services. The other ways to reach out that librarians identified are feedback, meetings, suggestion box, usability testing and application forms.

Social media and other online tools are identified as the best way to disseminate relevant information to academic library users (knowledge for users). This is likely because social media works as an invaluable tool to disseminate and communicate with users the information across a wide audience. The present finding relates with Collins and Quan Haase (2012)'s finding which indicates that interest of social media in academic libraries is increasing. Other ways of disseminating relevant information to the library users are through preparing user profiles, arranging workshops and through asynchronous communication such as email, listserv, etc. The librarians in our study indicated that the library uses the knowledge from its users to tailor its services to user needs, in areas such as acquisition and collection development. Identifying and acquiring user knowledge helps to understand their needs and expectations, which has a bearing on user satisfaction (Yang and Chen, 2008). Thus, academic libraries must continuously seek to understand users' behavioural needs, their overall attitudes and their perceptions on services by acquiring user knowledge.

RQ2. How does the library work with their users in jointly creating value? How does it ensure user-library dialogue? What does it think are the risks and benefits of co-creation?

Questions 5-8 in our study were related to the joint sphere (between the library and the users) in Islam, Agarwal and Ikeda (2015b) framework. Q6 specially focused on the joint sphere. This sphere includes the components from Prahalad and Ramaswamy (2004a)'s DART (dialogue, access, risk-return and transparency) model. In our study, we decided to focus on two of these 4 components – dialogue (Q5) and risk-return (Q7-8).

Meetings, discussions and consultations, collaboration and library events, through online mechanisms such as e-mail and live chat, interaction in the process of day-to-day services, focus groups, evaluation forms, surveys, events, social media, orientation about the library, and friends-of-the-libraries groupings were identified as the ways in academic libraries interact with their user communities. These tools ensure user-library dialogue and engagement, which is an important requirement for value co-creation, as per the DART model. The more the user feels wanted and valued, and the more the user's needs are met, the more s/he would want to remain engaged (Islam, Agarwal and Ikeda, 2015b). Here, user needs include the user's need for information, and library services, but also his/her other emotional needs. Effective engagement leads to fostering a sense of community among the library users. The respondents identified various mechanisms for achieving this, including greetings with coffee, guided tours of the library and asking users to provide voluntary services in some library operations.

Makespaces and collaborative workspaces emerged as primary areas where libraries are working with users to jointly co-create value. These areas help users to interact with each other, and also with library staff. They provide excellent means to foster dialogue - an important requirement for co-creation (Prahalad and Ramaswamy, 2004a). Other areas of co-creation include collection development, design of information literacy curriculum and website design. A respondent also identified peer-supporting learning of new services such as 3D printing as an area for value co-creation.

The user's lack of interest, lack of knowledge about the working of the library, unrealistic user expectations and librarians' concerns about lowering of standards were identified as some of the risks of the library working with users to co-create value. Of the 19 of 21 respondents who answered the question, 7 said that there is no risk in involving the users for value co-creation. This is significant finding and points to the increasing role and acceptance of value co-creation practices in academic libraries. These respondents expressed that inviting users in value co-creation enhances the quality of library services, strengthens areas of library weaknesses, and allows the users to be active actors in services, which leads to increased user satisfaction. Getting user feedback and identifying gaps were identified as the benefits of value co-creation in academic libraries. It would allow the users to take greater charge of their needs, and working with the library to meet them, rather than simply waiting for the library to

provide the services. When the library engages in a process where the library and the user interact, the user can suggest new ideas that the library has not thought about. The identification of gaps brings forth new ideas and potential areas for creativity and innovation (Vargo and Lusch, 2004). Most respondents felt that value co-creation would be extremely helpful for the innovation of new services in academic libraries.

RQ3. What do they think is the role of user involvement and co-creation in the innovation of library services?

The last two interview questions (Q9 and Q10) helped address this research question. It relates to the outcome of value co-creation in Islam, Agarwal and Ikeda (2015b)'s framework, which leads to service innovation.

Through committee work and pilot undertakings, taking suggestions from users, and following the best practices of other academic libraries were identified as ways in which academic libraries were bringing about innovation. Other ways included collaborative work, getting user feedback and using ICT tools in the library. OPAC/information literacy services, reference and user-centered design services appeared as the most innovative library services. As Magnusson (2003) identified, the service innovations suggested by the users are often more creative and useful than those suggested by professionals. Nowadays, web and mobile apps are offering libraries a new world of opportunities to engage patrons.

By encouraging and inviting students, staff and faculty for active participation in library processes, an academic library can tailor and design its services to meet user needs, and achieve its organizational mission and goals. 13 of the 16 respondents who answered Q10 (62% of the total sample) saw the user's role as critical and important in the design of new library services. Only 3 of the 21 respondents (14.3%) saw the user's role as little or unimportant for innovation in library services. This large support for user involvement has important implications for value co-creation and service innovation in the current libraries, and their working in the near future.

4.7 Conclusion

The study set out to test the conceptual framework presented by Islam, Agarwal and Ikeda (2015b). The responses brought forth an array of findings related to the

framework. The framework is to be seen from the top to the bottom. In the library sphere, academic librarians perceived that providing access to the library resources is of value to its users. In the value creating process, academic libraries use the knowledge of and from users, and also provide knowledge for users. By applying different methods e.g. face-to-face meeting, survey, social media, etc., the libraries gather user needs, and then tailors their services to address the identified needs. In this way, they seek to manage their user knowledge. Continuously gathering the knowledge of user needs, and being responsive to those needs is important for value co-creation in academic libraries

The joint sphere or encounter process is the mid-part of the framework which focuses on the library-user interaction to jointly create value. Value co-creation requires dialogue with users. Our findings identified that by arranging meetings, discussions and consultations, carrying out collaborative activities and library events, and reaching out to users both face-to-face and online, including through social media are the ways in which academic libraries create dialogue opportunities with their user communities. Makerspaces and collaborative workspaces emerged as big areas where libraries are working with users to jointly co-create value. The library-user dialogue is a key component of the joint sphere of value co-creation. Most of the academic librarians also identified some areas of risk in working with users to co-create value. Getting continuous user feedback and identification of gaps were identified as the benefits of value co-creation to academic libraries. An identification of these gaps will lead to areas and ideas for innovation in library services. The results of the study indicate that Islam, Agarwal and Ikeda (2015b)'s framework is supported in an academic library setting. Thus, this study provides empirical validity to the conceptual framework.

Chapter 5: KM and Service Innovation in Academic Libraries

5.1 Introduction

Effective management of all knowledge produced within an organization is frequently identified as key criteria for innovation of new products and services within the organization (Islam, Agarwal & Ikeda, 2015a). Academic libraries are beginning to realize the importance of knowledge management (KM) in this regard. Thus, libraries need to leverage employee and user knowledge, along with rapidly evolving technology. While there have been limited studies on KM in libraries, none have combined service innovation and KM in the context of academic libraries. Islam, Agarwal and Ikeda (2015a) came up with a framework for knowledge management for service innovation in academic libraries (KMSIL) (see figure 5.1). They investigated the strategies that librarians employ to ensure quality of service, the ways and barriers for service innovation, and the likelihood of adopting knowledge management for service innovation in libraries (KMSIL). They also investigate the role of KM, particularly knowledge of: the user, innovation possibilities and barriers, in facilitating service innovation. Based on that, the present study investigates the effect of KM (and each phase of the KM cycle) on service innovation. The study also demonstrated the relationship between the KM phases. The findings support the KMSIL framework.

5.2 Theoretical framework of KM for service innovation

In order to build the KMSIL framework, Islam, *et.al.,* (2015a) relied upon the qualitative survey method for collecting data, with open-ended questions sent to librarians via e-mail. The study population was academic libraries in ten countries and the numbers of respondents were 17 academic librarians. The research questions of e-mail interviewing was what are the strategies they employ to ensure quality of service, ways and barriers for the library to continue to innovate in providing service quality and how do they think KM will help to providing innovative library services. Three kinds of coding (Corbin and Strauss, 1990) were carried out. Open coding included an initial

pass through the data to come up with candidate concepts for categories. After an initial level of analysis, categories were combined into major categories (axial coding). Finally, the focus shifted to core categories (selective coding). Categories were reconciled for inter-rater reliability. They identified that most of the academic librarians agreed that service innovation is critical for continuous success of the academic library. Almost all the respondents felt that KM would be extremely helpful for the library in service innovation. Some of the respondent replied "*We do questionnaires about the library to continue develop our services and to be able to use our resources more effectively"; "We are using tools for KM, including SharePoint and Confluence. However, KM needs to be embedded in the daily work of each team and we have not reached that state yet".* Table summarizes the responses by the librarians about what sets them apart and the strategies they employ to ensure quality of service and service innovation.

Table 5.1 Strategies Employed for Service Innovation

Strategies employed	**Unique characteristics of the library**	**Current and ongoing innovative projects**
Being user-centered (18)	Innovative / responsive (6)	Adopting new technologies (7)
Increasing staff efficiency (10)	Good size / collection (4)	Collaboration / Integration with non-library services (4)
Technology (5)	Nimble / dynamic (2)	
Piloting / scaling-up (3)	Services on par with other libraries (2)	New search / discovery interface (4)
Openness (1)		Being user-centered (3)
	Value people (2)	Makerspaces / learning zones (3)

We can conclude three significant takeaways from the table 5.1. First, there is a big focus on being user-centered and responsive to user needs. Strategies for ensuing quality of services, some of the respondents replied that *"We define customer needs and rewarding customers"; "continuous assessment of customer feedback"; "We put new customer interface (discovery)"*. This is consistent with the first part of our theoretical lens that focused on looking externally i.e. developing the knowledge of customer needs through librarian-patron interaction. It also ties in with most service innovation studies that recognize user involvement as a key part of service innovation (Goldstein, *et.al.*, 2002; Magnusson, Matthing and Kristensson, 2003). As discussed earlier, the concept of a service, the client interface, the delivery system and technological options are the four

dimensional features of Service innovation (Hertog, 2000). Most of these dimensions deal with customer needs, customer satisfaction, what is to be done for the customer, and how it is to be achieved (Heskett, 1986; Miles, 1993; Hertog, 2000). The findings are also consistent with Scupola and Nicolajsen (2010) who saw unexplored possibilities for customer involvement in library service innovation.

The characteristics of being innovative, responsive, nimble and dynamic in the findings (second column) are consistent with the second part of our theoretical lens that focus on looking externally i.e. developing librarians' knowledge of innovations and what's out there or what's possible. The way their libraries are different and unique from other libraries, some respondents replied this ways "*We are one of the few libraries with a distinct marketing and communications department"; "I believe our collections are unique and really set us apart from other libraries" We are forward looking, risk taking and very digital in nature".*

Among other findings, libraries are increasingly being seen or remodeled as spaces for synthesis, integration, makespaces and learning zones where people gather not just to consume content, but to discuss and collaboratively create content (third column in table 5.1). For the example of current and ongoing innovative projects, some respondents answered this way, *"We have pilots of new services (iPad lending).*" *Granted we are not the innovators, we are working on implementing a search interface that will search all the library materials, physical, digital and electronic resources. I find that all library websites have the same problem, a page full of links to various search interfaces making it confusing and difficult to find library material."* All the findings in Table 5.1 are consistent with, and some combination of the four dimensions of service innovation discussed earlier (Heskett, 1986; Miles, 1993; Hertog, 2000). The respondents identified communication services and digital services among the most innovative departments. This is likely because these departments facilitate user interaction, and the service innovation dimensions of the client interface and technological options (Hertog, 2000). The technological innovations which most libraries had implemented (e-books, online research assistance, mobile apps/website, presence in social media, and digital libraries) map to the technological solutions and possibilities as per Hertog (2000)'s dimensions.

Table 5.2 below summarizes the opportunities and barriers for service innovation. Employing best practices, collaborative approaches, assessment and evaluation were identified as some of the opportunities and ways to move ahead with innovation. Some said *"Involve end users to consume your applications APIs to generate new and innovative applications and enhance service quality automatically*"; *"establish a separate unit for R&D and provide integration with the more traditional units."*.

Table 5.2 Opportunities and Barriers for Service Innovation

Ways to continue to innovate	**Desirable but not yet implemented**	**Barriers to service innovation**
Best practices / strategies (8)	Research / discovery / digital repository (6)	Inadequate staff / expertise (8)
Collaboration (7)		
Organizational restructuring (4)	Mobile and other technologies (4)	Lack of funding / resources (6)
Evaluation and service assessment (4)	Infrastructure / efficiency (3)	
Staff expertise / training (3)	Outreach / services (3)	Lack of sharing culture (5)
	Embedded Librarian (2)	Copyright issues (1)
		Leadership (1)

These call for a forgiving leadership (Jantz, 2012), and a focus on people – with employee training and continuous development of expertise. Technology and infrastructure (as studied by Dalbello, 2005; Cervone, 2010) call for additional resources, which is a barrier many libraries face. However, the limitations and perceived crisis often provide great impetus for pooling in existing resources for innovation i.e. making the best of what you have. This requires changes in attitudes (Musman, 1993; Clayton, 1997) and bringing in a knowledge-sharing and collaborative culture (Sheng and Sun, 2007). Apart from these opportunities, not having enough staff or enough expertise and lacking of fund or resources for innovation were cited as the biggest barriers.

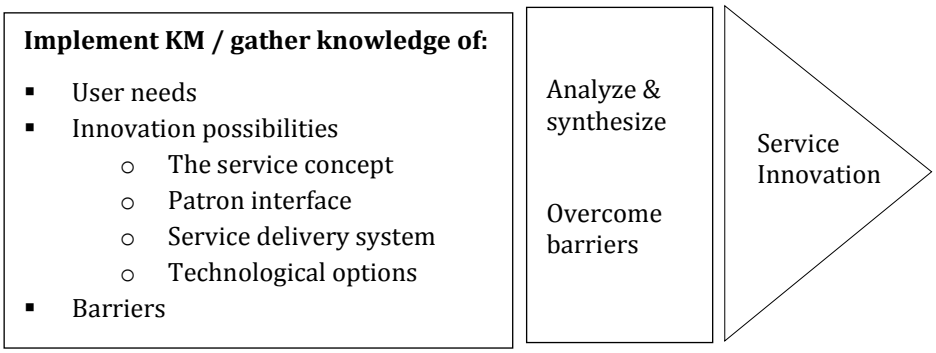


Figure 5.1 A Theoretical Framework of KM for Service Innovation in Libraries (KMSIL)

Even though the sample size was small and the study exploratory, Islam, Agarwal and Ikeda (2015a) draw some useful insights from the findings. We use our theoretical background and findings from the study to propose a theoretical framework of KMSIL (Figure 5.1). The framework is to be seen from left to right. For any change management or service innovation, being response to user needs and continuously gathering knowledge of those needs is important. This can be done through evaluation and assessment, staff-patron interaction, and through outreach (either in person or using social media). However, one cannot only be limited by user needs. Had Steve Jobs focussed only on user feedback, the iPad would never have been innovated. Along with user interaction, library staff must also keep themselves informed of innovation possibilities. This can be achieved by looking at peer libraries, attending conferences, workshops, webinars and reading latest research in KM and library journals and following innovative developments through social media such as Facebook groups and Twitter. Based on the findings of our study, these innovation possibilities include being user centered, nimble and responsive, providing collaborative makerspaces, adopting technology solutions (such as research, discovery, digital repository, mobile solutions and social media) and being embedded librarians (Si *et al.,* 2012) by integrating with non-library services such as courseware and other portals/applications. However, even if the librarians know what the user wants, and can imagine the possibilities, they cannot move much ahead if they do not understand systemic and other barriers prevalent in the library. Service innovation requires knowledge of barriers that need to be overcome before innovation can happen. Based on their framework, Islam, Agarwal and Ikeda (2015a) define KMSIL as gathering knowledge of user needs, innovation possibilities and barriers, analyzing and synthesizing these to overcome barriers, leading to service innovation in libraries.

5.3 Objectives of the study

This study investigates the effect of knowledge management on service innovation in academic libraries. The following research questions (RQs) guide the study:

RQ1. How does KM affect service innovation in academic libraries?

RQ2. How do different phases of the KM cycle affect service innovation?

RQ3. How do the different phases of the KM cycle affect each other?

KM is operationalized through three phases of the KM cycle 1) knowledge capture/creation, 2) knowledge sharing/transfer, and 3) knowledge application/use (Agarwal & Islam, 2014; Dalkir, 2013). The service innovation framework by Hertog (2000) is used to explain service innovation. In order to relate KM and service innovation, the KM for Service Innovation in Libraries (KMSIL) framework by Islam, Agarwal & Ikeda (2015a) is used. This study will empirically test the framework by designing survey questions based on the framework. Apart from knowledge capture/creation through interaction among library employees, we will also see if interaction with users (value creation) and working closely with the user (value co-creation) has any impact on innovation (Islam, Agarwal, & Ikeda, 2015b). These are included as control variables.

5.4 Research model

To empirically test Islam *et al.*, (2015a)'s framework and to answer the research questions for this study, we propose a research model which is helpful in demonstrating the relationships between the variables of interest (Figure 5.2). Service innovation is the dependent variable. Three integrated phases of the KM cycle (Dalkir, 2013; Agarwal & Islam, 2014) – knowledge creation/capture, sharing/transfer and application/use are independent/mediating variables. The relationships between these are hypothesized through H1, H3 and H5. H2 and H4 investigate the relationship between the KM cycle phases. A set of control variables pertaining to value creation, value co-creation (Islam, Agarwal, & Ikeda, 2015b) and demographics are also added to see if they have any influence on service innovation.

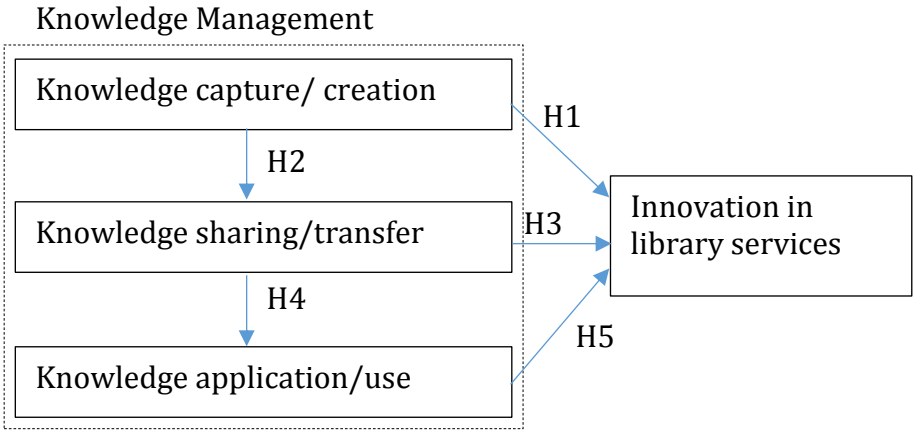


Figure 5.2: Research Model of KM Affects Service Innovation

5.5 Review of variables and hypotheses

We review specific variables identified in the research model and arrive at hypotheses.

Innovation in library services (dependent variable)

Hertog (2000) had come up with a 4-dimensional model to operationalize service innovation, with changes being related to the service concept, the client interface, the delivery system and technology use. Islam, Agarwal, & Ikeda (2015a) defined service innovation in libraries as 'new/improved technology or interfaces, improved services, outreach or organization methods, and other continuous work for patron satisfaction' (p.41). In this study, we operationalize innovation in library services as focusing on satisfying user needs through novel ideas and services, improved user interface, new outreach and ways of providing services, and technology applications.

Knowledge creation/capture (independent variable)

In the knowledge creation/capture phase of the KM cycle, tacit knowledge is identified or captured, explicit knowledge is organized or coded, and/or new knowledge is created (Dalkir, 2013). Here, the knowledge refers to the knowledge held by library employees. Based on Nonaka's (1991) socialization, externalization, combination, and internalization (SECI) model, knowledge creation in libraries is all about continuous transfer, combination, and conversion of the different types of knowledge. Incorporating the left part of Islam, Agarwal and Ikeda (2015a)'s KMSIL framework, we opererationalize knowledge creation/capture in the context of libraries as gathering knowledge of user needs, of innovation possibilities (incorporating Hertog's 4 dimensions), and of barriers to innovation. The ability to create new knowledge is often at the heart of the organization, as knowledge creation and innovation have a strong relationship (Darroch, 2005; Schulzea & Hoeglb, 2008). McAdam, Reid, & Keogh, (2006) conceptually established the relationship between knowledge creation and idea generation. Capturing and making sense of existing knowledge from different sources, identifying the gaps and then creating new knowledge to fill those gaps is a key aspect of service innovation in libraries (Islam, Agarwal and Islam, 2015a). Hence, we hypothesize:

Hypothesis 1: Knowledge creation/capture will positively affect innovation in library services.

As per Dalkir (2013) and Agarwal and Islam (2014), the created/captured knowledge is assessed and then shared and disseminated to the concerned people. Therefore, we hypothesize:

Hypothesis 2: Knowledge creation/capture will positively affect knowledge sharing/transfer.

Knowledge sharing/transfer (mediating variable)

Once knowledge has been captured and codified, it needs to be shared and disseminated throughout the organization (Dalkir, 2013). Through knowledge sharing, employees can mutually exchange their knowledge and contribute to innovation for the organization (Wang & Noe, 2010). For the present study, we operationalize knowledge sharing as an activity through which knowledge (i.e. skills, expertise or information based on experience, as well as reports, manuals and documents pertaining to user needs, innovation possibilities, barriers and other areas) is exchanged through informal dialogues, face-to-face meeting and group discussion. For innovation, an organization depends upon its employees' tacit knowledge (skills or experience) or explicit knowledge (institutionalized approaches or practices) (Lundvall & Nielsen, 2007). A library that can promote knowledge sharing practices among employees, or between employees and user communities is likely to generate new opportunities/ideas for innovation. Therefore, we hypothesize:

Hypothesis 3: Knowledge sharing/transfer will positively affect innovation in library services.

As per Dalkir (2013) and Agarwal and Islam (2014), the shared/transferred knowledge is contextualized and applied/used. Unless relevant knowledge is shared and acquired by those who need it, it cannot be effectively utilized. Therefore,

Hypothesis 4: Knowledge sharing/transfer will positively affect knowledge application/use.

Knowledge application/use (mediating variable)

Knowledge application/use is the final phase of the integrated KM cycle (Dalkir, 2013; Agarwal & Islam, 2014). When knowledge has been captured/coded, and shared/transferred, it becomes available for actual use. KM succeeds when knowledge is used. Without that, other cycles of KM will be in vain (Dalkir, 2013). In this study, we operationalize knowledge application/use to incorporate the right half of Islam, Agarwal, & Ikeda (2015a)'s KMSIL framework. We define it as an activity through which

the knowledge of user needs, barriers, innovation possibilities, and the overall knowledge of employees and users is analyzed and synthesized to come up with creative/innovative ideas to overcome barriers to innovation and to enhance library services. This process of synthesis and application is key to the development of new services. Cavusgil, Calantone, & Zhoa (2003) show that firms that create and use knowledge rapidly can lead to innovation faster than others. Therefore, we hypothesize: *Hypothesis 5: Knowledge application/use will positively affect innovation in library services.*

Value creation / co-creation (Control variables).

While libraries in general work to provide resources and services to address user needs and gather their feedback (value creation), very few actually involve the user in decision making and in creation of new services (value co-creation). Islam, Agarwal, & Ikeda (2015b) propose a framework for value co-creation in academic libraries. In libraries, knowledge creation/capture is an outcome of an interactive process between employee, employee-user and co-creating with users (Agarwal & Islam, 2014). We include value creation and co-creation as control variables and operationalize them for creating/capturing knowledge on user needs, of innovation possibilities (incorporating Hertog's 4 dimensions), and of barriers to innovation based on the employee-user interaction and co-creating with users.

5.6 Methodology

For the present study, we relied upon the survey questionnaire method as the questions related to the perceptions of librarians regarding KM and service innovation in their libraries. This allowed us to reach a wide pool of academic librarians in different countries.

5.6.1 Study population and sample

Academic librarians worldwide are the target population for this study. We chose academic libraries because they speed up knowledge creation and transmission by offering innovative services to students, researchers and faculties. The study population was academic libraries that were accessible using the International Federation of Library Associations and Institutions mailing list (IFLA Mailing Lists, 2015). Apart from these, we also reached out to academic librarians in USA (listing maintained by

University of Texas, n.d.), Canada (Universities in Canada, n.d.), UK (listing maintained by University of Wolverhampton, n.d.), Australia (list maintained by Council of Australian University Librarians (CAUL Members lists, 2015), and other countries such as Bangladesh (through Librarians and Information Scientists, Bangladesh Google group - LISBD, 2015), Malaysia, India, Singapore, Thailand, Vietnam, Belgium, France, Denmark, where universities were found using Web search. We tried to reach out to academic libraries in different countries where their contact details were accessible online. This ensured coverage of diverse socioeconomic and educational environments. However, we had to use convenience sampling. Data was gathered using a web-based questionnaire. The collected data was statistically analyzed to support for our hypotheses

5.6.2 Instrument development

The items developed for the 4 constructs of our research model, as well as other control and demographic variables are listed in Table 5.3 below. The control variables were not of theoretical interest but were included to see if they had any effect on the dependent variable. Where possible, survey items were taken from prior studies or adapted to suit the needs of this study. For other cases, the items were self-developed. The questionnaire used the 5-point Likert scale.

Table 5.3 Constructs and Items Included in the Questionnaire

Construct / Variable	Code	Item/Question	Source
		In our library:	
SI - Innovation in library services (dependent)	SI1*	We always focus on ways to satisfy user needs.	Edvardsson & Olsson (1996)
		We provide:	
	SI2*	A user-friendly interface (OPAC, website, etc.) for our services.	Self-developed
	SI3*	An interface through mobile apps or mobile website.	
	SI4*	An effective presence in social media (Facebook, Twitter, etc.)	
	SI5	We have an excellent service delivery system (automated circulation, inter-library loan, online reference, etc.)	
	SI6	We use state-of-the-art technology (RFID, QR code, digital library, etc.).	

	SI7	We are always quick in coming up with novel ideas or services for library users.	Wang & Wang, (2012)
	SI8	Our services are often perceived as very novel by our users.	Kör & Maden (2013)
KC - Knowledge capture/ creation (independent)		We spend a lot of time on learning by interacting amongst ourselves (library employees – reference, circulation, etc.) about	Islam, Agarwal, & Ikeda 2015a)
	KC1*	the needs of our users	
	KC2	innovation possibilities (new ideas, suggestions or solutions for the well-being or users)	Schulze & Hoegl (2008)
	KC3	what the concept of service means for the library and its users	Self-developed
	KC4	what the user interface should be like (physical or electronic)	
	KC5	the service delivery system that we can have (automated circulation, inter-library loan, online reference, etc.)	
	KC6	the technological options / tools we can adopt	
	KC7*	the barriers to innovation that we face	Islam, Agarwal, & Ikeda 2015a)
KS - Knowledge sharing/transfer (mediating)		In my library:	
	KS1*	people frequently share knowledge based on their experience.	Wang & Wang (2012)
	KS2	informal dialogues, face-to-face meeting and group discussion are used for knowledge sharing.	Self-developed
	KS3*	people frequently share codified knowledge like existing reports, manuals and official documents with their colleagues.	Wang & Wang (2012), Islam, Agarwal & Ikeda (2014b)
	KS4*	we capture best practices and lessons learned and make them available to all other employees.	Kör & Maden (2013)
	KS5 a-d	people frequently share the knowledge they're gathered on a) user needs b) innovation possibilities c) barriers to innovation d) other areas	Islam, Agarwal, & Ikeda (2015a)
	KS6*	people share the knowledge relevant for users (e.g. our products, services and other issues) with them.	Xu (2011)

KA - Knowledge application/ use (mediating)		In our library:	
	KA1	there is strong emphasis on using employee knowledge for enhancing library service activities.	Self-developed
	KA2	the management is always supportive of using/applying creative or innovative thinking for our services.	
		people spend a lot of time analyzing and synthesizing the knowledge we gather:	
	KA3	- From our users on their needs	Islam, Agarwal, & Ikeda (2015a)
	KA4	- From our employees on barriers to innovation	
	KA5	- From our employees on innovation possibilities	
	KA6	- The overall knowledge we gather from employees and users	Self-developed
		Once we capture/create new knowledge or ideas:	
	KA7*	- we apply them for the development of library services.	
	KA8*	- we come up with ways to overcome barriers to innovation	Self-developed
VC - Value creation (control)	VC1*VC2-3 VC4* VC5-6 VC7*	We spend a lot of time on learning by getting user feedback and making changes accordingly (creating value) about [VC1 – VC7 map to KC1 – KC7]	Islam, Agarwal & Ikeda (2015a)
VCC - Value co-creation (control)	VCC1-6 VCC7*	We spend a lot of time on learning by working with the user in decision-making (co-creating value) about [VCC1 – VCC7 map to KC1 – KC7]	Islam, Agarwal & Ikeda (2015a)
	VCC8	Please provide any examples of the way in which you "co-create with user"	Self-developed
Demographic (control)	NEMP	Number of employees in your library	Islam, Agarwal, & Ikeda (2014)
	LOC	City and country	
	ROLE	Work role and position	
	DEPT.	Department working in	
	NYR	Number of years in the library field	
	GEN	Gender	
	AGE	Birth year	
	EDN	Education	
	CMT	Do you have any other comments	

* removed after exploratory factor analysis

5.6.3 Data collection and analysis

The survey instrument was pre-tested to check for any question wording issues. Minor changes were made based on suggestions. The questionnaire and the design of the study were approved by the Institutional Review Board (IRB) Simmons College, USA. Filling out the questionnaire implied consent. A web-based version of the instrument was created using Google form (the final survey is accessible at http://tinyurl.com/km4si). None of the questions were made compulsory. Thus, a participant could choose not to answer a question s/he was uncomfortable with. In order to protect the identity of the librarians, no names, email addresses or library names were gathered. Based on the names of universities gathered, the respective library websites were searched. From the listing of library staff, email addresses of librarians were gathered and collated. While some library websites listed emails of individual staff members, others had a common contact email for all external mails. About 946 librarians were individually contacted, with the rest in mailing lists. In total, 110 librarians (107 valid responses) from 39 countries in 6 continents filled out the questionnaire after multiple follow-up emails and efforts at reaching respondents and mailing lists. As the survey was anonymous, it was not easy to distinguish how many of the responses were from individual emails and how many from mailing lists. Thus, it would be difficult to arrive a precise number for the response rate. If we were to disregard the number of people in mailing lists, the response rate would be 110/946 or = 11.63 percent (though the actual rate may be lower). As the responses were difficult to get, and the response rate not too high, no separate pilot data was gathered. Rather, exploratory factor analysis was done on the main data itself once the responses stopped coming in. Data was gathered in a 6-week period from mid-January to end-February 2015. PSPP 0.8.4, the open source alternative to SPSS, was used for statistical data analysis. The authors also had access to IBM SPSS 22. The results generated by PSPP were equivalent, and thus sufficient for analysis.

5.6.4 Demographics

Table 5.4 below shows the demographic distribution of the survey respondents.

Table 5.4 Demographics (Gender, Age and Education) (N=107)

Gender	**Distribution**	**Age (years)**		**Education**	**Distribution**
Female	57 (53.27%)	Mean	42.66	Masters	78 (72.9%)
Male	45 (42.06%)	SD	11.56	PhD	16 (14.95%)
Prefer not to say	3 (2.80%)	Min	25	Bachelors	12 (11.21%)
Other	1 (0.93%)	Max	69	Diploma	1 (0.93%)
Unspecified	1 (0.93%)	N	94		
		Unsp.	13		

Table 5.5 shows the working experience of the respondents and the number of employees in their library.

Table 5.5 Demographics (Library Experience and No. of Employees) (N=107)

Years of working		**No. of employees**	**Distribution**
Mean	14.99	1-19	32 (29.91%)
SD	10.16	20-49	21 (19.63%)
Min	0.50	50-100	23 (21.50%)
Max	40	101-500	26 (24.30%)
		> 500	5 (4.67%)

The survey was international, with respondents coming from 39 countries in all continents excluding Antarctica (see Table 5.6). Along with individual librarians reached out from university libraries in specific countries, this distribution also reflects the international nature of the mailing lists targeted.

Table 5.6 Demographics (Library Location) (N=107)

Continent	Countries	Distribution
Asia	Bangladesh 18; Thailand 7; India 5; Malaysia 4; UAE 2; Singapore 2; Vietnam, Pakistan, Hong Kong, China, Lebanon and Iran 1 each.	44(41.12%)
N. America	USA 17; Canada 3; Saipan and Cuba 1 each	22(20.56%)
Europe	UK 5; Poland 2; France 2; Estonia 2; Denmark, Belgium, Croatia, Bosnia and Herzegovina, Ukraine, Albania and Italy 1 each.	18(16.82%)
Africa	Nigeria 2; Kenya 2; Burundi, Ghana, RSA, Tanzania, Egypt, Zimbabwe and Uganda 1 each	11(10.28%)
Australia	Australia 8	8(7.47%)
S. America	Chile and Colombia 1 each	2(1.86%)
Unspecified		2(1.86%)

The work roles or positions specified by the respondents were classified into 3 categories based on hierarchy (see Table 5.7). The table also shows the library departments of the respondents.

Table 5.7 Position and Department (N=107)

Department working in	Distribution	Work position	Distribution
Library service	52 (48.6%)	Director/Head	26 (24.3%)
Reference	13 (12.15%)	Librarian	72 (67.29%)
Administration	9 (8.41%)	Library assistant	6 (5.60%)
Technology	7 (6.54%)	No response	3 (2.80%)
Technical services	5 (4.67%)		
Research/innovation	5 (4.67%)		
Customer service	4 (3.74%)		
Project	1 (0.93%)		
Communication	1 (0.93%)		
No response	10 (9.35%)		

5.6.5 Exploratory factor analysis (EFA)

Psychometric analysis was performed as per the procedure recommended by Anderson & Gerbing (1988). EFA with principal component analysis (Hair et al., 1995) was used to

extract the factors, followed by Varimax rotation. The procedure helps identify the underlying relationships or latent constructs between measured variables. In order to carry out EFA and to test for construct validity, it is recommended that 3-5 survey items are developed for each factor or variable. In our case, the number of items for constructs ranged from 7-9, as some of the constructs had multiple dimensions to address the theoretical basis for our operational definitions (see Table 5.3). From the variables of the research model, 12 survey items – SI1, SI2, SI3, SI4, KC1, KC7, KS1, KS3, KS4, KS6, KA7 and KA8 were found to be problematic (as well as 4 items from the control variables). Some of these didn't load well together as they related to different dimensions of the constructs. These items were examined statistically and theoretically and removed. Table 5.8 below shows the rotated component matrix for the 5 variables/factors in the research model of Figure 5.2, with eigenvalue greater than 1. The extracted factors together explained more than 77% of the variance. All items loaded correctly on their respective constructs. This indicates a high degree of convergent and discriminant validity, and thus construct validity for the 4 constructs of the research model. However, the items for the control variables value creation and value co-creation loaded together. This could be because both these required the library to reach out to the user (with the latter requiring greater user involvement), which couldn't be sufficiently distinguished by the respondents.

Table 5.8 Rotated Component Matrix

Coding	1	2	3	4	5
SI5	0.03	0.16	**0.84**	0.16	0.08
SI6	0.19	0.07	**0.81**	0.35	0.17
SI7	0.47	0.28	**0.61**	0.12	0.41
SI8	0.33	0.26	**0.72**	0.22	0.33
KC2	0.28	0.26	0.19	**0.67**	0.34
KC3	0.35	0.33	0.22	**0.62**	0.15
KC4	0.36	0.24	0.31	**0.79**	0.21
KC5	0.37	0.26	0.24	**0.85**	0.24
KC6	0.36	0.15	0.24	**0.84**	0.23
VC2 (control)	**0.66**	0.23	0.15	0.35	0.53
VC3 (control)	**0.65**	0.23	0.21	0.37	0.37
VC5 (control)	**0.75**	0.23	0.00	0.57	0.40
VC6 (control)	**0.89**	0.11	0.10	0.54	0.39

Table 5.8 Continue

VCC1 (control)	**1.04**	0.22	0.32	0.12	0.20
VCC2 (control)	**1**	0.30	0.11	0.19	0.31
VCC3 (control)	**1.14**	0.25	0.20	0.17	0.24
VCC4 (control)	**0.99**	0.18	0.27	0.37	0.18
VCC5 (control)	**1.10**	0.22	0.05	0.45	0.30
VCC6 (control)	**1.21**	0.19	0.15	0.40	0.25
KS2	0.02	**0.66**	0.32	0.04	0.22
KS5a	0.31	**0.81**	0.14	0.20	0.34
KS5b	0.22	**0.78**	0.13	0.40	0.32
KS5c	0.36	**0.88**	0.01	0.19	0.33
KS5d	0.23	**0.80**	0.17	0.35	0.19
KA1	0.33	0.41	0.22	0.14	**0.66**
KA2	0.21	0.22	0.41	0.16	**0.75**
KA3	0.42	0.17	0.14	0.30	**0.66**
KA4	0.31	0.25	0.01	0.22	**0.72**
KA5	0.19	0.32	0.14	0.29	**0.72**
KA6	0.21	0.30	0.21	0.14	**0.60**
Eigenvalue	11.05	4.62	3.35	5.20	4.96
% of variance	29.35	12.27	8.90	13.82	13.17
Cumulative variance	29.35	41.62	50.52	64.34	77.51

A reliability analysis was carried out using Cronbach's alpha. Table 5.9 below shows the descriptive statistics and Cronbach's α for the four constructs in the research model, as well as the control variables VC and VCC.

Table 5.9 Descriptive Statistics and Cronbach's Alpha

Code	Construct	No of items	Mean (1-5)	SD	Reliability α
KC	Knowledge capture/ creation	5	3.77	0.95	0.93
KS	Knowledge sharing/ transfer	5	3.53	0.92	0.92
KA	Knowledge application/ use	6	3.56	0.85	0.90
SI	Innovation in library services	4	3.65	0.90	0.85
VC	Value creation	4	3.44	1.05	0.93
VCC	Value co-creation	6	2.97	1.19	0.96

The KM cycle activities of the academic libraries in the table 5.9 was not well but on a moderate level. Among the three KM cycles, KS mean score was low compare to other scores. One possible interpretation would be that knowledge sharing practices are not well in academic libraries because of librarians are not aware of knowledge sharing

culture. Lack of employee recognition by reward, motivation, trust and organizational supports might be the reason of poor knowledge sharing. The internal consistency was above 0.85 for all constructs. It is interesting to note from table 5.9 that the librarians scored their role in value co-creation (involving the user in what they do) much lower than their scores for the other constructs.

5.6. 6 Hypothesis testing

After completing the validity and reliability analysis, hypothesis testing was done using multiple linear regression. We looked at the effect of the independent variable knowledge creation/capture (KC) and the mediating variables knowledge sharing/transfer (KS) and knowledge application/use (KA) on the dependent variable innovation of library services (SI).

Table 5.10 Effect of KC, KS and KA on SI

		Standardized Coefficients		
		Beta	t	Sig.
	(Constant)	0.00	2.98	0.004
H1 supported	KC	0.33	3.24	0.002
H3 not supported	KS	0.11	1.01	0.315
H5 supported	KA	0.32	2.89	0.005

Table 5.10 shows the β-coefficients for the effect of KC, KS and KA on SI. Hypothesis 3 (effect of KS on SI) was not supported, while H1 (effect of KC on SI) and H5 (effect of KA on SI) were strongly supported ($p < 0.01$). The adjusted R-square (coefficient of determination) was 0.45. We then regressed KS on KC (see Table 5.11).

Table 5.11 Effect of KC on KS

		Standardized Coefficients		
		Beta	t	Sig.
	(Constant)	0.00	4.29	0.000
H2 supported	KC	0.63	8.35	0.000

The adjusted R-square was 0.39. To test for H4, we regressed KA on KS (Table 5.12).

Table 5.12 Effect of KS on KA

		Standardized Coefficients		
		Beta	t	Sig.
	(Constant)	0.00	5.26	0.000
H4 supported	KS	0.71	10.39	0.000

The adjusted R-square was 0.5

The results of the hypotheses testing are also summarized in figure 5.3.

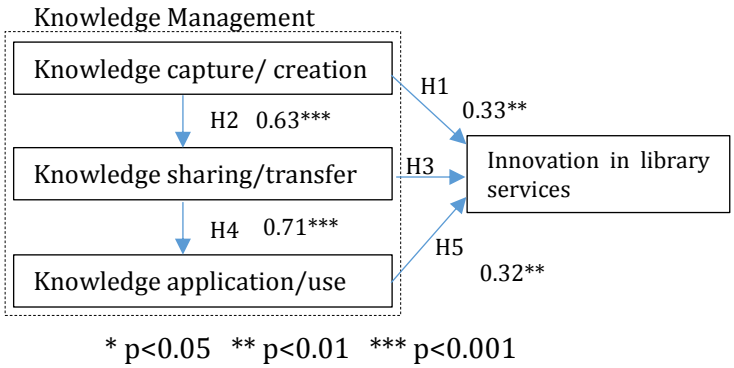


Figure 5.3 Results of Hypothesis Testing (β values and significance)

To test our first research question, we computed the average of KC, KS and KA to arrive at scores for overall knowledge management (KM) on a scale of 1-5 as provided by each respondent. On regressing SI on KM, we found that KM strongly affects SI (p=0.000, β=0.67, adjusted R-square=0.45).

5.6.7 Post-hoc testing

After the hypothesis test, step-wise regression was carried out to see any potential effect of the control variables VC, VCC on the dependent variable SI. The effect of value creation and co-creation on service innovation was found to be non-significant.

Regression was repeated to see the effect of the demographic variables gender, age, education, no. of employees in the library and no. of years in the library field on SI. None of the demographic variables had any significant effect on SI. However, upon including these variables, the effect of KA on SI was found to be very strongly significant at the p<0.0001 level (p=0.000, β=0.45), while the effect of KC on SI was significant at the p<0.05 level (p=0.012, β=0.29).

Regression was also repeated to see if any of the deleted items from the independent and control variables of Table 5.3 would have an effect on the dependent variable SI. Of all the deleted items, only VC4 (we spend a lot of time on learning by getting user feedback and making changes accordingly [creating value] about what the user interface should be like [physical or electronic]) was found to have a significant effect on SI (p = 0.022, β=0.27). Regression was repeated by treating each of the deleted items

of SI as the dependent variable, and regressing the independent and control variables on it. There was no significant effect observed.

To see if the individual items of VCC (value co-creation) would have any effect on SI, we regressed VCC1-7 on SI. None of the items were significant. However, two items VCC1 ($p = 0.056$, $\beta=0.37$) and VCC4 ($p = 0.057$, $\beta=0.3$) came close to significance ($p<0.06$). VCC1 pertained to working with the user on identifying user needs, and VCC4 was about working with the user on the user interface design.

As Dalkir (2013) and Agarwal and Islam (2014) showed a circular relationship from KC→KS, KS→KA and KA→KC (the applied knowledge is updated and based on gaps identified, new knowledge is captured or created), we repeated the analysis to see if there was any causal relationship from KA to KC. We found that KA strongly affects KC ($p=0.000$, $\beta=0.66$, adjusted R-square=0.44). On testing KC, KS and KA against each other for correlation, these 3 variables were found to be strongly correlated ($p<0.0001$). The Pearson correlation r of KC with KS was 0.63 ($p=0.00$) and of KC with KA was 0.66 ($p=0.00$). This explains the circular relationship.

5.7 Discussion

In this study, we set out to answer three research questions on the effect of KM on service innovation in academic libraries. The first research question was answered with a strong relationship established between knowledge management and service innovation in academic libraries. The second research question was addressed whereby a strong relationship was found between knowledge capture/creation and service innovation, and between knowledge application/use and service innovation. Both those phases are an integral part of Islam, Agarwal, and Ikeda (2015a)'s KMSIL framework. The formal refers to the left part of the framework, the latter refers to the right part. While there was no direct relationship established between knowledge sharing and service innovation, an indirect effect was established whereby the created/captured knowledge affected the shared/transferred knowledge, which in turn positively affected knowledge application/use. This addressed the third research question showing the relationship between phases of the integrated KM cycle. The cycle established from knowledge capture/creation to knowledge sharing/transfer to knowledge application/use and back to knowledge capture/creation support the integrated KM

cycle frameworks in Dalkir (2013) and Agarwal and Islam (2014) and most other frameworks of the KM cycle.

The findings support the view that academic libraries with more capability of knowledge creation are likely to offer more innovative services to their user communities. Similarly, academic libraries with better-developed knowledge application/use practices are likely to be offering more new services. The entire process of synthesis and application of the knowledge captured (as per the KMSIL framework) is crucial for the enhancement of existing services and the development of new services in academic libraries. The relationship between knowledge creation/capture and service innovation, and between knowledge application/use and service innovation is conceptually supported in the literature, although not well supported with empirical evidence. Our findings are in accordance with prior studies outside the library context such as Darroch (2005), Schulzea & Hoeglb (2008) and Du Plessis (2007), which found that innovation is extremely dependent on knowledge creation and its proper application. These studies found that creating knowledge and applying of that knowledge effectively leads to the innovation of new products and services in the organization. The results also support McAdam, Reid, & Keogh (2006)'s study where they conceptually established the relationship between knowledge creation and idea generation. The important finding in the study is that while knowledge sharing/transfer is a key component of knowledge management, sharing in itself is not sufficient if the shared knowledge is not applied/used in the process of idea generation and synthesis leading to innovation. It is only when this knowledge is used and applied that it leads to innovation. This supports the assertion by Dalkir (2013) that in the absence of knowledge application/use, the other phases of the KM cycle are in vain. Thus, academic libraries with a knowledge sharing/transferring capability do not necessarily offer innovative services.

5.8 Conclusion

The present study has explored the underlying phases of the KM cycle and their relationship to service innovation. The study found that academic librarians, in general, are practicing knowledge creation/capture, knowledge sharing and knowledge application activities, with the first and the third phase playing an important role in

their offering of innovative services to their valued users. Overall, the study points to a positive relationship between KM and innovation in libraries.

The study sheds light on how librarians perceive KM and service innovation, and the role of the former in bringing about changes in library services. Even in the process of gathering data, the study helped raise awareness of the role of KM in service innovation for libraries to adopt. Knowing the perceptions of librarians about the effect of KM on SI is the first step in determining whether academic libraries are ready to adopt KM or not. The process of filling out the questionnaire itself might prompt libraries to start thinking about KM seriously. The study also has implications for researchers – both in the KM cycle and service innovation areas. Bringing these two together open up further areas of research, and is a primary contribution of this study. The study lends quantitative evidence to Islam, Agarwal and Ikeda (2015a)'s KMSIL framework, which had earlier only been tested through a qualitative study of a small sample.

The study had a few limitations. First, a bigger sample than 107 would yield more data. One of five hypotheses was not supported. A larger sample could help determine if knowledge sharing does have any direct effect on service innovation. Second, a large number of survey items had to be dropped during analysis. Finally, while the study supports the KMSIL framework, some of the dropped items limited the validation provided by the study. Next, a strength of the survey is its wide global reach. The study has shown the value of utilizing both users' and librarians' innovation potential. Future work will show how to cultivate both these sources for service innovation in libraries.

Chapter 6: Discussion and Conclusion

In the previous chapters, we saw the results of the different studies on KM using social media, perceived readiness of academic libraries for KM, value co-creation for service innovation, and the effect of KM on innovation in library services. Using the data presented and interpreted in the previous chapters, we revisit the purpose and research questions of the study, summarize the findings, and propose a theoretical research model of KM (and value co-creation) for service innovation in academic libraries. We discuss the findings and the theoretical model. This is followed by implications, limitations and directions for future work.

6.1 Answers to the research questions (RQs)

SRQ1: Are academic libraries ready to adopt KM using social media?

In this study, organizational readiness factors have been extracted from literature reviews and surveyed through a questionnaire in chapter 3. The importance of KM in academic libraries is gradually increasing due to variation of user demand and changing pattern of academic libraries to collect, store, process and dissemination of information. Most of the academic librarians are familiar with KM and exhibited a relatively high degree of awareness about KM and KM practices. Librarians globally claim a good degree of knowledge in KM because KM is slowly, but surely finding its way in libraries. Dealing with both documents (explicit knowledge) and people (tacit knowledge) as key knowledge assets, academic libraries can re-shape it's position as connectors of people to knowledge. Social media in libraries provides a platform through which users can use the different services. Social media has dramatically changed the relationship between the library and its users. The capabilities of Social media enable library users to engage the library in a two-way communication and knowledge exchange. Most of the librarians felt that their library was likely to adopt KM-using-social media which in turn will make their library services more effective. It is in line with Kim and Abbas (2010) study where they showed that using this platform like blogs, libraries can aggregate user initiated knowledge from users, and library or provider initiated knowledge can be aggregated from RSS & Podcast activities. Moreover, blogging, Wikis, and Twitter can

serve knowledge creation by both parties (users and service provider) in libraries. The result also relates with Chu's (2009) study where he identifies that Wiki's can facilitate the decision making process in academic libraries. Having this possibility, adopting KM using Social media largely depends on organizational readiness.

For the degree of organizational readiness (moderator), the participants did not have a strong opinion on whether they thought their library was ready or not to adopt KM-using-social media, though they tended to think that it was (Mean value 4.85, hypothesis 2 which was not supported in chapter 3). After analyzing organizational readiness dimensions separately, we discovered that top management was open to "new ideas" and "sharing culture". However, funding for the new initiatives was identified as the problem for academic libraries. Academic library survival – especially in the face of budget and funding restrictions –is often the main focus, which more often than not overshadows the strategic issue of KM. This study identified that perception of KM using social media is considered to be highly useful, but the librarians were not entirely sure if their libraries were ready to adopt KM. This reinforces the reasons why academic libraries are not completely ready to adopt KM using social media.

To develop organizational readiness, libraries need to get more support for implementing new ideas and receive the funding for new initiatives easily. This is a bottleneck which needs to be addressed. For KM adoption, teams will need to be formed, and both people and technology infrastructure developed. Libraries need to become more agile by responding to change quickly and by providing timely support to new initiatives.

Overall, the study points to a favorable direction for KM-using-social media in libraries. The reason of adopting KM with social media would lead to more agile libraries and progressing gradually towards the "libraries of the future", while surviving budget cuts, competition from online sources such as Google and other difficulties. Apart from this, we also identified that libraries are able to retain and transfer their employee's knowledge through documentation, training and digital repositories. This finding is in line with the Rothwell, (2004) & DeLong, (2004)'s study where they showed that in transferring tacit knowledge to explicit, documentation is very important. Outgoing employees prepare it for the incoming employees, which is very helpful for the newly recruited people in an organization. Once it is documented, a digital repository is a good

place to preserve these documents. In the training areas, an exit interview helps the organization to retain the tacit knowledge of outgoing employees which helps the organization to conduct an orientation program for the incoming employees.

Lastly, as the Web 1.0 static pages of information transferred to interactive social media online communities of knowledge exchanges, academic libraries should continue to embrace the changes and find new ways to incorporate social media into their core mandate of access, freedom, and knowledge sharing (Courtney, 2007; Kroski, 2008). Academic libraries must embrace this, learning the value of social media for connecting library users to the library resources.

SRQ2: How can user knowledge and value co-creation be leveraged to innovate services in academic libraries?

We have addressed this question based on Islam, Agarwal and Ikeda (2015b)'s work on value co-creation for service innovation in academic libraries, by e-mail interviews with the academic librarians in chapter 4. Davenport and Jarvenpaa (2003) argue that "if knowledge is power, user knowledge is high-octane power". In the context of academic libraries, the library users are the main patron, and managing user knowledge is important which helps in co-creating value and offering innovative services to user communities. We identified that for wrapping user knowledge (about, for and from), libraries mostly used social media, online tools, face-to-face meeting, survey and others sources which go well with their own organizational settings. This is likely because social networking tools like Facebook, blog, Wikis and Listserv are invaluable tool to disseminate and communicate with users across a wide audience. It is in line with Collins & QuanHaase (2012)'s findings where they showed that use of social media is increasing in library services. Managing and co-creating knowledge with users, academic libraries can meet the unmet requirements of their user communities. By co-creating value with users, academic libraries are entering into new and meaningful relationships with users.

Interacting with library users by meeting, discussion, consultation, collaboration, e-mail and offering good environment, libraries are engaging their users in a two-way dialogue. These tools ensure user-library dialogue and engagement, which is an important requirement for value co-creation. "The more the user feels wanted and valued, and the more the user's needs are met, the more s/he would want to remain engaged" (Islam,

Agarwal and Ikeda, 2015b, p.49). Recognizing the importance of co-creation with users, we identified that academic libraries are working closely with their users in the areas of Makespaces, collaborative workspaces, project management and 3D printing. Makerspaces and collaborative workspaces help libraries where library users gather to generate new ideas that they apply for launching new services. Collaborating with users on these projects, academic librarians enrich their knowledge to upgrade catalogues and implement new discovery services. It is supported by Fagan & Keach (2009)'s study where they identified how users can work with the Web project management in academic libraries. It very significant for academic libraries that they are working with 3D printing technology to provide peer supported learning for the student to contribute to co-curricula recognition. These findings support the Cano (2015)'s study that 3D Printing can work as a powerful new curriculum tool in libraries. Despite the users lack of interest, lack of knowledge about value co-creation, unrealistic user expectations and librarians' concerns about lowering of standards, we identified that inviting users in value co-creation enhances the quality of library services which leads to increased user satisfaction.

Finally, user knowledge and value co-creation leads to design of new services that users bring, the improvement of existing services, and the way this allows them to tailor library services to meet user needs. With guidance on value co-creation in an academic library environment, and library actors mapped to the co-creation cycle, libraries can use the framework to offer new library services to user communities. Agarwal and Marouf's (2014) 10-step process for knowledge management in universities could also serve as one possible template for implementing value co-creation in libraries. Value co-creation for innovation is about libraries entering into new and meaningful relationships with users. Some users and employees are ready for this, while others are not. Thus,

A) A champion for co-creation must be found within the library.

B) Co-creation goals and priorities must be identified and ways of working with the user agreed – our examples provide ideas, for example, using social media for user-generated content or develop its own ideas based on need/opportunity).

C) The library can determine its current state (culture, resources, constraints, and ways in which they're already working for/with the user). Based on these, the library needs

to decide on co-creation tools and approaches to offer users to connect with their own and library ideas.

D) The library needs to come up with measures to determine the success of co-creation. The library can then develop an action plan, get all stakeholders in the library involved, and launch a pilot project for co-creation that could lead to tangible user value. Success stories can be captured, results publicized, and the process repeated with other priority areas.

SRQ3: How does knowledge management affect service innovation in academic libraries?

The effect of KM for offering innovation in academic library services has been analyzed based on the Islam, Agarwal and Ikeda (2015a)'s knowledge management for service innovation in libraries (KMSIL) framework and later statistically examined in the chapter 5. We have already identified that KM facilitates innovation which changes the library services and satisfies the user communities. In the knowledge creation process, academic librarians are spending a lot of time for learning and interacting amongst employees (library employees-reference, circulation, etc.), analyzing the need of users, thinking of innovation possibilities and adopting technologies to facilitate innovation activities in libraries. Acquiring knowledge and skills through interaction is considered to be an effective and efficient way of successful innovation. In this study, we have identified that knowledge creation or capture, affect innovation in library services. On testing KC, KS and KA against each other for correlation, these 3 variables were found to be strongly correlated ($p<0.0001$). It is correlated because once the knowledge has been created, it needs to be shared and disseminated throughout the libraries that can bring enormous benefit for the libraries. For the present study, there was no direct relation found between knowledge sharing and innovation for the library services. Jennex (2008) identified that communication by itself is not sufficient for knowledge sharing. Mutual trust and influence must be present for the knowledge sharing success. In line with the Dalkir (2013) study, even if knowledge is shared but is not applied in the proper areas, it does not lead to innovative services. Fort the present study, we have identified that knowledge application leads to innovation in academic library services. Giving emphasis of using library employee's knowledge, tailoring user needs, positive support from management and applying them for overcoming barriers ensure the

innovation in services. Finally, the process of synthesis and application ensure the development of innovative services. Thus, KM can influence library services by offering new ways of addressing user needs and coming up with novel ideas for libraries.

MRQ: What is the role of knowledge management (and value co-creation based on user knowledge) in facilitating service innovation in academic libraries?

To answer the major research question, we have composed of the subsidiary research questions, literature review parts along with some background of this study. We have focused on the KM enabling factors for the academic libraries with special emphasis on awareness and KM tools. Considering the social media as an integral means of communication for users, libraries can collect and analyze interaction data to find interesting patterns which are good for library services. Taking social media as a tool of KM, academic librarians were comfortable with using this tool and agreed that it would be would be useful for their libraries. This indicates that social media phenomenon and its implications on knowledge management which yield better assimilation of KM in academic libraries. To address user needs and their demand, three ways of user's knowledge are managed by the academic libraries. Knowledge for, from and about users help libraries to work on user interests. Managing these different knowledge flows is one of the biggest challenges of libraries and by doing many co-creating activities with the users, libraries address these challenges to redefine their position. Using Service-Dominant (S-D) logic, academic libraries are inviting users in the library services, which is gradually overcoming the challenges posed by user communities. Despite some concerns, academic libraries see value co-creation as critical to the innovation of new services and the continuing success of their library. By encouraging and inviting students, staff and faculty for active participation in library processes, academic libraries are tailoring and designing their services to meet user needs, and achieve organizational mission and goals.

In academic libraries, KM plays an invaluable role for offering innovation in services. Harari, (1994); Nonaka, (1994) and West, (1992) have discussed in their studies that the organizations that are able to stimulate and to improve the knowledge of their employees are much more prepared to offer innovation. This study is aimed to show the great importance of KM as a vital resource for modern libraries. Considering the effect

of KM in academic libraries, the right combination of interaction between library employees and users of libraries is addressed by such academic libraries. These are managing knowledge through interacting with employees, addressing user feedback, working with the users, informal dialogues, sharing codified knowledge and applying them properly where it is needed. Libraries should provide focus on the value of tacit knowledge and assists in creating the environment for tacit knowledge creation, sharing and leverage to take place for the library services. Creating a communities of practice and make them available to other employees, libraries should working for the development of services.

To be specific, what academic libraries can do is to write the job descriptions that each staff is required to share knowledge pertaining to their tasks and that each manager is required to gather and manage operational knowledge. Knowledge sharing/management should also be configured into the staff annual performance review or the librarian's portfolio for tenure or promotion. In many areas, academic libraries are exploiting and realizing knowledge of the employees and building a culture where knowledge sharing can thrive. Throughout this process, libraries generate value from their intellectuals. By doing this, KM ensured the availability and accessibility of both tacit and explicit knowledge used in the innovation process in academic libraries. As KM ensures the availability and accessibility of both tacit and explicit knowledge, through knowledge accessibility and knowledge flow, library members have increased their skill levels and knowledge both formally and informally. An increase in skills can improve the quality of innovation in library services. Management of academic libraries should recognize that the skills of library employees and their motivation make innovation possible in services. Schader (2008) identifies that at present, many university libraries include a large "learning commons", filled with computers, tables, and comfortable chairs. These spaces, often reclaimed from bookshelves, are designed to facilitate collaborative learning between students, as well as providing students with ready access to resources (both print and electronic), learning technologies, librarian assistance, and other services, such as writing reports or counseling support. Academic libraries would do well to follow this example in transforming themselves from warehouses into networked knowledge spaces. Establishing the academic library as the place to go for the conversations, storytelling, idea generation and make sense a place for learning which will re-shape the library services. Embracing instructional role,

academic libraries can offer technology or information literacy program that support library users in becoming stronger independent learners, and help them make even better use of the library's resources. Having the positive effect of KM, creative library personnel can contribute to face the user demand that propel new service approaches. Our research findings support the notion that knowledge management leads to truly novel service ideas. Academic libraries help to create and preserve the academic collection of published, written and digital content for the user community. They support and stimulate research of all kinds, and help researches to innovate and grow. These are the outcomes that drive academic libraries, and underpin its mission to make libraries the most open, creative and innovative service organizations of its kind in the world.

6.2 Theoretical model

The major contribution of this dissertation is to propose a theoretical model of KM (and value co-creation) for innovation in academic library services. Based on the literature review, the research questions and findings from the previous studies we have conducted and hypothesis we came up, we propose the following model for our study (see Figure 6.1). This model is to be seen from the left to the right. It comprises of four key elements in the present study – KM enablers, KM cycle (knowledge management) in academic libraries, value co-creation and findings of all elements which offer innovation in academic library services.

In earlier days, academic libraries were treated as the repository or guardian of knowledge where knowledge was kept and disseminate to the academic community. Libraries used to perform the roles of organizing, cataloging, and storing information in ways that faculty and students can readily access and use. It was all about one way communication as the users come to the library, library provide the services and users received it. However, academic libraries and it's users in the 21st century have been changed as changes happened in the library services, information industry, habits & needs of the academic communities. To remain relevant in the academic community and redefining academic library's position in the 21st century, we embrace managing knowledge both employee and users, and more user involvement in the services can facilitate academic libraries to adopt with the change management.

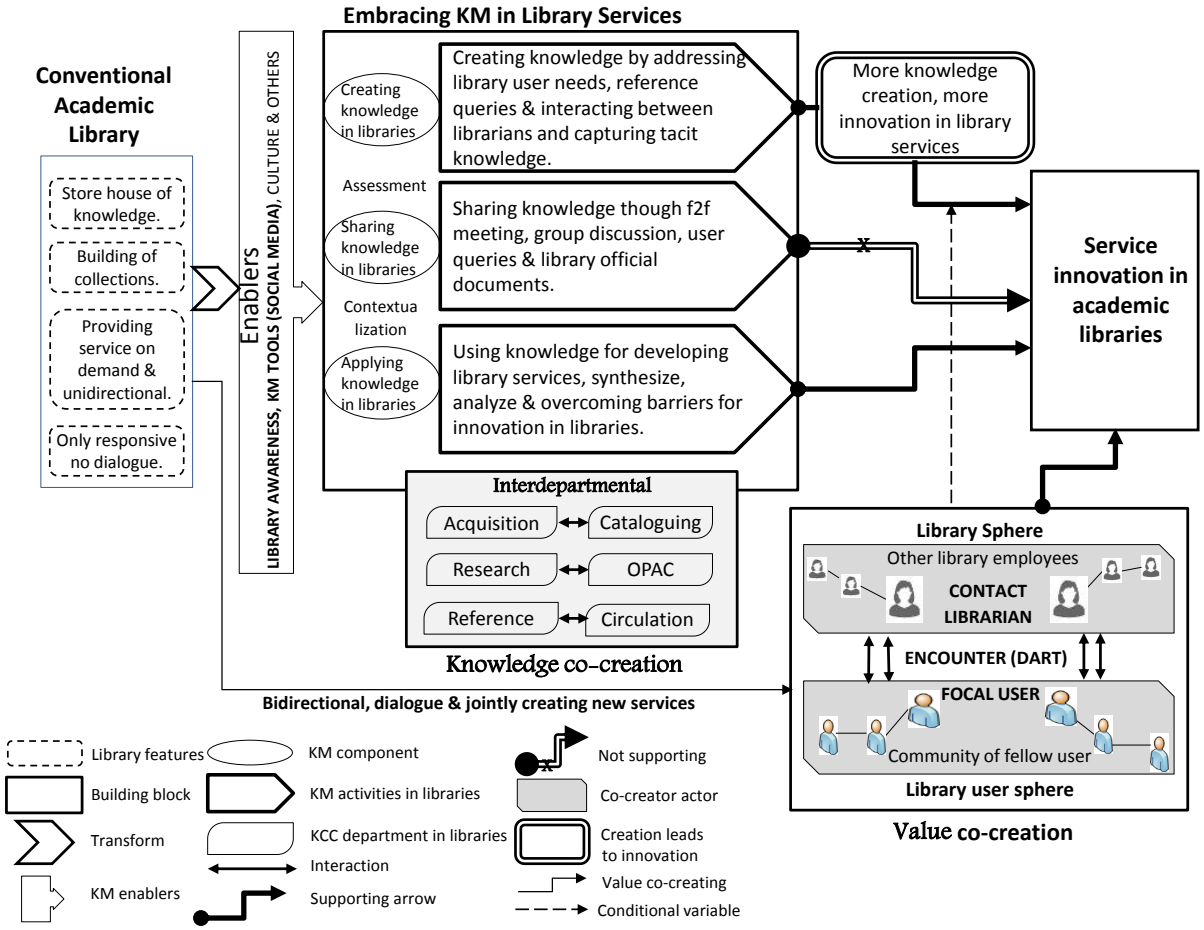


Figure 6.1 KM (and Value Co-Creation) for Innovation in Academic Libraries Services

The first part on the left refers to KM enabling factors, which help assess the degree to which the library is ready to implement knowledge management. O'Dell and Grayson (1998) list four major enablers for organizations – culture, infrastructure, metrics and technology. These would be crucial for academic libraries as well. For the present study, we have examined two enabling factors – the degree of KM awareness, and KM tools (social media). For the KM tools, the present study identified different KM tools based on the KM cycle that can be applied in libraries. We classified into the 3 phases of the integrated KM cycle and each phase was categorized with those tools. After that for the present study, we had investigated the awareness and readiness of KM using social media in academic libraries. It is very significant that academic librarins are well aware of KM and embracing KM to their daily activities (mean 5.05). It is because of academic libraries can no longer meet the information needs of the university community through the traditional process like store house of resources. Libraries need to embrace the knowledge needs of users and map internal and external knowledge that would assist

them in increasing their efficiency. Most of the library employees were comfortable with social media (mean 5.49) as it has become a part of library services to reach out user communities. KM using social media is highly useful for libraries and librarian's perceptions of KM using social media were positive (mean 5.75) but were not entirely sure if their libraries were ready to adopt KM using social media. By promoting and raising awareness of KM amongst the faculties, library users, librarians and other stakeholders can get the full benefit of KM in academic libraries. KM and social media serve as a new direction and academic libraries can think of applying these to their libraries by tapping user needs. Library leaders should understand that engagement is the best way to gather value from the knowledge exchanged in social media.

The second part of this model refers to the KM cycle in academic libraries. Based on Dalkir (2013) and Agarwal & Islam (2014)'s study, we have come up with three phases of KM cycle and applied in our study. As Dalkir (2013) and Agarwal and Islam (2014) showed a circular relationship from KC to KS, KS to KA and KA to KC where these 3 variables were found to be strongly correlated. In the first phase of knowledge creation, tacit knowledge of library employees is identified by interacting amongst themselves, getting user feedback, getting knowledge of library operations and making changes accordingly. For creating knowledge, library employees spend times on needs of the user, seeking for the innovation possibilities with different service activities and overcoming barriers for innovation in libraries. In libraries, it is typically the outcome of an interactive process that involve a number of librarians who work together from different departments, attending library events (workshops, seminars and conferences) and connecting with online communities. Apart from that, in libraries explicit knowledge of libraries was organized and codified for creating new knowledge. Based on Nonaka and Takeuchi (1995), Nonaka and Konno (2003) and Regeer and Bunders, (2003)'s work, we employ the concept of knowledge co-creation (KCC) as a part of KM activities in the KM cycle. In the process of knowledge co-creation, Regeer and Bunders (20013) identified that 'knowledge cannot be seen as separate from practice or context, but is acquired or gains meaning within a shared practice, community of practice or epistemic culture' p.63. In the present study, we found that communities of practice (CoP) are one of the important activities in the KM cycle of academic libraries. In academic libraries, employee interaction amongst different departments (reference, circulations, research and others), peer networks of practitioners within library, who

help each other perform better by sharing their knowledge. For example, if a library is committed to increase the effectiveness of its internet portal or digital repository or OPAC, Web service department would need to create knowledge from usage data, including user behavior such as databases accessed, failure rates, persistence rates, and so forth (from research department). The Web services librarian need to work together with research department to set goals and then to discover, design and try out ways to achieve the effectiveness. Both department needs to work closely with library staff and university communities to improve of web services and online resources. In academic libraries, the development of new services can be seen as a process which integrates the knowledge where the different actors already have, but it can also be seen as a community of practice in which different experts take part (Web librarians, research librarians, digital librarian and technology expert) and where new knowledge and innovations are created in a shared and intensive process. Based on Wenger (1998)'s process of knowledge co-creation (community of practice), we support that having a common goal which is decided by all the departmental librarins, who share a passion for something that they know how to do and to interact regularly to learn how to do it better lead to innovation in libraries. It is supported with the Shirahada and Umeda (2014)'s study where they showed that KCC improved the innovation rate in technology innovation organizations after applying KCC activities.

This dispersed knowledge captured or created across the library needs to be assessed, which follow closely to the library goals. In the assessment stage, once it has been decided that the new or newly identified content is of sufficient value, the next step is to contextualize (knowledge sharing activities) this content. Finally, contextualization will often succeed when the new content is firmly applied or used in library services (Application/use). From our study, we found that knowledge sharing activities (mean 3.53) in KM cycle in libraries were low compare to other two KM cycles (KC mean 3.77 & KA mean 3.56). Library employees may have knowledge sharing challenges because library employees tend to resist sharing their knowledge with the rest of the library employees. As knowledge is property, ownership and valuable which library employees do not want to share to lose their importance. Dalkir (2013) demonstrated that individuals are most commonly rewarded for what they know, not what they share.

Overall goal of KM is to make full use of the knowledge existing in a library which leads to offer innovation and increase the operational efficiency. The present study supports the effects of KM to offer innovative library services. Knowledge creation/capture and application/use cycles are statistically supported and significant for the innovation in academic library services. We identified that the more possibilities of libraries have to be innovative if they retain & transfer employee knowledge, capture the user needs, seek for innovation possibilities, and overcome barriers for applying knowledge. This finding is in support with number of studies where it is identified that KM plays a significant role in improving innovation and organizational performance (Darroch & McNaughton, 2002; Pyka, 2002; Adams & Lamont, 2003; Du Plessis, 2007). Moreover, Davenport & Prusak (1998) and Popadiuk & Choo (2006) noted that organizational knowledge creation leads to advancement of the generation of novel product ideas. It supports the view that academic libraries with more capability of knowledge creation are likely to offer more innovative services to their user communities. Similarly, once the knowledge is created, academic libraries with better-developed knowledge application/use practices are likely to be offering more new services. In general, the real focus of Knowledge Management in academic libraries is to effectively use the library personnel and to improve the efficiency and effectiveness of services.

The findings of this study reveal interesting facts where knowledge sharing does not support innovation in the academic library services. Librarians responded that there was no direct relation between knowledge sharing and innovation in the library services. The finding of this study reveals the contrary fact which is different from others research. It is not in line with the other studies where researcher brought out the findings that knowledge sharing effect to innovation & competitiveness in business firm or commercial organization (Wang & Wang (2012); Darroch (2005) and Lin, (2007). However, these studies were not written from the perspectives of academic library services. From the findings, we might think that knowledge sharing will not support innovation in academic library services without reward, trust, culture, motivation and others factors which are important for knowledge sharing in academic libraries. We believe that that the more possibilities of libraries have to be innovative if they share or transfer their knowledge and improve KS activities. For improving KS activities, the more librarins feel that they receive awards, the more they trust the library, the more the ready to collaborate or sharing knowledge. Aharony (2011) identified some

interesting factors that 'among those librarians whose attitudes toward knowledge management are lower, the reward plays an important role; if they receive a reward, they will be ready to collaborate' p.120. Constant, Kiesler & Sproull (1994) and Kelly & Thibaut (1978) have also discussed the value of rewards and asserted that knowledge sharing occurs when its reward exceeds its cost. Thus, if employees believe they will receive extrinsic rewards or promotion, they will develop positive attitudes toward knowledge sharing. Maponya (2004) noted that there is no KS coordination in academic libraries, what library people do is informal basis and usually based on conversation. There is no systematic approach to organizing the knowledge of the library, and making it available to other librarians and staff in order to improve the operation of the library. Moreover, unlike the private or business sector, academic libraries typically do not have extra financial resources to reward staffs who have contributed their knowledge. To promote knowledge sharing and remove knowledge sharing obstacles, the library must practice the knowledge sharing culture, recognizing the employees who actively participate and contribute knowledge sharing. To create a knowledge sharing culture libraries need to encourage employees to work together more effectively, formalizing KS activities to collaborate and to share which ultimately make libraries more productive. This culture will not only encourage library employees to continue contributing, but will also encourage other employees to join which will improve the innovation possibilities in academic libraries.

In the third part, knowledge creation phase of KM cycle can be further improved when academic libraries endeavor to co-create value with its users in services. Service in Knowledge science is defined by Kosaka & Shirahada (2014) as knowledge creation process for creating value for customer and service is related to knowledge creation. KM offers different tools which can be utilized to set up a successful framework for value co-creation. For working with users (co-creating value), managing user knowledge is important. Dous, Salomann, Kolbe, & Brenner (2005) conceptualize customer KM as the utilization of knowledge for, from and about customers in order to enhance the customer-relating capability of organizations. In academic libraries, knowledge for users refers to satisfying user requirements in the services and other relevant areas. Knowledge from users refers to ideas and suggestions that would be useful for the library to implement. Knowledge about users refers to understanding the patterns of user information needs which have been met or unmet. Having this knowledge,

academic libraries may have better understanding of what their user want and then can proceed for co-creating with users. In co-creation scenario from the library perspective, the persons interacting with the user are the contact employees (e.g. at the circulation desk, reference desk, online chat representatives, etc.). These employees in turn interact with other library employees (e.g. those working in technical services, acquisitions, systems, etc.). On the user end, the persons interacting with the library are the engaged, key, or frequent users (often termed focal users, ones who may be regular visitors to the library or users of electronic resources). In an academic library setting, these would be the faculty, students, and staff who regularly use the library for their research or other course work. These focal users, in turn, interact with members of the user community, which might include potential users or even non-users of the library. The focal users are in a powerful position to influence other users through word of mouth and other means, based on their co-creation experience. This joint value co-creation between the library and the user creates the conditions for service innovation. It is supported by Piller, Ihl and Vossen (2010) where they noted that user co-creation denotes an active, creative and social collaboration process between the library employees and the users/patrons, facilitated by the library.

Finally, the last part of this model refers to the findings of KM and value co-creation which propelled innovative services in academic libraries. We support that innovative services in academic libraries can be the new way of satisfying user needs, new interface of search services like star rating and discovery interface of OPAC, new ways of providing services (Social media, mobile based services, online reference services etc.) and using state-of-the-art technologies (RFID, QR code, etc.,) to offering services to the users. We have further simplified this framework (see Figure 6.2).

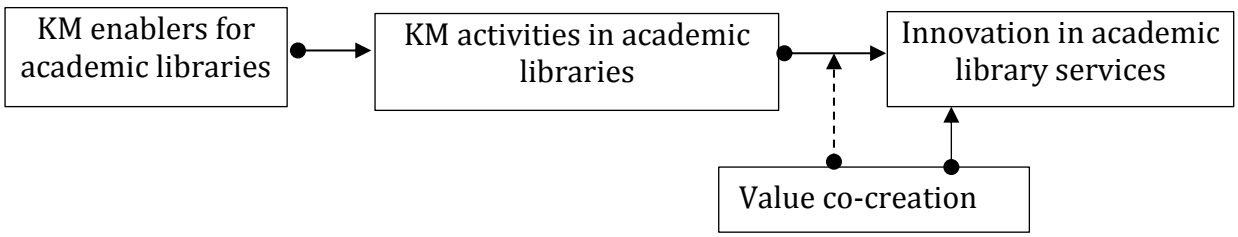


Figure 6.2 KM (and Value Co-Creation) for Service Innovation (Simplified)

The figure includes only the major building blocks from Figure 6.1 which is reflected in the simplified framework for KM (and value co-creation) for innovation in academic

library services (see Figure 6.2). The KM enablers determine the degree to which KM can be implemented in an academic library setting. KM (different phases of the KM cycle) positively affects service innovation. The positive effect of KM on service innovation is enhanced/expedited when the library employees involve the user in value co-creation. Here, value co-creation can be seen as a moderating variable that affects the relationship between knowledge capture/creation and service innovation. The effect of knowledge capture/creation on service innovation will be better/faster when there is user participation through value co-creation. Value co-creation also has a direct effect on service innovation in academic libraries.

Yet, like higher education, industry, firm & corporate world, libraries rarely use operational information to create or apply organizational knowledge. Townley (2001) noted that "Libraries do not manage knowledge about their organizations as they manage their other resources. They do not structure their organizations to use organizational knowledge" p.44. On the other way, it is noted that libraries are excelled at managing scholarly information, resources and providing those resources once it is needed. Libraries are not tended to create knowledge from organizational activities. Having these parameters, the present study brought the remarkable findings that academic libraries are shedding light on creating new knowledge by doing various activities. Creating knowledge in the library refers that academic libraries are embracing the idea of knowledge creation, begin to redesign its services, operation and thinking in more agile ways of creation. They are creating knowledge from usage of existing data, tailoring user needs and interacting among library employees, interacting between employees and users which add value to offer innovative services for the user communities. The model we arrived for this study is significant for stimulating ideas, and should be of considerable interest to a wide readership. Finally, it is found from this study that today's academic library's shift from a repository of collections to a catalyst for discovery and creating knowledge across the globe. They are shifting from their traditional approach 'storehouse of knowledge' to consciously create and then use knowledge to improve the organizational effectiveness.

6.3 Implications of the research

6.3.1 Implications for academic librarians & academicians

Based on the result of this study, library management, academic librarians and other patrons of academic libraries will be made aware of the effect of KM in library services. As KM has been greeted as a new discipline, academic libraries are gradually approaching to avail the benefits of KM in libraries. But this journey is not easy for the academic libraries. As the employee knowledge lies at the very heart of organizational knowledge, therefore it is very difficult to manage. Library human resources and staff development should think of working closely with managers at all levels to identify staff with valuable tacit knowledge and take every measure to retain such staff. The present study also provides the evidence of the importance of knowledge management and value co-creation that promote offering innovative services in academic libraries. The relationships between KM enabling environment, knowledge creation/capture, application/ use, value co-creation and innovation in library services may provide a direction how libraries should provide innovative services by using these elements. Based on this, academic librarians can redefine his/her working role by promoting knowledge creation, knowledge sharing culture, communities of practice, change management and ensure that people, processes, and technologies are aligned to effectively support for KM in their libraries. Apart from academic librarians, this study will contribute to wide-ranging discussion on the key concepts of KM, value co-creation and service innovation areas among the academic communities. Particularly, LIS academicians can be encouraged to focus on KM areas which bring the innovation in library services. We also believe that this study will help to open a debate and researcher will come forward to propel the issues how academic libraries can be a vanguard for the researchers in 21st century. Academics are the best knowledge creators and the knowledge creating activities are performed by universities. As a learning organization, universities should empower their libraries to develop campus-wide knowledge management systems.

6.3.2 Implications for knowledge science

Nowadays, in a society where we live, knowledge is a power and it leads the world towards the new horizon. Creating new knowledge and applying knowledge is the

motto of knowledge science. Being an interdisciplinary science, knowledge science can cover various research areas related to knowledge. In line with that, the present study has contribution to this school. In the transition period like information society to knowledge society, the role of academic libraries must undergo similar changes of priority. The outcome of this study will empower academic librarins in 21st century to become pioneers of the knowledge society. The relation between KM and library and information science (LIS) has already been identified in many studies. Having KM in libraries daily activities, academic libraries can provide new services, address new demand and want facing by the researchers and scholarly community. Creating new value for the academic community through knowledge creation, this study can further enrich knowledge science.

6.4 Limitations and future study

Firstly, the research theme for the present study was broad as KM, value co-creation and innovation in academic library services. Later one was the findings of the previous two constructs. Each of these constructs and their affect could well support on its own a separate dissertation. As a result it was difficult to give in-depth treatment for all of these.

Secondly, the target population of the study was only academic librarians across the world. The scope of the study is limited to academic libraries because they have played a significant role for supporting information dissemination activities to stimulate creation and transmission of knowledge. Although, the purpose was to reach out to a wide pool of academic libraries from different countries whose contact details were accessible online but the survey & e-mail interview succeeded mainly in obtaining responses from the USA, Canada, Brazil, the UK, Australia, New Zealand, Bangladesh, India, Thailand, Singapore and some African countries. Mails were also sent to some professional mailing lists like IFLA and IFLA (KM section. Covering other professional body's like Association for Information Science & Technology (ASIS&T), ASIS&T (KM section), American Library Association (ALA) and Association of College Research Libraries (ACRL) could improve the study. Moreover, the response rate was low for this study due to language barriers of the non-native English respondents, unwillingness to response of the survey, time variations between continents and e-mail spam. The lower rate of return in itself demonstrated some interesting areas. Academic librarians do not

directly involve with KM which reflected that they would not interest to respond to the survey instrument. Large majorities were apparently unsure to the areas and felt insufficient concern or praise to warrant the time to complete the survey. Moreover, often times library employees are busy with their daily works and they do not get time to response. After sending a couple of e-mails, reminder, response rates started to rise, but was not as high as we would have expected. The present study was conducted from Japan and we tried to reach out to academic librarians in Japan. Apart from language barriers in Japan, it was difficult for us to find out academic librarians whose contact details were accessible through online.

Thirdly, as the surveys were anonymous, there was no easy way to determine which of the responses resulted from the individual e-mails sent out, and which from the KM-specific mailing lists like IFLA (KM). There is the potential of a KM-specific response bias in the responses pertaining to KM. The use of convenience sampling would limit the generalizability of our findings. This could be explained and be vetted against more data to increase the transferability of findings. Thus, the result of this study is not representative of the academic libraries as a whole and, therefore, might not be the true picture of KM and value co-creation activities for service innovation in academic libraries. Again, the diverse contexts (library size, resources, culture, IT facilities, and others) in which the interviewees were located in academic libraries, limit the extent to which their experiences might be generalized. The bigger sample for the entire research would yield more data and it could help determine if KM and value co-creation are more fully supported for the innovation in academic libraries. The construct validity of the survey items (chapter 3 & 5) could be further improved by adopting a two-step sorting procedure described by Agarwal (2011), even before the data collection is started. The procedure, when carried out, helps improve the construct validity of survey items with a limited number of judges before carrying out the data collection.

Fourthly, in chapter four, we did not test the user sphere (the bottom part) of Islam, Agarwal and Ikeda (2015b)'s framework. Also, it focused only on the dialogue (D) and risk-return (R) parts from Prahalad and Ramaswamy (2004a)'s DART model (which forms part of the joint sphere in Islam, Agarwal and Ikeda's framework). The interview questions of the study did not cover the access (A) and transparency (T) components from the DART model. Moreover, the sample size was not adequate for a qualitative

study and was quite low. A bigger sample would gather more data which will overcome the limits of the transferability of findings. Future work should supplement this with more questions on the other parts of the framework in the context of academic libraries. While this study was qualitative, a survey study with a larger sample would be a good follow-up to this study. While this study did support and validate Islam, Agarwal and Ikeda (2015b)'s framework, it does need to be tested more and validated against further empirical studies.

Finally, future studies should continue to test the model we arrived at. The findings of the study could be supplemented with a case study or depth interviews of librarians to get a more in-depth picture of this study. While this study looked at different phases of the KM cycle and its effect on SI, future studies could concentrate on a single phase such as knowledge creation or application and study its impact on service innovation. Future studies also could focus more on knowledge creating phases using knowledge to co-creating (KCC) activities.

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Appendices

Appendix A

Table: 2.2 IT& Non-IT Tools for KM Cycle (applicable to libraries)

Cycle 1: Creation and capture

Table 2.2.1 Non-IT Tools (knowledge creation and capture)

Non-IT methods and tools	**What it does?**	**Application for KM in libraries**
Abstract Concept Representation / Mental Models	A mental model is a symbolic or qualitative representation of something in the real world. It is how human minds process and make sense of their complex environments. A cognitive map is a powerful way of coding this captured knowledge.	*Codification:* Employees can share common mental models about competition, survival, users, and other important aspects of decision making.
Action Learning	A continuous process of learning and reflection that happens with the support of a group or set of colleagues, working on real issues, with the intention of getting things done (McGill and Brockbank, 2004).	*Capture:* As learning institutions, libraries should support action learning for skill improvement, development of learning and knowledge sharing.
Ad Hoc Sessions	Formed to address a particular issue based on a member's call for help or other informal employee interactions.	*Capture:* Ad hoc, informal interactions among employees or between staff and users are crucial in project success, including in digital library projects.
After action review (AAR)	A technique to evaluate and capture lessons learned upon completion of a project.	*Capture:* AAR can be carried out at the end of digitization, library automation or other projects or activities. It helps to make 'tacit' knowledge 'explicit'.
Brainstorming A	A simple way to help a group of people generate new and unusual ideas.	*Creation:* Useful for gaining insight on patrons, ways to create innovative library services and to reward library employees for knowledge capture.
Guest speakers	Presents an opportunity to bring a fresh perspective or point of view – seminar or workshop.	*Capture:* The library community meets at regular intervals. Inviting guest speakers leads to tacit knowledge exchange.

Knowledge exchange/ Exit interviews	A structured process to capture an individual's knowledge, experiences and contacts before they move on.	*Capture:* Works well when there is risk of losing knowledge because of a staff member leaving an organisation or a team or project, and when hiring interns.
Knowledge café	A way to have a group discussion, to reflect, and to develop and share any thoughts/insights that will emerge, in a non-confrontational way.	*Creation:* These are about learning, bringing users together to listen and participate in open and creative conversations on topics that interest them. They help focus the library's knowledge, strengthen its networks, help a Community of Practice to get started, and to regularize knowledge sharing.
Knowledge marketplace	Could be seen as a 'dating service' for knowledge. It identifies what people know and what they need to know on a particular subject, then connects them appropriately.	*Capture:* It facilitates events or technology platforms to enable connections between library experts who have identified gaps in their knowledge in library areas, and those who have relevant knowledge and expertise which they can share.
Learning and idea capture / learning from others	A key aspect of KM, at the personal and team levels is to more 'collectively and systematically' capture the learning and ideas that are taking place.	*Capture:* Libraries can do this to be more creative, generate more ideas, learn faster, and turn its new learning into better knowledge to share, apply, and exploit.
Learning History	Learning histories (Roth and Kleiner, 2000) are useful in capturing tacit knowledge, especially in group settings.	*Capture:* It could serve to describe what happened, why it happened, how the library reacted, and what current library members should learn from this experience. These insights will help increase the library's reflective capacity.
Peer Assist	Direct knowledge transfer from individuals to others.	*Acquisition or sourcing:* It is used by a project team to solicit assistance from peers and subject matter experts from those in the library field regarding a significant issue the team is facing.
Road maps	Problem solving meetings that are scheduled, convened, and follow an agenda.	*Capture:* Helps libraries solve day-to-day problems in a public forum between librarians, users and management; often leads to the development of guidelines/ standards for continuous process/service improvement.

Table 2.2.2 Technology Tools (knowledge creation and capture)

Technology category	What it does?	Tool name	Application for KM in libraries
Co-browsing; Screen sharing; Remote support	2 or more people browsing the web at the same time; helping another person situated remotely by accessing his/her screen	Firefly, GoInstant, LiveLook, Skype screen sharing, GoToMeeting, TeamViewer, Join.me, Netviewer, Twiddla	*Acquisition or sourcing:* E.g. Join.me is used by librarians to help patrons resolve their password and login issues, to demonstrate search strategies, or to problems downloading pdfs.
Collaborative visual reviewing	Instead of emailing different versions of a document back and forth, team members can visually review documents, and all comment on a single read-only copy online.	A.nnotate, Diigo, Uptogo, ConceptShare, Creately, Review Studio (former Cozimo), Notable, GroupZap, Google Drive, PDF-XChange Viewer/Editor (annotate PDFs)	*Compilation or capture:* E.g. Diigo helps in research, sharing and collaboration in many library activities.
Collaborative writing	Projects where written works are created by multiple people together (collaboratively) rather than individually.	Mixedlnk, Wridea, Editorially, Draft, Google Docs/Drive	*Creation:* Help increase efficiency in creating storing, sharing document, bookmarks and citations. E.g. Google Docs/Drive can help library staff collaborate.
Document sharing - wikis	Helps to *create* and *share* work online and access *documents* from anywhere.	Wikis, Pbwiki, Wikispaces, Google Docs/Drive, Scribd, Issuu, Docstoc, MS SharePoint, Typewith.me	*Creation:* Wikis can be used by library staff to archive documents, and have places where multiple employees could upload/update.
Knowledge community /	Websites for profiling based on	Quora, K-comm.tk (Agarwal and Poo,	*Capture:* E.g. K-Comm helps capture the tacit knowledge held by individual library

profile capturing	expertise, and/or answering questions posed by visitors	2008; Lek, Poo and Agarwal, 2009), Yahoo Answers, Wiki Answers	employees in various domains – from the sublime to the mundane. Helps provide a sense of community where everyone is an expert.
Mindmapping and diagramming	A diagram used to visually outline information.	Freemind, The Brain, Mind42, XMind, Webspiration, Bubbl, Mindmeister, Mindjet, MS Visio	*Capture:* Useful for libraries to developing maps that chart information, thought processes, library's maps, contact information, meeting notes, project planning, SWOT analysis and future plans.
Social content	Helps the internet community tag content in websites, share metadata, and organize web links.	Del.icio.us, Blog, RSS, Tagging (Folksonomy), Diig, Diigo, StumbleUpon	*Acquisition or sourcing, and organization:* E.g. Delicious can help find other librarians/folks interested in the same knowledge field, libraries and discover their library-related links (add www.ala.org as one of your links, then find other people who are ALA fans).
Video recording	Useful for recording and editing video sessions of interviews, talks and presentations.	Video camera, Tripod, Video editing (Pinnacle Studio, Adobe Premiere Elements, Lightworks)	*Capture:* Libraries can record interviews of employees that are leaving, as well as talks and sessions held.
White boarding	Placement of shared files on an on-screen shared notebook or whiteboard.	Skrbl, Vyew, CoSketch Groupboard, Conceptboard	*Creation:* With collaborative features such as white boarding, desktop sharing, recording and video, e.g. Groupboard can be used to teach remote library members basic Internet and computer skills, while engaging participants with interactive lessons.

Cycle 2: Sharing and Dissemination

Table 2.2.3 Non-IT Tools (knowledge sharing and dissemination)

Non-IT methods and tools	What it does?	Application for KM in Libraries
Embed KM in organizational HR	Encourages KM behaviors and overall cultural change. Appropriate rewards and incentives are put in place for knowledge sharing behavior within ALL roles.	Library staff are rewarded to share e.g. incentivizing finding and adapting solutions from out with the library
Collaborative Physical Workspace	A place where human interactions such as face-to-face discussion, dialogues, etc. take place.	Information commons and learning commons are collaborative spaces within the library that go beyond the interactions in the reference and circulation desks. Three levels of interactions need to be facilitated: 1) librarian-patron; 2) librarian-librarian; and 3) patron-patron.
Community of Practice	A group of people who share a common interest working together over an extended period to explore ways of working in a specific area of knowledge.	Librarians often exhibit different levels of expertise. If librarians interact to share their knowledge within a community of practice, then that practice becomes more effective for the entire community.
Directory of experts e.g. Yellow pages, skill mining	Communities connect people. These connections are often used to develop yellow pages or an expertise location system.	An expertise directory provides a map to subject matter experts in various fields of the library.
Social Network Analysis (SNA) / Sociograms	Organizational networks and sociograms help map the flow of knowledge in an organization.	Using SNA, libraries can map relationships between people to identify knowledge flows: Who do people seek information and knowledge from? Who do they share their knowledge with?
Storytelling	Conveying events in words, images and sounds, often by improvisation or embellishment; useful for sharing experiential and tacit knowledge.	Libraries can use structured sessions to elicit stories of experience, and share knowledge of lessons learned and best practices pertaining to specific tasks or scenarios.

Table 2.2.4 Technology Tools (knowledge sharing and dissemination)

Technology category	What it does?	Tool name	Application for KM in Libraries
File sharing	Distributing or providing access to information stored digitally as files.	Dropbox, Skydox, clip2net, MediaFire,4shared, Google Drive, SkyDrive, box.com	E.g. Libraries could use Dropbox or Google Drive to organize and share files pertaining to meetings or committee work. They could also assign different file permissions and make folders transparent outside a committee.
Group communication / private social network for the organization	A software platform that implements some form of group communication; teams can connect online.	Yammer, Socialcast, Teambox, Hipchat, Chatter, Socialcast, Everyme, Nextt, Ning, Groupsite, Meetup	E.g. Socialcast or Ning helps library teams (even when dispersed geographically) to interact socially (less formal than email) by making knowledge and updates accessible to their peers through a news feed. They can also build their own communities.
Instant Messaging / Chat	Real-time text transmission over the Internet.	Adium, Pidgin, Meebo, Yahoo, Windows Live, eBuddy, Google Talk, Trillian, Digsby, Nimbuzz; Todaysmeet (backchanneling)	E.g. Many libraries are using Meebo as a KM tool for reference services.
Intranet / Portal	An internal computer network to share information, operational systems, or computing services within an organization.	Igloo, Interact-Intranet, Moxie software, Podio, X-Wiki	Many studies lists intranet among the most effective KM tools for libraries. Igloo, e.g., is a modern intranet that helps bring together content and conversation.
Large audience webinars – 100+ participants	A web-based seminar, lecture, presentation or workshop given over the web using web presentation tools.	GatherPlace, Adobe Connect, GoToWebinar, OmNovia, BigMarker	E.g. GoToWebinar can be used by librarians to disseminate best practices, or to update their skills by participating in webinars offered by others without leaving their work desks.

Social networking	Platform to build social networks or relations among people who share interests, activities, backgrounds or real-life connections.	Facebook, Twitter, LinkedIn, Google+, Myspace, Academia, ResearchGate, CiteULike	Libraries need to have a presence in Facebook and Twitter to reach out to their patrons.
Video conferencing	Allows two or more people in different locations to communicate and collaborate visually.	GoToMeeting, Click Meeting, Skype, Adobe Connect, OoVoo, Goober, Google Hangouts.	E.g. GoToMeeting can be used by libraries to have discussions or presentations of up to 26 people.
Virtual 3D immersive collaboration	Collaboration between virtual teams via technology-mediated communication, and using personalized avatars.	SecondLife, Tixeo, I-maginer, Teleplace	Many libraries have presence in SecondLife. Libraries can use it to provide a virtual tool of their facilities.
Audio conferencing using Voice-over-IP (VoIP)	Works similar to a traditional conference call using analog phones.	Infinite Conferencing, WebEx, Conference Calling, OoVoo, AccuConference (see reviews at TopTenReviews, n.d.), Google Talk, Voxox, Skype	Libraries can use ooVoo, e.g. to communicate with colleagues across locations (on best-practices such as digitizing an oversized rare book or any other topic), or to record a reference interview to improve user-experience.
Web conferencing	Allows conferencing events to be shared with remote locations.	Infinite conference, InterCall, Readytalk, GoToMeeting, iLinc	E.g. ReadyTalk facilitates collaboration and sharing with external librarians or partners. It provides recording and customization options for international library conferences.
Web/multimedia presenting	Helps create and share presentation online.	SlideShare, SlideRocket, Prezi, Empressr, VoiceThread, Zoho Show	E.g. VoiceThread allows a library to share materials with patrons, and allowing them to comment in voice/video/text to foster a sense of community.

Cycle 3: Application and Use

Table 2.2.5 Non-IT Tools (knowledge application and use)

Non-IT methods and tools	What it does?	Application for KM in Libraries
Cognitive Styles and Myers-Briggs Type Indicator (MBTI)	Personality assessment test for employees to find out their personality type. Individual personalities affect the way people acquire and apply knowledge.	Library staff can understand and better predict their personal preferences and behavior when accessing and using information.
Knowledge audit	Understanding the knowledge environment of an organization or project to identify and deal with knowledge gaps.	For continuous improvement, libraries need to understand the gap in their desired and existing knowledge.
Personalization and Profiling	Using continually-adjusted user profiles to match content or services to individuals.	Rather than one-size-fits-all library websites, users can be provided with personalization and profiling options.
Taxonomy	Helps organize information, documents, and libraries in a consistent manner.	Many libraries organize their knowledge assets using taxonomies to aid in effective navigation and retrieval.
Learning Reviews	Used by a project team to aid team and individual learning during the work process.	Team members working on library projects can continuously learn while carrying out the project.

Table 2.2.6 Technology Tools (knowledge application and use)

Technology category	What it does?	Tool name	Application for KM in Libraries
Content management	Creating solutions to manage all content created by the organization/library	WordPress, Drupal, Joomla, Plone, MS Sharepoint Server, Squiz Matrix (see other tools at CMS Critic, 2013)	Libraries are adopting Drupal, WordPress, Joomla or Plone for easy content management.
Event scheduling	Finding a common time when everyone can make it; carried out when planning an event	Google Calendar, Doodle, Genbook, TimeToMeet, Appointment-plus, MeetingMaker, EventBrite	E.g. Doodle helps in finding a suitable time for an event (meeting, conference, trip, etc.)
Expertise locator	Connecting people with knowledge needs to experts.	Who's who, LinkedIn, Science Citation Index	Useful to librarians as knowing 'who knows what' is often more valuable than knowing 'how to do'.
Project management	Plan, organize, and manage resource pools and develop resource estimates.	Basecamp, Freedcamp Todoyu, Clarizen, Genius project, AtTask, Project Insight, Daptive PPM, Tenrox, Project manager	Useful for projects such as creating a digital library, creating a multi-subject reference guide, preparing for teen reading week, etc.
Work grouping / team collaboration workspaces	Groups of users can easily access a set of related sheets, reports, and templates.	Smartsheet, AutoCAD, Wizehive, WebOffice, Onehub, Ubidesk, IBM Lotus Quickr, Teamlab	E.g. Ubidesk is fast and secure, and provides tools for knowledge creation, collaboration and sharing.

Appendix B

Institutional Review Board (IRB) Approval:

For the present study, all e-mail interviews as well as survey questionnaires were checked by the IRB Simmons College, USA. Before conducting these surveys and interviews, we had sent out this to the IRB committee for approval. Here, below we presented the entire format for this study and others are presented only the questionnaire.

Project name: Library adoption of knowledge management using social media: A new paradigm for libraries

Project description

KM plays an important role in any organization by facilitating the capture, storage, transformation and dissemination of information. In a knowledge-based organization, "errors and mistakes are embraced as experiential learning that produces lessons learned and best practices—knowledge that can be recycled to increase the wealth and performance of the overall enterprise". The library's primary functions are to act as a knowledge repository and an agent for the dissemination of knowledge. Until recently, however, these roles have been fulfilled with little user involvement. With the advent of social media, the relationship between the library, professionals and users has dramatically changed. In a digital environment, knowledge can be transferred in the form of many knowledge-based services and products including e-mail, social media, websites, online discussion forums, video-conferencing and collaboration tools etc. So, librarians using these tools can be able to share their knowledge with their colleagues in order to meet their users' needs faster and more efficiently. Knowledge created by the librarians in the library (internally generated) needs to be organized and managed. Here, social media could play important role for organizing individual, as well as, institutional knowledge.

Sources of Research Materials

The sources of research materials will consist of the filled out questionnaire (based on librarian's perceptions about social media and KM). The sample will necessarily be a purposive sample based on the email addresses of librarians obtained. It would include academic librarians (contacted over email) in a few countries such as the US, Canada, Australia, UK, and library professional mailing lists.

Risks

No risks to the subjects are anticipated. However, there's a possibility that there is a possible risk of discomfort for participants when answering the questions. For example, they may or may not be comfortable with the technology or think that their colleagues are not.

Protection against Risks

In order to address the possible discomfort, the following text is included in the introductory part of the survey:

"If you feel uncomfortable with answering any of the survey questions, you can move to the next question, take a break, or stop completing the survey." The top part of the questionnaire also makes it clear that participation is voluntary, and that filling out of the questionnaire implies consent. In designing the web-based form using Google drive, none of the questions will be made compulsory. Thus, a participant can choose not to answer a question that s/he is not comfortable with.

The personally identifiable information gathered in the survey are town name, job description, gender, education, and library location (but not names, emails or library names). Further, library practitioners' privacy and confidentiality will be strictly protected. No respondents' name or identity will be connected with any data or comments they might provide, and no names will be used in any article or report ensuing from the study.

Benefits

The indirect benefits to participants are developing awareness about knowledge management, even as they fill out the questionnaire. Knowing the perceptions of librarians about KM is the first step in determining whether academic libraries are ready to adopt KM or not. The process of filling out the questionnaire itself might prompt libraries to start thinking about KM seriously. Such integration of KM through social media should offer library and library practitioners not only qualitative services to the users but also help to build effective library system.

Informed Consent materials – Email to participants

The text of the email will read thus:

Name of person

Name of library

Library location

Dear <>,

I'm a Ph.D. student at the Japan Advanced Institute of Science and Technology, Ishikawa, Japan. I am conducting a survey study to determine the perceptions of librarians regarding Knowledge Management (KM) and the degree to which the library is ready to adopt KM using social media.

We'd be obliged if you could kindly participate in the survey by clicking on the link below. It should take you about 15 minutes:

http://tinyurl.com/nfc754m

Md. Anwarul Islam
PhD Student, School of Knowledge Science,
Japan Institute of Science and Technology (JAIST), Ishikawa, Japan
anwar@jaist.ac.jp

Informed Consent materials – Introductory part of the Questionnaire on informed consent

This study seeks to determine librarian's perceptions about Knowledge Management (KM) and the degree to which the library is ready to adopt KM using social media. This is purely an academic research. You should take about 15 minutes to complete the survey. Kindly fill all parts of the questionnaire carefully. We believe that participating in this research project presents no more than minimal risk to you. If you feel uncomfortable with answering any of the survey questions, you can move to the next question, take a break, or stop completing the survey. Participation in this survey is voluntary and completely up to you. Filling out the survey implies that you provide us an informed consent to use the data you provide in this questionnaire for research purposes. Your privacy and confidentiality will be strictly protected. All data gathered will be stored securely by the researchers. Potentially identifying information such as your name or name of library will NOT be collected or used. Only aggregate data will be used in the survey. Please feel free to ask any questions you may have about the study or about your rights as a research subject. If other questions occur to you later, you may get in touch with the investigator Md. Anwarul Islam (PhD Student, School of Knowledge Science, JAIST, Japan) at anwar@jaist.ac.jp +81 90283 13048, his research supervisor Professor Mitsuru Ikeda (School of

Knowledge Science, JAIST) at ikeda@jaist.ac.jp +81 761 511735. If at any time during or after the study, you would like to discuss the study or your research rights with someone who is not associated with the research study, you may contact the Human Protections Administrator through the Office of Sponsored Programs at Simmons College, Boston, MA, USA at +1 617 521 2415.

Questions

Please answer the following with respect to the library you work for:

i. No. of employees in your library: ☐1-19 ☐ 20-49 ☐ 50-100 ☐ 101–500 ☐ >500

ii. Library location_____ (city) _____ (country)

iii. Your work role/position _____

iv. Department working in _____

v. No. of years in the library field _____

Please circle the most appropriate answers below:

Comfort with social media (blogs, wikis, social networking sites)	1=strongly disagree						7=strongly agree
1. I feel comfortable using social media technologies.	1	2	3	4	5	6	7
2. I am able to clearly communicate using social media technologies.	1	2	3	4	5	6	7
3. I consider myself a heavy user of social media technologies.	1	2	3	4	5	6	7
4. I think most of my library colleagues are comfortable with social media technologies.	1	2	3	4	5	6	7
5. My library communicates with users using social media tools.	1	2	3	4	5	6	7

Please answer Q. 6 and Q.7 if you agree with Q.5, else skip to Q.8.

6. How long has social media been around in your library?

☐ < 1 year ☐ 1 year to less than 2 years ☐ 2 years to less than 3 years ☐ 3-5 years ☐ More than 5 years

7. In what forms have social media been implemented in your library? (answer 1 or more)

[ ] Instant messaging [ ] Blog [ ] RSS [ ] Wikis [ ] Intranet [ ] Social bookmarking

[ ] Social networking (Facebook, twitter, LinkedIn, Academia) [ ] others _____(please specify)

8. Which social media tools do you use most frequently

[ ] Instant messaging [ ] Blog [ ] RSS [ ] Wikis [ ] Intranet [ ] Social book marking

[ ] Social networking (Facebook, twitter, LinkedIn, Academia)[ ] Others _____(please specify)

[ ] I am not much into the social media stuff

KM Awareness	1 = Strongly disagree						7= strongly agree
9. I had never heard of KM until now.	1	2	3	4	5	6	7
10. I have heard of KM but am not exactly sure of the concept.	1	2	3	4	5	6	7
11. I have heard the term Knowledge Management but it has been a challenge for me to understand what it is all about.	1	2	3	4	5	6	7
12. I have good knowledge about KM.	1	2	3	4	5	6	7

13. How does your library retain the knowledge of people who leave or resign from the library?

    ----

14. How does your library provide organizational knowledge to new employees?

    _____

Usefulness of KM using Social media for libraries	1 = Strongly disagree						7= strongly agree
Implementing KM using social media in libraries will:							
15. Make library services more effective.	1	2	3	4	5	6	7
16. Make the library staff feel more valued.	1	2	3	4	5	6	7
17. Lead to increase in productivity.	1	2	3	4	5	6	7
18. Help to create new knowledge in libraries.	1	2	3	4	5	6	7
19. Improve users' satisfaction in libraries	1	2	3	4	5	6	7
20. Make my life at work easier.	1	2	3	4	5	6	7
21. Be useful for libraries.	1	2	3	4	5	6	7

Library readiness to adopt KM	1 = Strongly disagree						7 = strongly agree
22. In my library, we always ask each other for work-related knowledge.	1	2	3	4	5	6	7
23. Most colleagues in my organization are ready to share their knowledge.	1	2	3	4	5	6	7
24. I think my library has a knowledge sharing culture.	1	2	3	4	5	6	7
25. The top management of the library is always open to new ideas.	1	2	3	4	5	6	7
26. My library usually gets the money for new initiatives it wants to take up.	1	2	3	4	5	6	7
27. In my library, it takes a very long time to get any new initiative approved.	1	2	3	4	5	6	7
28. My library is well supported in its technology.	1	2	3	4	5	6	7

29. Once they understand the value of KM, library staff will be ready to invest time and effort for KM in our library.	1	2	3	4	5	6	7
30. If my library were to implement KM, I think we have all the right things in place.	1	2	3	4	5	6	7

Likelihood of library adoption of KM using social media	1 = Strongly disagree						7 = strongly agree
31. I expect that I will apply social media based KM in my library-based work in the future.	1	2	3	4	5	6	7
32. I am likely to recommend to my library to adopt KM using social media in the near future.	1	2	3	4	5	6	7
33. It is likely that my library will adopt KM using social media in the short term.	1	2	3	4	5	6	7
34. It is likely that my library will adopt KM using social media in the longer term.	1	2	3	4	5	6	7
35. It is likely that my library will adopt KM using social media.	1	2	3	4	5	6	7

Your personal information

Gender: ☐ Male ☐ Female ☐ Other ☐ Prefer not to say Birth Year: 19 _____

Education: ☐ Ph.D. ☐ Master's degree ☐ Bachelor's degree ☐ Diploma ☐ Others

Thank you for your participation!

Appendix C

Project tile: How do academic libraries work with their users to co-create value for service innovation? A qualitative survey.

Questionnaire

Value co-creation

Value co-creation may be defined as the joint, collaborative creation of value between the library and the user, where a dialogical, personalized user library interaction plays a major role. While value creation is unidirectional (initiated by the library), value co-creation is bidirectional (created jointly by the library and the user). Value co-creation can have a profound impact on innovation of new services in the library.

1. What services does your library provide that you believe is of value to your users?

---

2. How does your library learn about the user (both current and potential users) and his/her needs? (Knowledge about users)

---

3. What mechanisms does the library employ to disseminate relevant information to its users? (Knowledge for users)

---

4. How does your library make use of the knowledge that your users possess? (Knowledge from users)

---

5. How do you ensure user library interaction? What are the mechanisms by which you engage your users in a two ways dialogue? What strategies do you employ to foster a sense of community among your users?

---

6. Are there areas in which your library works jointly with your users to co-create value or to design services and offerings? Please elaborate,

---

7. What do you think are the risks of users participating with the library in value co-creation?

---

8. What do you think are the benefits? Do you think involving the user in value co-creation helps in the innovation of new services in the library?

---

9. How are you bringing about innovation in your library? Which services are the most

innovative in your library?

---

10. What do you think is the role or contribution of users in designing the services you mention above?

Demographic information

Gender: ☐ Male ☐ Female

Birth year

19 ☐

Education: ☐ PhD ☐ Master's degree ☐ Bachelor's degree ☐ Diploma ☐ Others

Number of employees in your library

☐ 1-19
☐ 20-49
☐ 50-100
☐ 101-500
☐ >500

Library location (City & country)

Your work role/position/designation

Number of years in library field

Thank you for your participation!

Appendix D

Project title: Effect of Knowledge Management on Service Innovation in Academic Libraries

Questionnaire

Please answer the following with respect to the library you work for:

i. No. of employees in your library: • 1-19 • 20-49 • 50-100 • 101–500 • >500
ii. Library location_____ (city) _____ (country)
iii. Your work role/position _____
iv. Department working in _____
v. No. of years in the library field _____

Please circle the most appropriate answers below:

Service Innovation (coming up with new library services or making continuous enhancements to existing services)	1=strongly disagree 5 =Strongly agree				
Answer the following questions with respect to the library you work at.					
1. We always focus on ways to satisfy user needs.	1	2	3	4	5
2. We provide a user-friendly interface for our services. e.g., OPAC, website, etc.,	1	2	3	4	5
3. We provide an interface through mobile apps or mobile website	1	2	3	4	5
4. We provide an effective presence in social media (Facebook, Twitter, etc.)	1	2	3	4	5
5. We have an excellent service delivery system (automated circulation, inter-library loan, online reference, etc.)	1	2	3	4	5
6. We use state-of-the-art technology (RFID, QR code, digital library, etc.).	1	2	3	4	5
7. We are always quick in coming up with novel ideas or services for library users.	1	2	3	4	5
8. Our services are often perceived as very novel by our users.	1	2	3	4	5

Knowledge capture/creation The following questions focus on the way employee (and user) knowledge is captured in the library or the way new knowledge is created. **By employee interaction** = interacting amongst ourselves (library employees – reference, circulation, etc.) **By user feedback** = getting user feedback and making changes accordingly (creating value) **By co-creating with user** = involving the user / working with the user in decision making (co-creating value)					
We spend a lot of time on learning; a) by interacting amongst ourselves (library employees – reference, circulation, etc.) b) by getting user feedback and making changes accordingly (creating value) c) by working with the user in decision-making (co-creating value)	1=strongly disagree 5 =Strongly agree				
9. … about the needs of our users	1	2	3	4	5
10. … about innovation possibilities (new ideas, suggestions or solutions for the well-being or users)	1	2	3	4	5
11. … about what the concept of service means for the library and its users	1	2	3	4	5
12. … about what the user interface should be like (physical or electronic)	1	2	3	4	5
13. … about the service delivery system that we can have (automated circulation, inter-library loan, online reference, etc.)	1	2	3	4	5
14. … about the technological options / tools we can adopt	1	2	3	4	5
15. … about the barriers to innovation that we face	1	2	3	4	5

16. Please provide any examples of the way in which you "co-create with the user" (involve the user/ work with the user in decision making) write N/A if not applicable.

_____

Knowledge sharing/transfer	1=strongly disagree 5 =Strongly agree				
In our library:					
17. … people frequently share knowledge based on their experience.	1	2	3	4	5
18. … informal dialogues, face-to-face meeting and group discussion are used for knowledge sharing.	1	2	3	4	5
19. … people frequently share codified knowledge like existing reports, manuals and official documents with their colleagues.	1	2	3	4	5
20. … we capture best practices and lessons learned and make them available to all other employees.	1	2	3	4	5

21. (a-d) … people frequently share the knowledge they're gathered on a) user needs b) innovation possibilities c) barriers to innovation d) other areas	1	2	3	4	5
22. … people share the knowledge relevant for users (e.g. our products, services and other issues) with them.	1	2	3	4	5

Knowledge application/use	1=strongly disagree 5 =Strongly agree				
In our library:					
23. There is strong emphasis on using employee knowledge for enhancing library service activities.	1	2	3	4	5
24. The management is always supportive of using/applying creative or innovative thinking for our services.					
People spend a lot of time analyzing and synthesizing the knowledge we gather:					
25. ……from our users on their needs	1	2	3	4	5
26. …..from our employees on barriers to innovation	1	2	3	4	5
27. …..from our employees on innovation possibilities	1	2	3	4	5
28. …..the overall knowledge we gather from employees and users	1	2	3	4	5
Once we capture/create new knowledge or ideas;					
29. ….we apply them for the development of library services.	1	2	3	4	5
30. …..we come up with ways to overcome barriers to innovation	1	2	3	4	5

Your personal information

Gender: ☐ Male ☐ Female ☐ Other ☐ Prefer not to say Birth Year: 19 _____

Education: ☐ Ph.D. ☐ Master's degree ☐ Bachelor's degree ☐ Diploma ☐ Others _____ (specify)

Thank you for your participation!