

Analysis of the Implementation of an Institutional Repository: A Case Study of Dedan Kimathi University of Technology, Kenya

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ABSTRACT

Knowledge is imperative for development. The management of their knowledge materials is considered of paramount importance to the competitiveness of universities. This can be achieved through setting up an institutional repository. Therefore, the main objective of this study was to analyze the implementation of an institutional repository focusing on the case of Dedan Kimathi University of Technology. This was a case study in which data was collected using interview schedules and questionnaires with open and close ended questions. The sample population size for this study was determined using Yamane's simplified formula. Questionnaire respondents were selected through stratified random sampling. Interview respondents were selected using purposive sampling. A pilot study was carried out at Jomo Kenyatta University of Agriculture and Technology to assess the validity and reliability of the research instruments. The quantitative data analysis was carried out descriptively using percentages and weighted averages with Microsoft Excel 2007 as a tool. Qualitative data analysis was limited to content analysis using Microsoft Word 2007 as a tool. From the findings, it was observed that there is interdependence between the management of knowledge and implementation of the institutional repository. Although there are challenges that are facing the University's institutional repository that need to be addressed for it to fully enjoy the services offered by an institutional repository.

KEYWORDS: Knowledge management, Institutional repository, DeKUT

1. INTRODUCTION

1.1 Background to the Study

Through the practices of teaching, research and innovation academic institutions create knowledge for the betterment of society. Faculty and research staff in these academic institutions develops research materials and scholarly publications. These research materials and scholarly publications which are knowledge intensive can be captured and maintained in an institutional repository, so that it enables knowledge sharing and learning. Conventionally, scholarly publishers and institutional libraries served complementary roles in facilitating scholarly

communication and preserving an institution's intellectual property. However, there has been a shift in the economic, market and technological foundations that sustained this symbiotic publisher-library-market relationship. Several factors like technological change, significant increases in the overall volume of research resulting in information explosion (McKinsey Global Institute, 2011), increasing dissatisfaction especially on the part of librarians with traditional print and increasing uncertainty over who will handle the preservation and archiving of digital scholarly research material, are forcing change in the structure of scholarly communication (Crow, 2002). All these factors have evolved and combined to create new expectations in the academic community for the production, distribution, and interchange of scholarly communications and to force a rethinking of the relative roles of authors, librarians, and publishers as well as the possibility of entirely new actors who will emerge as the publishing model evolves.

1.2 Dedan Kimathi University of Technology

Dedan Kimathi University of Technology is located 6 Km from Nyeri Town. Nyeri town is 153 Km to the north of Nairobi, the capital city of Kenya. It was started as a community project in 1972. The Institution was upgraded to a University College status in 2007. On 14th December, 2012 it was upgraded to full University status after being granted a charter and renamed Dedan Kimathi University of Technology. It is also popularly known by its abbreviation DeKUT.

1.3 Statement of the Problem

The results of proceedings of the 14th International Symposium on Electronic Theses and Dissertations held at Cape Town, South Africa, in September 2011 indicate that 65% of Kenya Library and Information Service Consortium (KLISC) member institutions in Kenya have already embraced the institutional repository concept. The main purpose of them embracing this movement being knowledge dissemination. However, how do other knowledge management practices, for instance, knowledge creation and capture; sharing and refinement; and storage and retrieval benefit from institutional repositories? Therefore, the research problem was to analyze the implementation of an institutional repository, with Dedan Kimathi University of Technology being the case study. It also explored the root causes that hinder the acceptance of using institutional repository in knowledge management; highlighting remedies that can be deployed to address these challenges.

1.4 Research Objectives

The main objective of this study was analyze the implementation of an institutional repository. The specific objectives of this study were;

- i. To analyze the method of building the institutional repository at Dedan Kimathi University of Technology.
- ii. To investigate the knowledge management challenges that the University's institutional repository faces.
- iii. To investigate the interdependence of knowledge management and the institutional repository at Dedan Kimathi University of Technology

2. LITERATURE REVIEW

2.1 Current Trends in Institutional Repositories

The development of repositories follows the development of the Internet and the World Wide Web. The first discipline archive, begun by Paul Ginsberg, launched in 1991 was the physics repository now known as arXiv. It started as a server for articles on theoretical physics. As the Internet developed, the archive grew and expanded to include other areas of physics, math, and computer science. Other early repositories included EconPapers, CogPrints, and PubMed Central (Giesecke, 2011).

In 1999, the framework for developing interoperable archives was developed and became the Open Archive Initiative. In 2001, the University of Southampton launched EPrints, a software package supporting open access deposit of research materials. Massachusetts Institute of Technology (MIT) followed in 2002 with the launch of DSpace to manage self-archiving of research articles by MIT faculty. Commercial products and additional open access systems followed as libraries and universities became more interested in the idea of creating repositories for faculty work (Thornley, 2006)). In 2003 the Digital Academic Repositories project in the Netherlands was initiated by the SURF foundation and concluded in 2006. It succeeded in establishing the institutional repositories at each of the universities in the Netherlands and the national portal, currently online under the name Narcis. Joint Information Systems Committee followed in 2005 in the UK with a number of cross institution repository related initiatives. Under the umbrella of these initiatives, services such as OpenDOAR emerged.

The directory of Open Access Repositories service provides a quality assured listing of open access repositories around the world. It shows that the growth of institutional repositories has been very remarkable in developed countries as well as some developing countries like Brazil, India and South Africa (Christian, 2008). Not much has been heard in Africa south of the Sahara. This is emphasized in a study by Chisenga (2006) who states that several of the research output from Africa exists in the form of unpublished information and knowledge resources.

According to Ezema (2013) the local knowledge materials generated by researchers on daily basis need to be made visible to the global world through proper management and publication in institutional repositories. It is for this reason that in July 2011, the president of Kenya launched Kenya Open Data. This initiative attributed to rigorous training and sensitization done in 2009 and 2010 by Kenya Library and Information Service Consortium to its members to embrace the IR concept for knowledge management. This aspect has been demonstrated in a study by Wasike (2013) who assess the status of open access institutional repositories in Kenyan university libraries. In his study, Jomo Kenyatta University of Agriculture and Technology adopted an open access policy as part of the University's strategic plan of 2009-2012. This strategic plan was to invest and engage in productive collaborations with national and international institutions and industry to enhance knowledge creation and exchange. In relation to this, Vlachaki and Urquhart (2009) stated that for any university worthy of its goals, research is one of the major pillars of growth. This was exemplified by the University of Nairobi which put research as its key driving pillar after teaching. In its collaboration with electronic information for libraries (EIFL) it conducted a one day workshop to sensitize the university management about open access and IR.

Therefore, this study analyzed the implementation of an institutional repositories in Kenya; taking up a case of DeKUT. With the aim that Kenyan university's ambitions to become Africa's knowledge resource hub is achieved.

2.2 Knowledge Management in Universities

Rowley (2000) argues that universities are also in the knowledge business, since they are involved in knowledge creation, knowledge dissemination and learning. Kidwell, Linde and Johnson (2000), who stress that using knowledge management techniques and technologies in universities is as vital as it is in the corporate sector, identify some of the benefits which might accrue to universities if they apply knowledge management techniques. Such benefits include enhanced decision making capabilities, reduced production cycle development (such as curriculum development and research), and improved academic and administrative services and related costs.

According to Davenport and Prusak (1998), knowledge management is concerned with the exploitation and development of the knowledge assets of an organization, with the view to furthering organizational objectives. In view of such thinking, therefore, universities, whose main preoccupation is to ensure that knowledge is shared among lecturers, researchers and students, should be the leading advocates of knowledge management, as their objectives so clearly fall within the realm of knowledge management

Universities operate in a knowledge bound context within a global context, in which both increased competition for students and funding, as well as the need to offer best-quality education to clients set the parameters for knowledge management. Such a scenario, coupled with the need to obtain sufficiently high international ratings as academic institutions, dictates that universities manage their knowledge resources better than they did in the past, or else risk becoming irrelevant. The 2002 World Bank report titled *Constructing Knowledge Societies: New Challenges for Tertiary Education* indicates two central issues which underline the importance of knowledge management in higher education. Firstly, tertiary education is necessary for effective creation, dissemination, and application of knowledge, as well as for building technical and professional capacity. Secondly, both developing countries, as well as those which are in transition, are at risk of being further marginalized in a highly competitive world economy, as their tertiary education systems are not adequately prepared to capitalize on the creation and use of knowledge. In support of such findings, Kumar and Idris (2006) argue that most universities have come to realize that to meet unprecedented demands of knowledge and other ever changing educational needs of a globally competitive society; they must manage their knowledge better. Such improved management of their resources will only be possible if knowledge management is placed high on the agenda of universities.

Universities undoubtedly, have significant opportunities for applying knowledge management practices to support every part of their mission, whether in training, research or consultancy work. As Kidwell et al. (2000) observed that knowledge management should not be treated as a new idea to universities; rather it is the main reason of their existence.

2.3 Interdependence between KM and IRs

We are living in a knowledge society, a society that has dedicated its intellectual and technological assets towards its own future development. The intellectual assets such as datasets, course material, theses, and research papers are visible over the web now as many universities

have set up digital repositories (Hoorens et al., 2008). From the research done by Ismail and Chua, (2005) the universities are no longer just providing knowledge to the students, but also have to manage and share the existing knowledge for future reference. The key concepts of knowledge management processes could be used to help understand the interdependence of knowledge management and institutional repositories.

The current study adopted the knowledge management practices of knowledge creation and capture, knowledge sharing and refinement, information storage and retrieval and knowledge dissemination in keeping with the findings of Filemon Jr (2008). The role of institutional repositories on each of the above mentioned practices.

a. Institutional Repositories towards Knowledge Creation and Capture

Knowledge creation, which is at times referred to as knowledge construction (Demarest, 1997), is considered to be the most important process in knowledge management. Knowledge creation involves developing, or replacing old knowledge with, new knowledge (Nonaka, 1994). In addition, Nonaka and Takeuchi (1995) argue that knowledge creation involves knowledge addition, or the correction of the existing knowledge. In universities, such knowledge creation is made possible by means of research. The institutional repository enables the research to be carried out to create knowledge by offering an avenue for getting research materials. This aspect of an institutional repository is brought out by Bailey (2005) who focuses on the diversity of digital materials contained in the institutional repositories.

b. Institutional Repositories towards Knowledge Sharing and Refinement

In order to achieve better results in the process of knowledge transfer and sharing first it is necessary to refine knowledge. Regarding the life cycle model, knowledge refinement serves as the processes and mechanisms that are used to select, filter, purify and optimize knowledge for inclusion in various storage media, (King, Chung and Haney, 2008). This can be achieved through an institutional repository. It forms as an avenue where researchers can post their grey literature and get views from other researchers in the same field thus enriching their output, hence refinement. It can also be used for knowledge sharing where lecturers can post knowledge materials and where the university scholars can intentionally search for knowledge.

c. Institutional Repositories towards Information Storage and Retrieval

Alavi (2000) asserts that to create new knowledge is not enough; people and organizations simply forget and mechanisms are needed to store acquired knowledge and to retrieve it when needed. Therefore, effective ways to store and organize knowledge have to be found (Grant, 2005). Knowledge which is stored within the organization is often referred to as 'organizational memory' (Stein and Zwass, 1995) and includes physical resources (like written documentation, structured information stored in electronic databases, codified human knowledge stored in expert systems, documented organizational procedures and processes) as well as non-physical sources (knowledge stored in the heads of the employees also referred as individual memory) (Alavi and Leidner, 2001). The organizations should ensure that acquired or shared knowledge is readily accessible to others. This can be achieved through institutional repositories in the universities by storing knowledge in a centralized location with sufficient provisions for easy retrieval.

d. Institutional Repositories towards Knowledge Dissemination

Unless knowledge is effectively disseminated, the development impact of knowledge will remain limited. For knowledge dissemination to be effective it will require the transformation of highly

individualized tacit knowledge into explicit knowledge that can be more widely shared. Publications, presentations, websites and libraries are the most obvious forms of dissemination of knowledge. Participation in external networks, establishing partnerships with other organizations, and creation of knowledge centers are also effective means to disseminate knowledge. The dissemination of knowledge is arguably where most of the knowledge management activities occur. It is also in this sphere that technology is playing a significant role, referring to the use of intelligent agents to customize information delivery, email, data mining, Intranets and Web portals (Liebowitz, 2000). In the universities, libraries play a key role through the provision of high quality knowledge resources. So by use of institutional repositories they will easily disseminate this knowledge.

3. RESEARCH METHODOLOGY

This study adopted a case study research design. The study was carried out at selected campuses of Dedan Kimathi University of Technology namely Main campus, Nyeri town campus and Nairobi CBD centre. A purposive sampling procedure was used to collect data from the interview participants. Stratified random sampling technique was used for questionnaire respondents because the population at DeKUT was not homogenous. The total population at DeKUT was divided into various strata namely the academic, non-academic, students and others where respondents was asked to specify. Computation of the sample size was done using the simplified formula provided by Yamane (1967). When the above formula was applied to the 487 staff members and 4057 students as potential respondents it yielded a sample size of 147 academic staff members, 154 non-academic staff members and 364 students.

Interviews schedules were used to yield qualitative data which was limited to content analysis using Microsoft Word 2007 as a tool. Questionnaires were used to yield quantitative data. In this study quantitative data analysis was descriptive using percentages and weighted averages with Microsoft Excel 2007 as a tool.

4. SUMMARY OF THE FINDINGS

The first objective was stated as follows; To analyze the method of building the institutional repository at Dedan Kimathi University of Technology. Regarding the process of building the institutional repository at the University, the respondents agreed that both technology and people are necessary in order to develop the University's institutional repository. In addition the items can be searched through the University website, at its homepage where there is an option of the Library then the searcher selects the institutional repository to have access to the contents. Further, the respondents indicated that the institutional repository accepts all formats of materials. The materials include academic research papers, books and book chapters, doctoral theses and dissertations, journals and, masters theses and dissertations. Additionally, the manager's respondents concurred that digital rights are maintained by the users being assigned passwords and limited download where a person can't download the whole document. Lastly the success that has been achieved by the University's institutional repository has been described as average meaning that there is still room for improvement.

The second objective was stated as follows; To investigate the knowledge management challenges that the University's institutional repository faces. The findings show that the respondents concurred that there are challenges. This is indicated by a weighted average of 3.78, majority of the respondents to the questionnaire were not sure and agreed that depositing in an

institutional repository adds extra workload for staff. Additionally 32% of the respondents agreed that institutional repositories may breach the confidentiality of data in some research. Further based on the weighted average of 2.96, majority of the respondents disagreed and were not sure that institutional repositories expose more work to plagiarism. Also 32% respondents disagreed that when everyone is required to deposit their research in the institutional repository there will be no competitive advantage in doing so. This finding was in agreement with Ezema (2013) finding that the greatest challenge is the ability of information professionals to bring together the abundant local knowledge resources and make them accessible to global scholarly community.

The third objective was stated as follows; To investigate the interdependence of knowledge management and the institutional repository at Dedan Kimathi University of Technology. The findings indicated that the respondents agreed and were not sure that there is interdependence. This is based on weighted average of 3.74, majority of the respondents agreed and were not sure that the University's institutional repository facilitated the discovery and capture of knowledge. Further 50% of the respondents agreed that the institutional repository eases the transfer of knowledge materials around the University. In addition based on weighted average of 4.36, majority of the respondents agreed that institutional repositories facilitate the storing of knowledge resources for University's wide access. Also 38% of the respondents agreed that the institutional repository speed decision making by facilitating retrieval of knowledge material across the University.

5. Conclusions of the Study

Although a lot of effort in terms of time and money has been put in implementing the Dedan Kimathi University of Technology's institutional repository to ensure that the staff members and students enjoy the benefits that come with the University having an institutional repository, the researcher established that the IR has not been able to achieve all the expected results. For instance, the University has no policy on the management of the institutional repository. The model used for DeKUT's IR is "If you build it, they will come" model from the phrase from the motion picture *Field of Dreams* (Gordon, 1989). Unfortunately this model has been shown to be unattractive due to the low number of deposits of research work.

The researcher has been able to establish through the findings that there is interdependence between the management of knowledge and implementation of the institutional repository. This is because the respondents concurred that the knowledge management processes are facilitated by the services offered by the institutional repository.

However at the same time the respondents indicated that there are challenges that are facing the University's institutional repository. The researcher therefore has been able to conclude that, though there are benefits that the University gains from having its institutional repository there are challenges that need to be addressed for it to fully enjoy the services offered by an IR.

7. Recommendations of the Study

The researcher recommends that the University should have a policy ensuring that peer-reviewed versions of all scholarly articles by faculty members, all research articles and, theses and dissertations are deposited upon acceptance in the University's repository. This policy would represent a vital step toward enhancing scholars' awareness of and participation in deposits,

building a sizeable repository, and adjusting academic systems to this type of innovative scholarly communication.

From the findings, the major challenge indicated by the respondents as depositing in an institutional repository adds extra workload for staff members. The researcher therefore recommends that the University management develop a model that will motivate the members of staff to make deposits to the institutional repository. The model should ensure that the staff members don't view the process as extra workload but also for their growth. They should also put in place measures to ensure their work gains global visibility as an enticement for deposits. Additionally, they should ensure that procedures are put in place to ensure the security of their work.

The researcher recommends that for University management to ensure that all the benefits are accrued by the University building an institutional repository, they should ensure that all new staff members and students are taken through the user's module of the institutional repository. This can be achieved during the orientation process of new staff members and students, which will ensure that all the users of the institutional repository are aware of its existence, and are able to enjoy its services for instance depositing, preserving and downloading.

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