International Journal of Scientific Research and Engineering Development-– Volume 8 Issue 5, Sep-Oct 2025
Available at www.ijsred.com

RESEARCH ARTICLE OPEN ACCESS

Dimensions of applicability of Model for Personal Computer Utilization and Information System Success Model in adoption of institutional repositories: case of Sokoine University of Agriculture and University of Dar es salaam

Musa Kasella Amosi
(Department of Regional Development Planning, Institute of Rural Development Planning, Lake Zone Center Mwanza
E-mail: mamosi@irdp.ac.tz)

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Abstract

This study was conducted to assess dimensions of applicability of Model for Personal Computer Utilization (MPCU) and Information System Success Model (ISSM) at Sokoine University of Agriculture and University of Dar es salaam institutional repositories. They were chosen as guide to study phenomena in relation to adoption of institutional repositories because they contain constructs that are useful for designing and adopting academic institutional repositories. Therefore, the study was conducted to address existing managerial, practical, policy and theoretical gaps in tackling challenges of adoption of academic institutional repositories. Three specific objectives (SO) were to; SO1: Analyze facilitating conditions required for adoption of institutional repository in academic institutions, SO2: Demonstrate measures of institutional repository design and implementation complexities regarding application of MPCU and ISSM models and SO3: Identify long term benefits of the institutional repository through utilization of MPCU and ISSM models in academic institutions. Triangulation methodological approach was designed whereby direct observation, documentary reviews, semi-structured interviews and survey questionnaire methods were devised to collect field data. Analysis was done by using descriptive statistics. The findings indicated that Model for Personal Computer Utilization and Information System Success Model models are useful in the designing and adoption of academic institutional repositories. Furthermore, the findings revealed that the two academic institutional repositories were still facing adoption challenges. This study inform various academic institutional stakeholders to act in different ways in order to alleviate the challenges being faced due to inadequacy in design and implementation of both institutional information systems and open access institutional repositories.

Keywords **— Model for Personal Computer Utilization, Information Systems Success Model, academic information systems, institutional repository adoption, facilitating conditions, complexity, net benefit**

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I: INTRODUCTION

Assessment of dimensions of applicability of models and theories in describing adoption of academic institutional repositories is still lacking clear and adequate literature. The studies that attempt to analyze information systems theories and models in relation to their applicability in the design and implementation of institutional repositories are very rare too. In this study these dimensions are angles of considerations in relation to the subject matter and in this instance of this study they are variables or constructs pertaining to the designing and implementation of institutional repositories.

According to [1], an institutional repository, also referred to as a digital repository or digital commons, is a set of services that a university offers to the members of its community for the management and dissemination of digital materials created by the institution and its community members . [2], defined broadly that, a digital institutional repository could be any collection of digital material defined by the institution; but, given the SPARC s emphasis on scholarly communication, Scholarly Publishing and Academic Resources Coalition (SPARC) limits its definition to scholarly material. In terms of repository goals, SPARC emphasizes that content must be cumulative and perpetual, and open and interoperable.

A model is a simplified representation of a complex system whereby the representation of the real world is reduced to elementary levels and laws [3]. According to [4] theories and models of information systems can be subdivided into five categories; analyzing models, explaining models, prediction models, explaining and predicting models and design and implementation models. The Model for Personal Computer Utilization (MPCU) and Information System Success Model (ISSM) are the models that have direct effects on workability of the information systems ([5] [6]). Designing and action models in the institutional information systems are crucial and ground stones for success of institutional repositories [7]. Adoption of these models in institutional entities has been met with various problems and challenges due to various factors surrounding them. Their variables are made up of constructs which are determinants of the models. Constructs pertaining to MPCU and ISSM are complex in nature and definitions of them are cumbersome [3]. Hence, integration of MPCU and ISSM constructs in a desirable proportion results into a well defined design and implementation information system. MPCU constructs; facilitating conditions, affect towards use, long term consequences, job fit, complexity and social factors in their totality result into PC utilization [8]. In the ISSM, [9] list down information quality, system quality, service quality which in their matrix breed intention to use, use, and user satisfaction as constructs which build-up the model. Intention to use, use and user satisfaction result into net benefits. These two models were chosen because integrated MPCU and ISSM constructs bear a highest proportion of the information system in their functionality because they are more practical than theoretical. The remaining types of information systems supportive models are concerned mainly with planning, behaviors and expectations and are particularly dealing with initial planning of an information system [4]. The question here arises; who are the key role players in the design and implementation of an IR information system? The answer to this arbitrary question is obvious that community members pertaining to the institution are rational actors in the system but they are normally neglected and confused to users of the system while realistically they are creators, workers and benefactors of the system at the same time. But, according to [10], it seems that institutional repository community members are affected by lack of awareness of institutional repositories as well as their positions and responsibilities in running the repositories.

Academic institutional repository is made up of the information system comprising of people, technology, procedures, hardware, software and infrastructures [11]. It comprises people or stakeholders whose organizations do not clearly describe their positions in relation to the performance of the institutional repositories and this has lead to underperformance of most of repositories [12]. In this case all components of the information systems were regarded such as; choice of software and hardware to be installed, analysis of people to be involved from within the institution community members, putting in place all necessary infrastructures to facilitate deployment of the institutional repository, computer hardware, information communication technology and identification of procedures. Types and dimensions of complexities ranges from lack of knowledge and skills to manage local content, establishment of guiding policy and principles and limited or lack of incentives. These models also provide a concept of long term benefits of a system. These benefits are considered to be social and economical net benefits.

However, existence of these models is more imaginary than reality because they cannot be seen by bare eyes instead they can be realized by analysis of the structure of information systems from the scratch up to the widest picture [3]. It is through this angle of view that we find insufficient or weak system components and the low performance of the systems. Three key dimensions of these problems and challenges according to [13] are: a) identification and deposit of content; b) access and use of services; and c) preservation of content and sustainability of service. Every challenge of the system has got its root on the models which are running the system. It is found that, the fewer the defects in the models running the systems the higher the functionality of the information systems. It is from this point of view examination of existence of institutional repositories in relation with the existence of the information systems supportive models have been done in this study to assess MPCU and ISSM to know their empirical existence and to understand how far they are affecting functionality of the Sokoine University of Agriculture as well as the University of Dar es Salaam institutional repositories.

To sum up, previous reviews focus on analyzing the functionality and validity of implementation and adoption theories and models [14. They often examine one theory or model and base their findings on a relatively small sample of articles. Thus, they do not provide a comprehensive state-of-the-art overview of the most influential models and their applications that are used in implementation and adoption research, and henceforth, a wide, comprehensive and structured review of the most influential theories and models, their research subjects and contribution to ICT implementation and adoption studies seems to be lacking.

In this study of dimensions of applicability of the Model for Personal Computer Utilization (MPCU) and the Information Systems Success Model (ISSM) in adoption of two academic institutional repositories were explored. According to Triandis (1979) it was noted that the Personal Computer utilization may be influenced by individuals feelings toward using PCs, social norms, expected consequences, habits, and the facilitating conditions. Complexity and job fit are added to the model to explain the perceived consequences aspect. In 1994 the authors proposed that the experience has a direct, indirect, and moderating influence on using personal computers. MPCU model is one of the oldest theories developed purely for computers usage and utilization ([15],[16]). The last most cited theory was the Information Systems Success Model. [9] reviewed prior research and introduced a comprehensive taxonomy of factors contributing to the success of information systems. Together, these two models are interrelated and interdependent and provide a comprehensive view of information system (IS) success.

The constructs pertaining to these models were assessed on how they impact designing, development and management of institutional repositories. Thus, dimensions of applicability in the process of managing institutional repositories were examined. The main purpose was to examine Dimensions of applicability of Model for Personal Computer Utilization and Information System Success Model in adoption of institutional repositories at Sokoine University of Agriculture and University of Dar es salaam.

Three specific objectives were;

SO1: To analyze facilitating conditions required for adoption of institutional repository in academic institutions

SO2: To demonstrate measures of institutional repository design and implementation complexities regarding application of MPCU and ISSM models and

SO3: To identify long term benefits of the institutional repository through utilization of MPCU and ISSM models in academic institutions

A. Statement of the problem

Globally, there is an increasing rate of adoption of open access institutional repositories ([17] [48]). One of the key aspects of adoption of IRs is design, implementation and maintenance of the information systems and institutional repositories in particular

[4]. However, studies which address the issues of design, implementation and maintenance of the institutional repositories in relation to utilization of information systems supportive theories and models such Model for Personal Computer Utilization (MPCU) and Information System Success Model (ISSM) are still scanty. This study has attempted to use the above information systems models to examine how they can affect design and implementation of institutional repositories.

B. Significance of the study

This study will add an understanding on how MPCU and ISSM models as information systems models can impact design and implementation of institutional repositories. At the other hand, the institutional management team, academicians and particularly the information professionals will gain deep insights on how to use these models to analyze the needs and requirements when designing and implementing open access institutional repository services. Policy makers can gain knowledge on deciding on necessary inputs related to adoption of institutional repositories.

C. Literature review

1. Facilitating conditions required for adoption of institutional repository in academic institutions

According to the literature reviewed studies show that IRs depend on availability of institutional information system. Although IRs depend on institutional information systems but it is obvious that functionality of institutional information systems are directly linked with proper applicability of the information systems supportive models. The term model is interchangeable or equivalent with theory in this context. Many information systems fail due to improper or deficiency in utilization of models. Adoption of MPCU and ISSM models in information communication technology management in higher learning institutions to facilitate design and development of institutional repositories are still questionable because they have met with challenges and problems which some of them are not yet solved. Adoption levels differ from one institution to another. These adoption levels of MPCU and ISSM determine success and failure levels of particular institutions.

System quality

The repository should contain information which is well processed and stored in the digital archives so as to benefit the stakeholders. Information quality is determined by what kind of information is ingested in the information systems and institutional repository as well. [19], identified the inclusion and quality of metadata to be a major consideration in content evaluation. [19], noted that Workflow is one of the tool to facilitate practice of recruitment of local content. [20] Johnson-freeman, [21] found that normally, the task of populating local content is bestowed into the hands of librarians but due to limited time and immense amount of scholarly output this task is also done by other community members such as faculty members and students.

System quality

In order to assess the system quality it must be assured that all components of the systems which are hardware, software, infrastructure, people, technology and process are put into considerations [22] The studies of ([23] [24] [25]) found that lack of funding as an impediment to establishing and implementing institutional repositories.

Service quality

Hands-on technical solutions accompanied with customer service and customer care [26]. Most academic institutional goals are to strive for excellence in their businesses and for this case academic institutions normally rely on a slogan publish or perish and that is why they compete on amount and quality of services they provide especially trainings, researches and consultancies. Therefore, steady growth of repository services is significant to the service quality of academic institution.

Institutional repository software

One of the factors for the choice of IR software are scalability, flexibility, enhance accessibility and easiness of use [27]. D-Lib, (2015) highlights evaluation criteria for selecting repository software to include checking the functionality of the software, scalability, interoperability, ease of deployment, system security, system performance, physical environment of the software, and strength

of technology roadmap for the future ([28] [29] [30]). [31], found that DSpace and Eprints were the most widely used open source software preferred by educational, governmental, private and commercial institutions viz., museums, state and national libraries, state archives, journal repositories, consortiums and commercial companies to manage their digital assets. These programs support utilization of Dublin Core as the default metadata schema for content submission workflow [32]. The latest versions contain tools to manage digitization and encourage metadata entry by normal users. DSpace also uses persistent URIs to access the digital content, providing a unified access mechanism to external services. Open Access Initiative Protocol for Metadata Harvesting (OAI-PMH) harvester harvests and aggregates metadata records from OAI-PMH institutional repositories make them accessible online via indexers such as Google Scholar, ResearchGate and Academia.edu.

2. Measures of institutional repository design and implementation complexities regarding applications of MPCU and ISSM models

Library and librarian roles

The fact that we speak of recruitment rather than collection development implies that non-librarians or non-archivists have a major role in what goes into the repository and by extension, what is preserved. Provided that librarians are information professionals then the task of processing local contents automatically fall into their hands. Another key role of library units and librarians in the academic institutions is to devise a plan and an implementation policy for institutional repository by collaborating with information technologists and university and faculty administrators ([33],[34],[35],[36]). A librarian identifies materials to be digitized, clears copyright issues, digitizes, provides metadata and acquires software to make such resources available, as well as its maintenance in form of a digital library [37]. Digitization of important materials that may deteriorate because of age and condition is being carried out by information professionals. Other prominent roles of librarians are training of faculty members, advocacy of IRs to persuade them to comply, support authors with self-archiving ([38],[39],[40])

It should be noted that in every information system there are difficult and complex matters which should be put into considerations throughout systems development and implementation [41]. From point of view of information systems complexity is always found in the usability of micro, mini-frame and main-frame computers in communication systems because they are indispensable tools which are used for creation of information, processing, sharing, dissemination, as well as preservation of information [42]. Therefore review of complexity causatives and their particular dimensions is one of the specific objectives of this study. In order to come up with a clear picture of what might be complexity dimensions, several literatures have been consulted to investigate the nature of institutional repository system. From these perspectives literature discussions are put into comprehensive order as follows:

In their study [43] found that DSpace does not indicate the difference between superscript and subscript characters with the normal characters. It is quite difficult to enter the titles, which has chemical formulas. Example: Aryl halide coordination to Ru(II): crystal structure of *mer, trans*-[RuCl2(PPh3){PPh2CH2C(But)=N-N=CH(C6H3F2-2,6)}]. [44] states that the default installation of DSpace is based on a compiling method containing many steps to be executed manually which makes the deployment of DSpace-based application a laborious work, and usually needs some technical skills. [45], found that most of the platforms used in the repositories are using out of date technology which was designed two decades ago. For this reason, repositories have not yet reached their full potential and they are mainly used for publishing the research output of the institutions. [32], noted that building partnerships and creating collaborations are good long term strategies. However, these strategies are time-consuming and it is challenging to demonstrate immediate results. Harvesting full-text content from databases can be very complicated because of involved copyright issues and licensing agreements [46].

IR stakeholders who are directly connected to IR may include authors, funding agency, researchers, students, faculty, librarians, institutional repositories implementation/sustenance teams, and university administrators [12]. These stakeholders are directly involved with the deposition of IR contents, technical and administrative backups, provision of running funds, usage of the content and the provision of policies, rules and regulations that directly affect the innovation of IR.

IRs require a huge effort, both in the management/policy system (choosing and implementing content management/recruitment, staff to dedicate, training staff, marketing the IR and facing licensing agreements), and in the technical environment (choosing metadata, infrastructure, software, customization) [2]. At this time, best practices seem to guide the implementation of repositories: experiences are all different and rooted in each institution s environment, so it s difficult to outline a universal model. Each institution can choose its own policies, taking advance and reusing other repositories experiences and outcomes. As [41] reports, implementation requires several stages of inquiry that have influence on choices and decision making: technological issues are for example choosing a repository platform, assessing technical needs, establish metadata and vocabulary principles, while political issues can be summarized in evaluating requirements of staff (and its training), promotion, and marketing challenges [47].

Academic reward system: this is one of the hardest issues, since habits in self-posting are different for each discipline and scholar. Huge discussion is taking place, about financial reward for uploading electronic copies of each scholar s output and certainly this influences institutional policies, about self-archiving as a mandatory or voluntary activity.

Authors act as barriers due to the traditional culture and reward systems that shape different scientific disciplines. One expression of this is how *Authors* might be unwilling to deposit their content if other content present in the same outlet are not peer-reviewed, such as in medicine. This is also related to issues about tenure and promotion which is described more thoroughly in the *Authors* category [48]. Depositing papers has become even more challenging as publishers have introduced policies making the conditions of deposit more restrictive.

Digitization of local content

Digitization is a process by which physical or manual records such as text, images, videos, and audio are converted into digital form [49]. Digitization is sometimes presented as a panacea for problems of preservation and access. However, access to digitized collections and their preservation, especially in the longer term, may be problematic [50]. It was found that digitization was in progress in both institutions. Still some challenges were; presence bulk of hard copies of institutional documents which are worth for preservation for future uses in the institutional repositories, inadequate library staff acquainted with digitization knowledge and skills, low motivations, and inadequate scanning equipments.

3. **Long term benefits of the institutional repository through application of MPCU and ISSM models**

The third objective which this study intended to obtain was to know long term benefits of the IR in HLI. One of the constrictions for development and growth of institutional repositories is absence of awareness presence of the repository itself as well as benefits of the repository to the individuals, the institution and the larger academic and scholarly community worldwide. Through investigation in most of the reviewed literature it is found that most people don t know short and long term benefits which results from adoption of IRs in academic institutions.

Net system benefits

[51] Through the adoption of *Open Access* ideas the *Accessibility* and *Visibility* of *Scholarly Communication* content is increased. Furthermore, *Open Access* also increases *Usability* of disseminated content as it allows users to read, download, share, store, print, link and cite the literature freely. This increase in *Availability*, *Usability*, and *Visibility* is a major driving force for the progress of *Open Access*, ([52], [53], [54]).

urthermore, IRs may be used: to support marketing activities, to attract high quality staff,

students and funding from development partners and other donor agencies; as a means for the centralization and storage of all types of institutional output, including unpublished literature; as a supporting tool for learning and teaching; an instrument to standardize institutional records ability to keep track of and analyze research performance; and a way to break down publishers costs and permissions barriers and dependency for preservation of content. Adoption factors are expected academic benefits, visibility, cultural issues, content availability, accessibility and quality, ([4],[23]).

As the Information Systems Success Model elucidates in its constructs there is an aspect of net system benefits when using information system. As usual every system aims at maximizing profits while minimizing inputs hence efficiency of any system is measured by net outputs versus net inputs. Institutional repository evaluates net benefits obtained during its operations. These are individual as well as institutional benefits according to [55].

D.Conceptual framework

The choice of variables for research was done by review of existing literature relevant to this study whereby conceptual framework was devised and variables prepared to guide finding answers to the research questions.

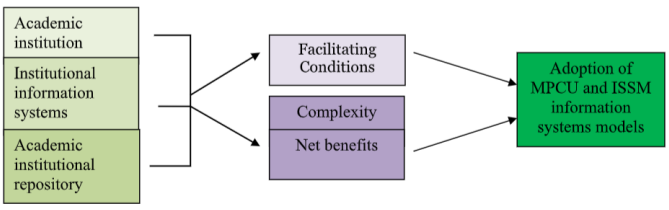

Fig. 1 Conceptual framework

II: METHODOLOGY

A. Study design and approach

The study was conducted by using horizontal approach whereby triangulation methods in data collection was applied. Four methods which were applied are; direct observation on the research fields on particular research aspects which were particularly the information systems components, then, documentary reviews whereby all documents which were deemed to be part and parcel of the institutional frameworks were searched in the libraries, offices, institutional repositories and websites.

B. Study area, sampling technique and sample size

This study was conducted at the Sokoine University of Agriculture and the University of Dar es Salaam. Sample frame included the whole institutional information systems. Probability and non-probability sampling techniques were used to obtain sample units which were used as respondents and observations in the study where questionnaires and semi-structured interviews were used to gathers answers of the research questions. 19 documents of the Sokoine University of Agriculture and 24 documents of the University of Dar es Salaam, respectively, were found and examined. Hence, a thorough review of institutional documents was done by consulting the most relevant documents to answer each particular question.

Semi-structured interviews guide for staff was devised to search for opinions, knowledge, facts and phenomena related to questions of the research. 10 respondents as key informants per each of the two institutions were purposively selected to answer main semi-structured interview questions in order to test several research variables obtained in the literature as well as in the theoretical review. Questionnaire was devised and 24 SUA staff members and 40 UDSM staff members and 31 SUA postgraduate students and 60 UDSM postgraduate students responded to the questionnaires. And analysis of the literature here was done in accordance with the order in which the research objectives and subsequent research questions appear.

C. Data analysis techniques

Analysis of the data here was done in accordance with the order in which the research objectives and subsequent research questions appear. Due to triangulation methodology which was applied in searching field data it was observed

that descriptive statistics and thematic analysis were applied to treat data.

D. Ethical considerations

Assurance to all participants in the study that any information they would provide would be treated as confidential and would not be used anywhere for any other reason other than the initial reason for which it was sought was provided. Ensuring privacy along the research process was essential to create safe and comfortable environments to participants to share their thoughts, experience and sensitive information. Care was taken to ensure that all works referred to in this study were acknowledged to so as to avoid cases of plagiarism.

III: RESULTS AND DISCUSSION

A. Summary of key results

The discussion of findings is based on the evaluative aspects of the information systems and institutional repositories.

TABLE 1: *Profiles of Sokoine University of Agriculture and University of Dar es Salaam*

Institution	Library staff	Academic staff	Administrative staff	Number of postgraduate students	Number of faculties colleges Institutes schools
SUA	38	600	835	891 (2022)	6 colleges 2 schools
UDSM	128	1941	1638	5536	7 colleges 7schools 7 institutes 17 centres 12 directorates 2 units

TABLE 2: *Information systems components at Sokoine University of Agriculture*

IS components	Findings
Hardware	HP/Dell computers, network Servers, CZUR book scanners backups, CCTV cameras
Software	Windows 7/10, DSpace (version other) Date of birth 20th May 2015, antivirus, firewalls and other application software
Infrastructures	Seminar rooms, study rooms, offices, libraries, departments, Colleges/schools/institutes canteens, ICT rooms, study areas, ICTs maintenance workrooms
People	ICT officials, ICTs Librarians, Lecturers, Students, IR/librarians specialists, Directorate of Research Officials, Directorate of Postgraduate officials, directing and coordinating, security guards
Technology	Ethernet, WiFi hotspots, authentication and login ICTs security firewall
Processes	Dissertations, thesis, articles, papers, etc accommodation, automation, copyright check, policies, guidelines, acquisition process, evaluation and reporting

TABLE 3: *Information systems components at University of Dar es Salaam*

IS theme	Findings
Hardware	Lenovo/Dell/HP computers, network Servers, 2 Bookeye Scanners backups
Software	Windows 7/10 DSpace (version other), Date of birth 23th March 2016, antivirus, firewalls
Infrastructures	Seminar rooms, study rooms, offices, libraries, Confucius Institute, departments, Colleges/schools/institutes, University Computing Center, canteen, ICT rooms, study areas, ICTs maintenance workrooms
People	IEMT, ICT officials, ICTs Librarians, Lecturers, Students, IR/librarians specialists, Directorate of Research Officials, Directorate of Postgraduate officials, directing and coordinating, security guards
Technology	Ethernet, WiFi hotspots, authentication and login ICTs security, firewall
Processes	Dissertations, thesis, articles, papers, etc accommodation, automation, copyright check, policies, guidelines, acquisition process evaluation and reporting

B. Detailed results

Inadequate information systems and institutional repository facilitating conditions which were commonly found at SUA and UDSM

- It was found that there were gaps in ICT knowledge and skills amongst institutional stakeholders. Results show that 91.7% of staff in SUA and 65.0% of staff in UDSM started to learn computer science at college level
- It was found that library staff workers are inadequate and most of them are undergraduates at 40% in both institutions

- It was found that most postgraduate students and staff members own both Smartphones and laptop PC
- Well established infrastructures in terms of buildings, equipments and working spaces
- 64 wireless (WiFi) hotspot connections were found around the SUA campuses
- 134 wireless (WiFi) hotspot connections were found around the UDSM campuses
- High security measures taken to control risks of attacks and sabotages by ICT s users within the information systems were found
- Moderate security measures taken to control risks of attacks and sabotages by ICT s users within the information systems were found in UDSM

Management of information systems and institutional repository commonly at SUA and UDSM still challenging

- 62.5% at of staff at SUA said that awareness, connectivity, copyright, skills, bundle, and electricity were challenges while 42.5% of staff at UDSM said lack of enough awareness about institutional repository was a great challenge. 29.0% and 40.0% of postgraduate students at SUA and UDSM, respectively, said lack of enough awareness about institutional repository was a great challenge
- Few library and ICT staff members involved in local content accommodation. 4 library staff members at SUA and 4 library staff members at UDSM were specifically appointed for full involvement in recruitment of local contents in institutional repositories
- Scanning of local content for archival in institutional repository in progress by using CZUR book scanners in SUA and Bookeye Scanners in UDSM
- Low self-archiving practice. Only 45.8% of staff in SUA and 32.5% of staff in UDSM have already participated in depositing their scholarly documents in their institutional repositories
- Automated IR workflow still challenging. Due to lack of clear guidelines and mechanisms to track and trap some scholarly works to be accommodated into institutional repository
- No multimedia were shared in the IR which showed that expertise is still a challenge to accommodate multimedia
- Lack of clear guidelines for coordination of repository works amongst stakeholders such as COSTECH
- Seminars and user education were provided to community members regularly
- Control of room temperature for ICT equipments was found difficult in some ICT infrastructures.
- Low PC utilization knowledge and skills amongst stakeholders are still some of the setbacks
- Adoption of SUA library policy in relation with SUA institutional repository policy implementation were found containing shortcomings due to fast changes in open access landscape
- Acquisition of local content by the Sokoine National Agricultural Library (SNAL) from sister institutions for the sake of accommodating the contents in the institutional repository was found not efficient due to slow coordination and inadequate fund
- Some metadata inconsistency was found

I: Library and librarians roles at SUA

Management of Information systems and institutional repository in particular still challenging

- Processing guidelines, tools and techniques included; Dissertations, thesis, articles, papers, etc accommodation, automation, digitization, copyright check, policies, guidelines, acquisition process, evaluation and reporting
- Inadequate guidelines and mechanisms to track and trap some scholarly works to be accommodated into institutional repository, especially from those sister institutions, was found
- SUA Institutional repository registered on ROAR and OpenDOAR (Sherpa)

I: Library and librarians roles at UDSM

Management of information systems and institutional repositories in particular still challenging

- New biggest library equipped with adequate new ICT equipments was built by China as an aid, to supplements the Old Chagula Library, and was completed and opened since 2018.
- Inadequacy of clear guidelines and regulations enacted in some institutional policies and plans relating to establishment and running of the institutional repository was found
- Library policy missing. Adoption of library policy in relation with IR policy implementation were found containing shortcomings
- Institutional repository policy missing. Adoption of institutional repository policy still challenging due to delay in formulation and or updating of some policies and guidelines
- Two repositories: That is to say that accommodation of local content are done at two points i.e
    1. **UDSM Research Repository** Institutional Repository http://journals.udsm.ac.tz UDSM Research Repository: http://repository.udsm.ac.tz:8080/xmlui/ it is registered on ROAR and OpenDOAR (Sherpa). And only abstracts of dissertations and thesis shared
    2. **UDSM** Library Repository at; https://libraryrepository.udsm.ac.tz UDSM Library Repository is not yet registered on ROAR and OpenDOAR (Sherpa). Mwalimu Julius Kambarage Nyerere and other national archives are being accommodated in this repository.

Net systems benefits at Sokoine University of Agriculture and University of Dar es salaam

Several common impacts found in the study;

- 5799 documents deposited or accommodated in SUA institutional repository and shared to the community at institutional repository
- 15743 documents deposited or accommodated in UDSM institutional *library* repository and shared to the community
- 5991 documents deposited or accommodated in UDSM institutional *research* repository and shared to the community
- Visibility of institutional activities and outputs enhanced
- Prestige of individual authors and institutions enhanced
- Increased information and knowledge shared within scholarly community
- It was found that high price of Internet broadband from ISP hinders full utilization of PCs due to low budget allocated for Internet uses
- Study found that scholars were moderately motivated to deposit their publications due to incentive schemes

C. Discussion

1. Facilitating conditions for adoption of academic institutional repositories

Information system quality

In Information Systems Success Model (ISSM) systems quality is one of the construct pertaining to it. System quality in this context means institutional repository information system quality. Institutional repository as a system is recommended to comprise components of the systems in a sufficient quantity and quality. A good system must be free from faults, defects and deficiencies and if one of the factors is compromised then the consequence is always felt throughout the system. As the world is fast changing in compliance with the change of technology software or programs have become indispensable in these changes. Most of the jobs nowadays are done by machines working according to computer programs rather than pure manual labour. In higher learning institutions software have become integral parts of everyday needs. Libraries as one of the units and departments of the academic institutions highly need software in their daily activities. Institutional repositories as one of the entity of the academic and research libraries use software to curate, process, store, preserve and disseminate to information to information users. Institutional repositories mainly use open source software to enable open access to the local content to its community members and beyond.

Information quality

In higher learning institutions the information should meet expectations of the information users and suffice the need of scholarly

communication. [56], noted that institutional repositories contain various outputs of the institution and observed that research results are important among these outputs as well as works of qualification, and teaching and learning materials. In the survey it was found that the information accommodated in both repositories contained metadata according to Dublin Core. Only a few metadata were found inconsistent. Metadata quality indicators included number of elements, completeness, accuracy, and consistency and should be taken with high consideration and for this matter metadata and content recruitment workflows are important. Practice of recruitment of local content met with challenges of lack of time, lack of ICT knowledge and expertise which results into poor data and information.

Service quality

Since the Budapest Open Access Initiative inaugurated in 2002 there is a paradigm shift from business model of scholarly communication favoring growth in open access repositories. Service quality is determined by several factors within an information system. The determinants of service quality such as diversity of information materials made available for community consumption, time taken to openly access the documents, increased visibility and prestige of the particular institution. Service quality as one of the constructs of the ISSM should be the key function, mission and goals of an academic institution.

2. Measures of institutional repository design and implementation complexities regarding applications of MPCU and ISSM models

i. Management of information systems and academic institutional repositories

Implementation of institutional repository after an adoption is one of the factors of management. As the findings above have shown there are some challenges are still existing and which in effect hinder full potential of adoption of institutional repositories in both universities. Issues like lack of enough and clear guidelines for implementation of IRs due to weaknesses in institutional frameworks, inadequate knowledge and skills concerning open access repositories, weak workflows and low awareness are some of the drawbacks.

ii. Library and librarian roles

Facilitating conditions for development of open access within institution amongst others are reliable manpower equipped with reliable knowledge and skills on information technology, suitable and enabling IR infrastructure, and up to date technology [57]. In performance, libraries and librarians play pivotal roles such as to collect, process, store, preserve and disseminate information to patrons. Likewise an institutional repository collect, process, store, preserve and disseminate local content in digital format emanated from daily activities conducted by an institution as well as community members of the institution [58].

3. Net benefits

The adoption of institutional repositories have resulted into several positive impacts to the scholarly communities such as increased visibility, prestige, accelerated knowledge sharing and reproduction, enhanced innovations and financial benefits.

IV: CONCLUSION AND RECOMMENDATIONS

A. Conclusion

Assessment of dimensions of applicability of MPCU and ISSM models in adoption of institutional repositories is one of the methods that can be used to evaluate design and implementation of institutional repository projects in higher learning institutions because it provides some facets or constructs that can be measured during monitoring and evaluation stages.

B. Recommendations

This study has three recommendations;

- Management teams should regularly review facilitating conditions required for adoption of institutional repository in academic institutions
- Policy makers and information specialists should collaborate in determining academic institutional repository design and implementation complexities by regarding application of MPCU and ISSM models so as to solve issues pertaining to adoption of institutional repositories

- Awareness creation on presence of academic institutional repository and long term benefits of the institutional repository through utilization of MPCU and ISSM models in academic institutions to stakeholders should be enhanced by intensive and extensive marketing strategies

Limitations

There were some limitations which were encountered and consequently affected the research process, these limitations were;

- Failure to conduct focus group discussion to participants in all two institutions because the participants claimed that their timetables were very occupied
- The analysis was done manually and automatically by using SPSS
- Due to language barrier only the literature written in English language were reviewed.

Implications for future research

- Exploratory studies on facilitating conditions and corresponding qualities required for adoption of institutional repository in academic institutions
- Descriptive studies on determinants of academic institutional repository design and implementation complexity dimensions by regarding applications of MPCU and ISSM models and
- Quasi-experimental studies on identification of long term benefits of the institutional repository through utilization of MPCU and ISSM models in academic institutions

ACKNOWLEDGEMENT

Almighty God is the foremost recipient of my gratitude for always being there for grace and strength. I would like to extend my heartfelt appreciations to my family for their invaluable support throughout this endeavour. I also extend my gratitude to every research participant as well as research field assistants during data collection. Friends and relatives deserve appreciation for their being there when I needed them for help.

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