FACTORS AFFECTING FACULTY ACCEPTANCE AND USE OF INSTITUTIONAL

REPOSITORIES IN THAILAND

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Institutional repositories have been introduced as an innovative and alternative technology for scholarly communication and have received considerable attention from scholars across disciplines and around the globe. While some universities in Thailand have developed and implemented institutional repositories for nearly a decade, knowledge of the acceptance and use of institutional repositories on the individual level in the country remains limited. As an insufficient knowledge of technology acceptance and adoption at the individual level is considered partially responsible for the underutilization of innovation or of information system implementation, this study seeks to uncover knowledge regarding the level of institutional repository acceptance and use. This study applied the unified theory of acceptance and use of technology (UTAUT) model and the model of faculty members' self-archiving behavior to investigate factors affecting faculty acceptance and use of university-based institutional repositories. The study employed a mixed methods approach involving a survey followed by semi-structured, one-to-one interview. This study confirms that the success of university-based institutional repositories depends not on a single factor but on multiple factors. The results of the study show that performance expectancy, social influence, and resistance to change were direct determinants of faculty members' intention to use institutional repositories. Additionally, behavioral intention and altruism were found to be the main determinants of actual usage behavior.

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CHAPTER 1

INTRODUCTION

This chapter presents a discussion of the research background, the problem statement, the purpose of the study, the research questions, the terminology, and the significance of the study.

1.1   Research Background

The term scholarly communication is a broad term reflecting various processes in the creation of knowledge. According to the Association of College & Research Libraries (2003), scholarly communication refers to "the system through which research and other scholarly writings are created, evaluated for quality, disseminated to the scholarly community, and preserved for future use" (pp. 1).

The process of scholarly communication consists of three different stages. The first is the conducting of research; during this process, the scholar will communicate informally with other scholars and scientists to develop ideas and create new knowledge or scholarly content. The second step in the process is to prepare and shape the work and to communicate with peers or colleagues in order to make a decision regarding what will become the formal research results. The final step in the process is the creation of the ultimate formal product that will be distributed to the broader community through one or more of the various scholarly communication forums, including both print and electronic forums. The complete process of scholarly communication starts with content creation and ends with dissemination (Thorin, 2003). According to Thorin (2003), academic libraries and librarians perform functions at the end of the assembly line on which the problem emerges. Academic libraries are responsible for holding the scholarly content in order to satisfy the needs of their user communities; however, a growing number of cases show that academic libraries are becoming less and less able to afford to purchase the journals

needed for their communities due to the dramatic increase in subscription costs, particularly in the fields of science, technology, and medicine (STM), along with the declining of academic library budgets. This phenomenon has been termed the serial crisis. According to Atkinson (2003), the serial crisis is not just a library problem; rather, it is a broader crisis in scholarly communications.

The serial crisis started in the late 1980s and has become a more serious issue as commercial publishers have gained complete control over traditional scholarly publishing and, at the same time, dominated the users' space. Many researchers agree that the introduction of electronic publishing has made this issue more complicated. Journal articles are made available as licensed materials, and this model has become the norm for scholarly publishing (Thorin, 2003). The negotiation of licensing contracts has become a challenging issue that university librarians and administers must face.

The situation is no different for academic libraries in developing countries, including Thailand. Indeed, the problem might be even more evident in those countries. The journal crisis has been reported as a widespread issue affecting scholarly communication in Thailand. In Thailand, the journal crisis was at its worst in 1997 after the Thai government decided to float the local currency. Prior to that time, 25 Thai Baht equaled 1 US Dollar; the currency exchange reached its peak at 50 Baht to the Dollar, entailing a one hundred percent increase in journal subscription rates and other purchasing prices of foreign material. As a result, many academic libraries and special libraries, particularly in science, technology, and medicine, decided to cancel their research journal subscriptions and to pull back on full-text database licenses. Access to scientific information and technical materials at that time was extremely limited. It was difficult for scholars to keep up with scholarly output (Stueart, 2000). Other issues facing

universities included funding for research and higher education, low staff morale due to low salaries and an unrewarding research system, brain drain, overloading of researchers with teaching and administrative duties, and lack of technological sophistication.

While the growth of digital technologies and electronic publishing appears to have made scholarly publishing more complicated, it has also helped scholars and academic librarians to explore a new direction for scholarly communication. Björk (2007) correctly sees "technology developments as a trigger for changes in scientific communication" (p. 1). Prior to the time of the Internet and information technology, scholarly communication was very slow. The advent of information technology has brought about effective ways to create, store, and disseminate scientific knowledge. The open access movement and institutional repositories have emerged as a new strategy that allows universities and academic libraries to deal with the challenges of scholarly communication in the digital age, such as declining library budgets and rising subscription fees.

Due to the increasing adoption of open access technology, scientific and scholarly information is freely available via the Internet through open access forums such as personal websites, departmental websites, open access journals, discipline repositories, and institutional repositories (IRs). Among them, IRs and discipline repositories are preferable forums for scholars and scientists since they offer features and services that enhance access to scholarly content (Kim, 2008). According to Lynch (2003), IRs are "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" (p. 2).

Since the idea of open access and IR services was introduced in many scholarly forums such as the Budapest Open Access Initiative (BOAI) and the Scholarly Publishing and Academic

Resources Coalition (SPARC), there have been increasing numbers of open access and institutional repository projects worldwide. Recently, OpenDOAR, an authoritative directory of academic open access repositories, listed 2800 academic open access repositories. Lynch and Lippincott (2005) reported that in the United States, 40% of doctoral universities were already operating IRs. There were only 100 repositories registered in OpenDOAR in 2006; however, the numbers of IRs in the United States has increased during the past ten years. Currently, there are 463 open access repositories operated by 348 organizations in the United States listed in OpenDOAR. An example of a repository listed by OpenDOAR is ArXiv, a disciplinary repository operated by Cornell University Library, with a total of 1,245,393 documents (OpenDOAR, 2017).

While the numbers of open access services and IRs have increased during the past ten years, research areas related to open access services and IRs have also received considerable attention from many researchers. Initially, research centered on how IRs should be developed and implemented. Many researchers have attempted to identify the success factors for IR implementation and management (Yakel, Rieh, Markey, St. Jean, & Yao, 2009; Westell, 2006), and case studies of the development of specific projects have also been published (Chan, 2004). However, many researchers have found that the success of IRs depends mainly on faculty participation and on the numbers of items contained by the IRs (Shearer, 2003; Tribodeau, 2007; Yakel et al. 2009; Xia & Sun, 2007).

Several qualitative and quantitative empirical studies have been conducted to examine the self-archiving behavior and experience of academic authors (Allen, 2005; Davis & Connolly, 2007; Dulle, 2010; Foster & Gibbons, 2005; Kim, 2008, 2010; Park & Qin, 2007; Swan & Brown, 2005) Among them, Kim's (2008, 2010) studies focused on faculty members' motivation

to self-archive and the factors affecting their decisions to do so. Dulle (2010) studied factors affecting the adoption of open access scholarly communication by researchers in Tanzania, using the unified theory of acceptance and use of technology (UTAUT) model. However, these studies focused on faculty members' self-archiving behavior in all open access forums. The present study has a narrower focus on faculty members' acceptance and use of IRs in the Thai higher education context, particularly in research universities. Different from the previous studies, which were conducted during the early stage of IR development, the present study was conducted within a distinct context and addresses the utilization of IRs at a different stage. Therefore, it is interesting to determine whether factors identified in previous studies can be shown to be relevant to the acceptance and use of IRs in a different context. In addition, it is also interesting to investigate why some faculty members make the decision to deposit their work and what factors contribute to their decision whether or not to deposit work.

1.2   Problem Statement

Institutional repositories (IRs) have been introduced as an innovative and alternative technology for scholarly communication and have received considerable attention from scholars across disciplines and on a global level. However, in Thailand, while some universities have developed and implemented IRs for nearly a decade, knowledge of the acceptance and use of IRs on the individual level remains limited. Empirical study in this area has rarely been conducted. Among such studies, Yoowang (2012) focused on studying institutional repositories' operations from the viewpoint of academic library directors and found that some directors mentioned issues related to personnel related problems, content recruitment, and faculty involvement in IRs as problems they have faced in the management of IRs. Klungthanaboon (2013) studied the current status and the impact of Open Access and Institutional Repositories developed within three

research universities from the viewpoints of institutional repository stakeholders, including

academic library directors, journal editors, and authors, employing a grounded theoretical and a

qualitative approach. However, there have been no studies seeking to identify the factors

affecting faculty members' acceptance and use of IRs in the Thai context. Knowledge in this area

has generally been neglected by previous studies. This study seeks to fill this gap. Since an

insufficiency of knowledge of technology acceptance and adoption at the individual level is

considered to be in part responsible for the underutilization of innovations and of information

system implementation.

In addition, an analysis of factors affecting faculty members' acceptance and use of

institutional repositories may provide insight into effective ways to develop, implement, and

improve IRs in Thailand. Therefore, this study seeks to uncover knowledge regarding the level of

IR acceptance and use by individuals by applying different theoretical models from different but

related disciplines. The first model is the unified theory of acceptance and use of technology

(UTAUT) model (Venkatesh et al., 2003) from the information systems field, particularly

relevant to the area of technology acceptance and adoption in an organizational setting. The other

model is the model of faculty's self-archiving behavior (Kim, 2008, 2010) from the field of

information science. These two models are used together as a theoretical framework for the

study.

Although there are some studies utilizing the UTAUT model to study the acceptance and

adoption of information technology, there has been limited research utilizing the UTAUT model

to investigate issues regarding the adoption and use of institutional repositories in higher

education. Most of the studies in this area are devoted to the study of factors affecting authors'

self-archiving practices in various open access venues (Kim, 2010; Dulle, 2010; Mann, Walter,

Hess, & Wigand, 2009; Singeh, Abrizah, & Karim, 2013a, b; Xia, 2007, 2008). The study by Mann et al. (2009) employed the UTAUT model to study researchers from the information systems, German literature, and medical science disciplines and confirmed that attitude is a significant predictor of behavioral intention to use open access publishing. In addition, Dulle (2010) used the UTAUT model in investigating factors affecting the adoption of open access scholarly communication in research activities at the Tanzanian Public University. Similar to Mann et al. (2009), Dulle (2010) found that besides performance expectancy, effort expectancy, and social influence, attitude is also one of the key determinants and predictors of Tanzanian researchers' behavioral intention to use open access scholarly communication. Findings from both studies contradict what might be expected based on the original UTAUT model, which theorized that attitude is not a direct determinant of behavioral intention. This gives rise to interesting questions, since attitude has been confirmed to be significant and to have a direct effect on behavioral intention across studies related to open access scholarly communication conducted in different contexts (Mann et al., 2009; Dulle, 2010). This study seeks to fill a gap by investigating whether attitude has significant direct effects on behavioral intention, particularly in the area of the acceptance and use of IRs, which is considered as an alternative forum for scholarly communication.

The other relevant issue in the area of technology acceptance and use is resistance to change (RTC). Resistance to change (RTC) is an aspect of personality that is highly critical for technology adoption (Venkatesh, Morris, & Ackerman, 2000). Oreg (2003) found that people who exhibited higher levels of resistance to change were less likely to try using new technology. In the library and information science field, Nov and Ye (2008, 2009) found that users with higher RTC had higher effort expectancy regarding new technology, particularly in the digital

libraries adoption context. While many researchers have found that RTC is a direct antecedent of effort expectancy (Nov & Ye, 2008, 2009; Thong, Hong, & Tam, 2002), rarely has research been conducted to determine whether RTC has a direct effect on an individual's behavioral intention to use a technology. RTC should not be disregarded as a predictor of behavioral intention, since some researchers have cited cultural inertia, a resistance to change or reluctance to adopt new culture or technology, as one of the reasons for the slow adoption of self-archiving (Chen, 2004; Kim, 2008). Therefore, resistance to change should not be ignored and should be considered as one factor that might affect faculty members' acceptance and use of IRs. Clearly, it should be tested to determine whether it should be confirmed or disregarded as a determinant of behavioral intention to use institutional repositories.

1.3   Purpose of the Study

The primary propose of this study is to determine the factors affecting faculty acceptance and use of university-based institutional repositories in the Thai research university context. This study explores the relationship and relative importance of factors that influence a user's behavioral intention and usage behavior in relation to the use of institutional repositories. This study contributes to the existing body of knowledge regarding the acceptance and use of institutional repositories and scholarly communication in the Thai higher educational context. Factors identified in this study are expected to be of use to IR managers and developers in developing and improving more user-centric IRs, which may help to increase and improve the adoption and use of IRs.

1.4   Research Questions

To determine the factors affecting faculty acceptance and use of university-based institutional repositories in the Thai research university context, this study attempts to answer the following research questions:

RQ1: To what extent do faculty members in Thai research universities accept and use institutional repositories?

RQ2: What are the factors that affect faculty members' acceptance and use of institutional repositories in the Thai research university context?

RQ3: To what extent do these factors affect faculty members' acceptance and use of institutional repositories (IRs) in the Thai research university context?

Based on the theoretical framework of the present study, derived from two research models, the unified theory of acceptance and use of technology (UTAUT) model (Venkatesh et al., 2003) and the model of faculty's self-archiving behavior (Kim, 2008, 2010), the proposed research model for this study is presented in Figure 1.1.
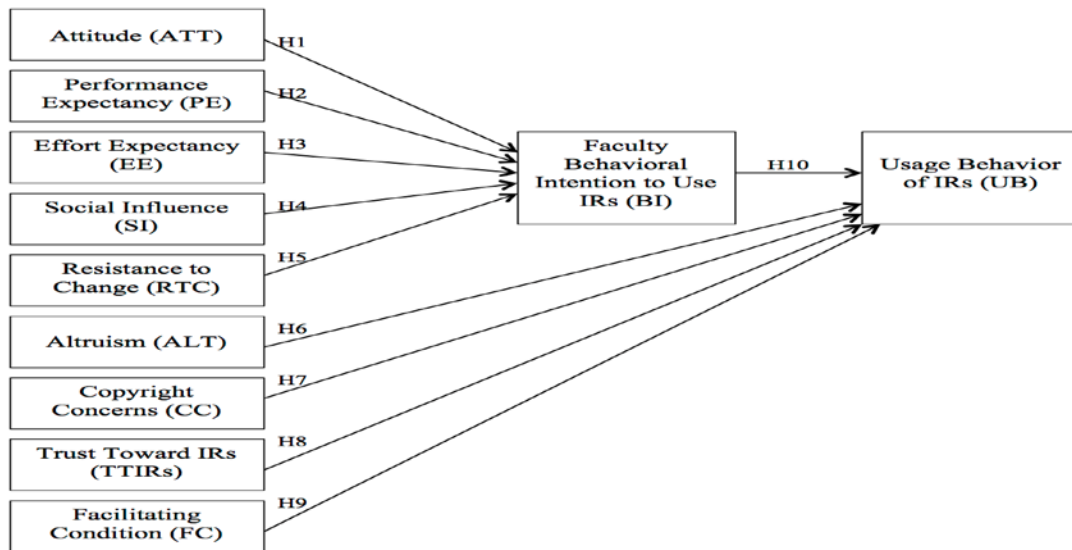
Figure 1.1. The proposed research model of faculty members' acceptance and use of IRs.

The proposed research model consists of ten main constructs (factors): attitude toward IRs (ATT), performance expectancies (PEs), effort expectancies (EEs), social influence (SO), resistance to change (RTC), altruism (ALT), copyright concerns (CCs), trust toward IRs (TTIRs), facilitating conditions (FCs), and behavioral intention (BI). While ATT, PEs, EEs, SO, and RTC are expected to be direct determinants of faculty members' behavioral intention to use IRs, ALT, CCs, TTIRs, FCs and BI are expected to be direct determinants of faculty members' actual usage of IRs. The relationships of the independent variables and the dependent variables presented in Figure 1 reflect the following hypotheses.

H1: Faculty members' attitude toward IRs will have a significant direct effect on behavioral intention.

H2: Performance expectancy will have a significant direct effect on behavioral intention.

H3: Effort expectancy will have a significant direct effect on behavioral intention.

H4: Social influence will have a significant direct effect on behavioral intention.

H5: Resistance to change will have a significant direct effect on behavioral intention.

H6: Altruism will have a significant direct effect on actual usage of IRs.

H7: Copyright concerns will have a significant direct effect on actual usage of IRs.

H8: Faculty members' trust toward IRs will have a significant direct effect on actual usage of IRs.

H9: Facilitating conditions will have a significant direct effect on actual usage of IRs.

H10: Faculty members' behavioral intention will have a significant direct effect on actual usage of IRs.

The two major theoretical models, the UTAUT model and the model of faculty's self-archiving behavior, are discussed in a greater detail in Chapter 3. In addition, Chapter 3 also explains how the proposed research model was formulated.

1.5   Research Design

This study employed a mixed methods design to understand faculty members' acceptance and use of Institutional Repositories in the Thai research university context. A QUAN + QUAL approach was employed, in which more weight was given to quantitative data. A mixed methods design allows the researcher to collect different but complementing data using both quantitative and qualitative approaches. A quantitative method was used to determine the factors affecting faculty acceptance and use of IRs along with the relationships among the factors that affect the faculty members' behavioral intention and usage behavior. A qualitative method of content analysis of semi-structured interview results was used to extend the findings from the quantitative part of the study. This method helped the researcher gain an in-depth understanding of the phenomena identified in the quantitative part of the study. Also, it allowed for capturing the participants' views on institutional repositories in depth. Additionally, the participants' suggestions and comments about institutional repositories were gathered through this method.

While the quantitative method allowed for generalization about acceptance and usage patterns, the follow up interviews with some participants which comprise the quantitative part of the study allowed the researcher to study the participants' acceptance and use of IRs and reasons related to that acceptance and use in greater detail.

Research universities in Thailand were targeted in this study. This study was conducted on research universities that have implemented IRs for their communities. While six of the nine research universities have implemented and operated IRs, findings from the preliminary study showed that only four research universities qualified for this study. The inclusion of only public universities facilitated the study of the acceptance and usage of IRs by faculty in nearly identical organizational contexts.

The population of this study was thus limited to faculty members in four research universities. Altogether, a total of 8,399 faculty members currently teach in the four research universities, which are located in different geographic areas. According to Krejcie and Morgan (1970), the sample size representative of the population of 8,399 faculty members in this study would be 367.

The survey questionnaire employed here was developed for this study; it includes a set of questions addressing faculty members' awareness and usage of IRs, their self-archiving experience, and factors affecting their intention and usage behavior of IRs. Factors that might affect faculty members' acceptance and use of IRs were presented as statements based on a Likert scale with a range of options across five points: strongly disagree, disagree, neither agree nor disagree, agree, and strongly agree.

The interview protocol was developed, validated, and revised immediately after the preliminary study. Semi-structured interviews through Skype and email were conducted with the participants who agreed to be interviewed. These methods are discussed in greater detail in Chapter 4.

1.6   Significance of the Study

Since this study addresses the acceptance and use of institutional repositories among the faculty in research universities in Thailand, it is significant for several reasons.

This study was the first to investigate faculty members' acceptance and use of institutional repositories in Thailand after the development and implementation of the first institutional repository in 2005 by Chulalongkorn University. Some studies regarding institutional repositories in Thailand had been conducted previously; however, those studies emphasized the development and management of IRs from managers' or developers' viewpoints

(Klangthanaboon, 2013; Yoowang, 2012). This study was the first to focus primarily on understanding faculty members, who are considered as key stakeholders who can make or break IRs, particularly in the Thai research university context.

In addition, the current study focused on faculty members as both content depositors and users of IRs. This study aimed to provide a holistic picture of IR acceptance and usage by faculty members in the university setting. Understanding the factors influencing individuals' intention to utilize IRs can assist IR developers to implement strategies, derived from the users' perspectives, to increase and improve the uptake of IRs, particularly for universities in Thailand and other higher educational institutions in similar contexts. This may lead to a more user-centered approach in developing and implementing IRs, which may in turn lead faculty, who are both contributors to and users of IRs, to deposit more materials in the repositories and to increase their rate of use of the repositories. Growth in the collection and usage rates of IRs will contribute to the success of IRs. IRs not only help scholars to disseminate and share scholarly content but also help them to access and use contents that they may not otherwise be able to access and use. IRs are also viewed as tools for preserving and ensuring long-term accessibility of scholarly content. If this mode of scholarly communication is widely accepted and used, it can in turn help to enhance the effectiveness of scholarly communication on both local and global levels.

This study will contribute to the existing body of knowledge in the area of library and information science, particularly in the area of open access and institutional repository acceptance and use. In addition, it is expected to shed light on the ongoing debate in technology acceptance research regarding an individual's attitude toward technology and resistance to change, particularly in the area of IRs, as it provides evidence for whether to confirm or to

disregard both factors as determinants of behavioral intention toward the acceptance and use of IRs as a new scholarly communication tool.

1.7   Definitions of Terms

An institutional repository (IR) is a set of services and technologies that a university provides for its community members to collect, store, disseminate, and preserve digital materials created by its community members. The digital material may include, but is not limited to journal articles (pre-print and post-print), theses and dissertations, book chapters, research reports, data sets, conference papers, teaching materials, lecture notes, and other multimedia objects. Although the community members in the context of a repository are faculty, research staff, and students, this study focused solely on faculty members. The term university-based IRs is used interchangeably with institutional repositories (IRs) in the current study to refer to institutional repositories operated by research universities.

The term research university refers to the nine universities in Thailand's National Research University (NRU) initiative. The NRU initiative project was launched in 2009 by The Ministry of Education (Thailand) through the Office of the Higher Education Commission. The nine universities are Chiang Mai University, Chulalongkorn University, Kasetsart University, King Mongkut University of Technology Thonburi, Khon Kaen University, Mahidol University, Prince of Songkhla University, Suranaree University of Technology, and Thammasat University. The national research universities have received a large proportion of the research funding from the Thai government (Sombatsompop, Markpin, Ratchatahirun, Yochai, Wongkaew, & Premkamolnetr, 2010). Although there are nine research universities in Thailand, not all of them have operated institutional repositories. The exclusion of universities that have not operated institutional repositories left six universities as targeted universities for this study. However,

findings from the preliminary study showed that only four research universities qualified for this study: Chulalongkorn University, Mahidol University, Prince of Songkhla University, and Suranaree University of Technology.

Faculty members in the Thai higher education context include professors (full professors), associate professors, assistant professors, and instructors or lecturers (Office of Higher Education Commission, 2016; Tamronglak, 2013). Members of all of these groups have four major roles: teaching, advising, service, and scholarly and professional activities. Some of them may have administrative duties not required of all faculty members. Instructors and lecturers were considered as faculty members in Thai higher education context; therefore, this group of faculty was considered as part of the population and included in the current study.

User acceptance is "the demonstrable willingness within a user group to employ information technology for the tasks it is designed to support" (Dillon & Morris, 1996, para. 4). This study focused on faculty members' acceptance and use of university-based institutional repositories in the Thai research university context. Acceptance and use of a particular repository means depositing as well as accessing and using digital materials stored in the repository.

CHAPTER 2

LITERATURE REVIEW

2.1   Institutional Repositories

Institutional repositories (IR) have been developed, implemented, and used as an

alternative channel for scholarly communication. Not only do faculty benefit from IRs, but other

members of scholarly communities benefit as well.

This chapter reviews the development of institutional repositories and the definitions of

the term. It then addresses the current stage of institutional repositories both on the global level

and in the Asian region. Previous studies on IRs and other related topics will be discussed.

Factors that might affect faculty acceptance and usage of IRs will be identified.

The knowledge presented in this chapter serves as the literature foundation for this study

and is intended to expose the limitations and identify gaps in the literature.

2.1.1   Emergence and Evolution of IRs

Over the past three decades, the advance of information and communication technology

(ICT), along with the Internet and the Web, has altered the patterns of communication and

brought about a transition in scholarly communication. Open access and institutional repositories

have emerged as new strategies for scholarly communication. According to the Budapest Open

Access Initiative (BOAI) (2002), open access literature means:

> its free availability on the public Internet, permitting any users to read, download, copy,
> distribute, print, search, or link to the full texts of these articles, crawl them for indexing,
> pass them as data to software, or use them for any other lawful purpose, without
> financial, legal, or technical barriers other than those inseparable from gaining access to
> the Internet itself. The only constraint on reproduction and distribution, and the only role
> for copyright in this domain, should be to give authors control over the integrity of their
> work and the right to be properly acknowledged and cited. (para. 3)

In short, open access means free and online access to all digital content which authors

willingly make freely available for all users without financial, legal, or technical barriers. The

open access movement is viewed as an alternative form of scholarly communication that differs from the traditional one in which scientists and scholars publish in subscription-based journals, which have restricted access.

Public declaration of the Budapest Open Access Initiative urged scholars to publish their research outputs in institutional archives and encouraged the creation of new open access journals. The BOAI's declarations gained more attention from academia as well as from national and international funding agencies. Many national funding agencies such as the National Institutes of Health (NIH) and the National Science Foundation (NSF) in the U.S. and the Research Councils in the UK have declared their support for and commitment to open access (Research Councils, n.d.). According to Hargermann (2012), over 300 research institutions, including the HIH, the NSF, and the Research Councils, have implemented open-access mandate policy. This policy requires "scholars to self-archive their research outcomes in a repository or a website, to promote free access to and wide sharing of information" (Xia et al., 2012, p. 85). As a result, scientists, scholars, and students around the world can benefit from scholarly materials published in both open access journals and open access repositories. The statistics show that to date approximately 9,325 academic journals have been published in the Directory of Open Access Journals (DOAJ) (2017), and more than 3,200 open access repositories are listed in the Directory of Open Access Repositories (OpenDOAR, 2017). Statistics from both DOAJ and OpenDOAR show that the total number of open access journals and open access repositories has increased continuously since the technology was introduced.

The definitions of the term institutional repository (IR) are diverse. Analysis of IR literature shows that the definition of the term IR is fluid; IR may mean different things to different people from a variety of disciplines which are involved in the creating and developing

of IRs (Allard, Mack, & Feltner-Reichert, 2005). Generally, an IR is understood as a digital archive of scholarly outputs created by the members of a particular scholarly institution. The definitions of institutional repositories contributed by Clifford Lynch and Raym Crow are the two most frequently cited (Allard et al., 2005). For Crow (2002), an institutional repository is "a digital archive of the intellectual product created by the faculty, research staff, and students of an institution and accessible to end users both within and outside of the institution, with few if any barriers to access" (p.15), while Lynch (2003) defines the IR as follows:

> a university-based institutional repository 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. It is most essentially an organizational commitment to the stewardship of these digital materials, including long-term preservation where appropriate, as well as organization and access or distribution. (p. 328)

In the above definitions, both authors emphasize the collections of IRs, the community being served, services, the access issue, and the long-term preservation of scholarly material. All of these are essential components that contribute to the success of an IR.

Crow (2002) explains that the content of an IR is institutionally defined, scholarly, cumulative and perpetual, and open and interoperable. In other words, the content of an IR is institutionally defined; it is developed within a particular institution or group of institutions. Therefore, "institutional repositories represent an historical and tangible embodiment of the intellectual life and output of an institution" (p 18). Secondly, an IR collects, contains, preserves, and disseminates a variety of scholarly content of the institution or community. The collections may include classroom teaching materials, peer-reviewed articles, conference papers, electronic theses and dissertations, pre-prints and works-in-progress, and other types of gray literature. In addition, the content within an IR should be cumulative and must be preserved to ensure long-term access to digital objects. Finally, IRs should be interoperable and open access, since the

motivating factor that leads to the development of an institutional repository is to provide free access to intellectual scholarly outputs generated by a variety of research communities. The interoperability characteristic of IRs enables scholars and researchers from a variety of disciplines to access and benefit from those digital assets. This helps to encourage the creation of open access scholarly communication. Even though the last-mentioned characteristics of IR support open access, some circumstances such as copyright restriction, policies established by a particular research group, the conditions of sponsor contracts, and monetary access fees allow an institution to limit access to some specific content published in an IR. All of these elements are essential and pertain to the development and implementation of IRs.

Besides institutional repositories, there are many other types of repositories currently being developed. According to Armbruster & Romary (2010), there are four different types of repositories, including subject-based repositories (discipline-specific or subject-oriented repositories such as arXiv, RePEc, and PubMed), research repositories, and national repositories (a national repository is generally designed for capturing and preserving scholarly outputs in the higher education of the nation such as the Japanese Institution Repositories Online [JAIRO]). Each type of repository has been developed by different communities, has different characteristics, serves different user groups, and varies from the others in terms of service quality. While institutional repositories may not offer dedicated services as do other types of repositories, they play a role in assisting scholars to deposit their work, compile publication lists, track their own impact as IRs, and support scholars in teaching and learning (Armbruster & Romary, 2010). Due to their availability, the collections of IRs serve as important information resources for community members, ranging from faculty, researchers and their colleagues, students, and alumni of the institution. Through the open access agreement, researchers and

individuals around the world can also benefit from those open access scholarly works, to which they may not normally have access.

2.1.2   Current State of IRs on a Global Level and in Asia

OpenDOAR is an authoritative directory of academic open access repositories developed by the University of Nottingham, UK. As of January 2017, OpenDOAR listed more than 3,200 open access repositories categorized into four major types: institutional, discipline, aggregating, and governmental repositories. The majority of open access repositories were institutional repositories. The largest number of repositories was in the European countries (45%), followed by Asia (20%), and North America (18%); the remaining were in Africa, Australia, the Caribbean, Central America, and other areas. According to the OpenDOAR, the United States, the United Kingdom, Japan, Germany, and Spain are the leading contributors on a global level. DSpace and Eprints are the two most popular software applications used to develop and implement IRs, while Digital Commons and other unknown software are also being used by some institutions. The content types in OpenDOAR repositories vary in the purpose of the repository organization. The content of a repository may include, but is not limited to journal articles, theses and dissertations, book chapters, unpublished reports and working papers, conference and workshop papers, multimedia and audio-visual materials, learning objects, bibliographic references, datasets, patents, software, and other types of materials. Even though the statistics from OpenDOAR show a continuous growth of IRs around the world since 2005, it should be noted that the directory might not represent the real world statistics of IRs. Since OpenDOAR aims to enhance and support academic and research activities, it accepts only the repositories that embrace the concept of open access to full text resources that are of use to academic researchers. As a result, any repositories that do not support open access are excluded.

In addition, the sites that contain only metadata records are also excluded. As a result of these criteria, some IRs may not be listed in the directory. This leads to an underestimation of the number of IRs presented in the statistics.

The literature reflects the continuous growth of IRs on the global level, including in Asia. In 2006, there were only 40 repositories registered in OpenDOAR, but the number of IRs rose to 138 in 2008 and 296 in December 2010 (Nazim and Mukherjee, 2011; Wani, Gul, & Rah, 2009). To date (January 2017), Asia is ranked the second contributor on the global level. Statistics from OpenDOAR show that Asia contributes 624 repositories, and the majority of them are maintained by organizations from major contributing countries such as Japan (211 repositories, 32%), India (76 repositories, 12%), Turkey (75 repositories, 11%), Taiwan (60 repositories, 9%), and Indonesia (58 repositories, 9%). While all of these countries are ranked as leading contributors in this continent, the rate of the adoption of IRs in each country is still low. In spite of the continuous growth of the collections and the fact that Japan ranks as the third contributor on a global level and the first contributor in this region, the number of IRs registered in OpenDOAR is still low, compared with the current number of institutional repositories listed in the National Institute of Informatics Institutional Repositories Program (NII), Japan (National Institute of Informatics, 2011, 2014). Similarly, although there are signs of a positive movement in India regarding the development of open access repositories, the growth rate of Indian IRs is still low compared with the growth rates of IRs in other developed countries. In addition, statistics show that few of the IRs in India have strong collections; many contain only a minimum number of records (Roy, Mukhopadhyay, & Biswas, 2012). According to the previous studies, issues related to the quality and quantity of contents, metadata standards, technical

infrastructure, copyrights, and policy are some of the challenges facing the development of institutional repositories in some countries (Roy et al., 2012; Shukla and Khan, 2014).

Since this study focuses on faculty acceptance of IRs in Thailand, located in the Southeast Asian Region, the following section discusses the current stage of IRs and presents findings from studies focusing on institutional repositories in that area, aiming to present a clear picture of institutional repositories and to address the current awareness and usage of IRs in this region.

2.1.3 Current Stage of IRs in Southeast Asian and Thailand

Although statistics from OpenDOAR show a continuous growth of IRs in some leading countries such as Japan and India, this growth is not everywhere in Southeast Asia. In this region, there are 104 repositories distributed among seven countries (January 26, 2017). While Indonesia, Malaysia, and Thailand are the top three contributors in this region, with 58, 21, and 12 repositories respectively, some countries, such as Cambodia, Brunei, Burma, and East Timor, have not yet instituted any repositories. Eprint and DSpace are the two most popular repository platforms, used by 88% of the repositories listed in OpenDOAR. Most repositories in this region hold several content types. Although content in IRs may vary depending on the content recruitment policy of each country and institution, the main focus of the holdings is on journal articles and theses and dissertations, while other types of content such as multimedia and audio-visual materials, learning objects, and other special item types seem to be rare.

According to Farida, Tjakraatmadja, Rudito, and Basuki (2013), there were 32 Indonesian open access repositories registered in OpenDOAR in 2013. Although, the number of Indonesian IRs registered in the OpenDOAR had increased to 55 by August 2016 and reached 58 in January 2017, the open access movement in Indonesia may be considered slow. Because the

number of IRs registered in OpenDOAR is very low when this number is compared to the total number of higher education institutions in the country (Priyanto, 2015). Among those whose have registered, some have already attained a large content size, while others are still in the developing process. Indonesian open access repositories are viewed as an alternative type of scholarly communication that is able to enhance the visibility of the scholarship of Indonesian higher education. Researchers have found that not only are open access institutional repository (OAIR) processes (i.e., content recruitment strategy) and technological functions essential for developing open access repositories in higher education in Indonesia, but people are essential, too (Farida et al., 2013; Farida, Tjakraatmadja, Firman, & Basuki, 2015; Priyanto, 2015). According to Priyanto (2015), although the librarians in Indonesia are somewhat familiar with open access, their understanding of OA is still limited. As a result, they have implemented and operated OA repositories using limited knowledge and skills.

Malaysia, the second-largest contributor in the Southeast Asian region, also faces a similar situation. Open access and institutional repositories have become topics of interest in the Malaysian scholarly community. While some research universities in Malaysia have developed institutional repositories aiming to enhance the availability and visibility of the research outputs and to increase the impact of the research generated within those universities (Abrizah, 2010), a number of studies have found that faculty in some of the research-intensive universities have little awareness of IRs. Additionally, faculty who were aware of the existence of IRs did not want to get involved in the creation of IRs, resulting in a slow rate of adoption and use of IRs (Abrizah, 2010; Singeh et al., 2013a, b). Since the value of repositories depends on authors' acceptance and use of the IRs, further studies in this area would be of great benefit for content recruitment and the development of institutional repositories.

Thailand is the third-largest contributor in this area. In the years since DSpace software was first adopted and used by Chulalongkorn University to develop the first institutional repository in 2005, some public and private universities in Thailand have started developing and implementing institutional repository projects (Klungthanaboon, Leelanupab, & Moss, 2012; Yoowang, 2012). According to OpenDOAR (2017), twelve repositories are listed in OpenDOAR. While the majority of them (10) are institutional repositories, the others are a disciplinary repository and a governmental repository. Eleven IRs use DSpace software for content management, while the other remaining repository uses IR+. According to Wipawin and Wanna (2014), intellectual repositories and knowledge banks are the two most common terms used to refer to institutional repositories, as reflected in the name of some repositories such as the Prince of Songkla University Knowledge Bank (PSU Knowledge Bank). Most repositories hold several content types. However, journal articles, conference and workshop papers, and theses and dissertations are most common content types in IRs. It should be noted that the number of repositories listed in OpenDOAR might not reflect the current number of IRs in Thailand, since any repositories that do not fully embrace the notion of open access are excluded from the OpenDOAR directory. Currently, many universities and other organizations have developed and implemented IRs. A study in 2012 found that eleven universities had implemented IRs, including nine public universities: 1) Chulalongkorn University, 2) Khonkhan University, 3) Mahidol Univerity, 4) Prince of Songkla University, 5) Rajamangala University of Technology Phra Nakhon, 6) Rajamangala University of Technology Thanyaburi, 7) Suranaree University of Technology, 8) Thaksin University, and 9) Thammasart University) and two private universities: 1) Shinawatra University and 2) Sripatum University (Yoowang, 2012). A survey of university library websites in Thailand in 2014 reported that there were 22 accessible IRs being operated at

the time. In addition, 23 institutional repositories are currently registered in DSpace User Registry. Similar to Indonesia, most of IRs in Thailand were developed for the purpose of making electronic theses and dissertations accessible (Wipawin & Wanna, 2014).

Klungthanaboon (2013) employed a qualitative and grounded theory approach to study the current status and impact of Open Access and IRs developed within three research universities based on IR stakeholders' viewpoints, including those of academic library directors, journal editors, and authors (faculty), university executives, a research funder (National Research Council of Thailand), the National Library of Thailand, and the Thai National Research Repository Committee. Content recruitment, a low rate of awareness, sustainable support from senior administrators, the copyright issue, and faculty's reluctance to participate in IRs due to their misconceptions regarding IRs are the major issues related to the development and implementation of IRs in Thailand. Similarly, Wipawin and Wanna (2014) also found that issues related to policies, quality and technical standards, and legal aspects are important issues pertaining to the success of the development of IRs in Thailand.

The literature reviewed in this section shows that even though the researchers studying the Asian region have conducted research on IRs within different contexts (e.g., in different communities, stages of development, and geographical areas, etc.), they all touch on similar issues related to content, standards and technology, and people, which are essential for developing and implementing institutional repositories. The studies highlight that issues related to people, particularly authors, seem to be the most important issues that affect the growth of IRs.

In relation to Thailand, we can see that only a few studies have been conducted although IRs have been developed and implemented by many institutions in Thailand for a considerable

period of time, particularly in the university setting. Among them, two studies have focused on the managerial aspects of the development of IRs and on technological issues, while one study addressed issues related to all groups of stakeholders. However, none of the studies in Thailand were focused solely on the users, whom many researchers agree are the major stakeholders who can make—or break—an IR. Knowledge in this area is important not only for the initial stages of planning but also for the implementation stages of institutional repositories, since any knowledge regarding the users may provide information useful for designing, developing, and improving IRs that are tailored to those users' needs.

2.2   Research Studies about Institutional Repositories

The role of IRs is to store and to make accessible digital materials. There is a simple equation by which IRs can become a successful innovation: "Input of documents + Access/Use of documents = Success of the IR" (Dorner & Revell, 2012, p. 262). Therefore, any evaluation and analysis of IRs should be done taking into account both of the elements on the left side of the equation. This section presents previous studies regarding IRs in three different areas: IR development/implementation and content deposition, authors' behavior and their self-archiving practices, and factors affecting authors' participation. Since this study focuses on factors affecting faculty acceptance and usage of IRs, the emphasis in this section is on the studies related to this area; however, it also covers other related topics such as open-access and self-archiving.

2.2.1   IR Development/Implementation and Content Deposition

Content is an essential component pertaining to the success of IRs. Researchers have agreed that the success of IRs can be predicted by the contents or the growth of contents that involve faculty contribution (Westell, 2006; Thibodeau, 2007; Yakel et al. 2009). Despite the

fast growth of IRs, the quantity of the contents deposited in IRs remains quite low. This is indicated by many studies conducted in the early stage of institutional repository development and implementation.

The survey of 45 IRs in April 2004 found that the number of documents per IR was too small in light of the huge amount of financial resources and staff hour spent. In fact, the average number of documents per repository was 1,250 (Ware, 2004). Additionally, Ware (2004) also found that issues surrounding faculty participation and difficulty persuading faculty to use institutional repositories were major challenges for IR development and implementation. Similarly, Chan (2004) conducted a case study of the University of Toronto's institutional repository—Tspace—during the implementation period of the repository, when faculty participation was entirely voluntary. It was found that the submission rate was low and that the reasons for the slow adoption of self-archiving include cultural inertia (a resistance to change or reluctance to adopt new culture or technology—self-archiving in this case), lack of trust in the repository, and uncertainty about intellectual property rights.

Additionally, results from a nationwide census of IRs in the U.S. academic institutions showed that the content sizes of both pilot-test IRs and operational IRs were very small. The majority of respondents in this study agreed that the success of IRs was connected to IR contributors and their contributions and stated that recruiting content for IRs was difficult. Issues related to faculty contributions were on the top-ranked factors that inhibited the deployment of IRs (Markey et al., 2007).

Studies from the early stage of institutional repositories show that many institutional repository projects have faced similar issues related to low submission rate, resulting from low rates of faculty participation. These are critical issues that challenge the development and

implementation of institutional repositories. It seems clear that an understanding of academic authors' perceptions regarding open access and IRs is vital, since the results of studies on this topic can be used to plan repositories that are tailored to the authors' needs. In turn, this can encourage more adoption. Emphasis should be put on academic authors, since they are the ones who will make or break IRs. Therefore, some researchers have tried to study authors' behavior and self-archiving practices.

2.2.2   Authors' Behavior and Self-archiving Practice

Foster and Gibbons (2005) observed how 25 faculty members at the University of Rochester across a variety of disciplines, including Economics, Physics, Political Science, Linguistics, and Visual and Cultural Studies, interacted with digital tools and how they organized work in both virtual and physical workspaces. They identified the specific needs of the faculty. For instance, the faculty needed to work with co-authors, preferred complete control over their work, wanted to be safe with regard to copyright issues, and wanted to make sure that participating in an IR would not increase their workload. This means that faculty members were not eager to participate in an IR and deposit their work if the process required additional time and effort. Understanding the faculty behavior gave the research team a fuller perspective on the faculty's lack of intention to participate in the IR. Personalizing the digital repository to meet the needs of the faculty and enhancing DSpace to make it much easier for faculty members to deposit their work are two possible strategies to increase faculty participation. A faculty-centric approach might make the IR become more useful and more appealing to the faculty, which may lead them to deposit more work into the IR (Foster & Gibbons, 2005). This work is the pilot work considering the importance of understanding users' behavior and their preference in regard to institutional repository design.

Allen (2005) examined the content of twenty-five repositories operated in the UK and employed a survey and follow-up interviews to study the attitudes and behavior of academics in the humanities, including lecturers or professors and Ph.D. and post-doctoral students. The results of the study were compared with findings from previous studies focusing on scientific, technical, and medical (STM) fields. Since the population of the study was all academics in the humanities, it was difficult to calculate the size and take a sample from the whole population. Therefore, the researchers decided to distribute questionnaires through the JISCmail service. There were only 75 academics, including lecturers or professors and PhD and post-doctoral students, who participated in the study. The majority of respondents were from the UK (60%), North America (15%), and Europe (15%), with the remaining (5%) from India, China, Australia, and New Zealand. The majority of the respondents, about 49 out of 75 (65%), considered themselves as IRs contributors, while the others considered themselves as non-contributors. While the users of the institutional repositories perceived increased accessibility, increased research impact, and the permanence of the archive as the most common advantages of IRs, other groups cited fear of plagiarism, the quality of content of the repositories, and the copyright agreement issue as the top three perceived disadvantages. However, Allen (2005) found that both groups shared concerns over two similar issues: "plagiarism and breaking copyright agreement" (p. 43). It was concluded that despite the low level of awareness about and low usage or IRs, academics in the humanities saw the benefit of depositing materials. This benefit was not only for themselves but also for other users (readers). Although this study was the first empirical study emphasizing academics in the humanities, its findings cannot be generalized to other contexts and used to explain attitudes and behavior of academics in the humanities toward IRs in general due to the sampling method, which raised issues regarding external validity.

During the same period of time, Swan and Brown (2005) carried out a large-scale study, involving 1,296 respondents from the arts and humanities, the social sciences, and the scientific disciplines across different geographic locations, including the United Kingdom, Western Europe, North America, Japan, Asia, Central/South America, Africa, and Australia and New Zealand. The researchers explored authors' experiences and opinions on publishing in open access journals and self-archiving. The majority of the respondents (66%) reported that they had never published any work in open access journals. Those who had published in open access journals cited accessibility as the major reason for publishing, followed by the larger readership and faster publication time than was possible with subscription-based journals. The majority of respondents had self-archived at least one article during the previous three years, through at least one of the following media: an institutional (departmental) repository, a discipline-based repository, or a personal/institutional website. Some authors who had not self-archived cited the perceived time required for self-archiving and technical difficulties as major reasons for reluctance to self-archive, while some expressed concern about copyright infringement and viewed it as "a stumbling block for self-archiving" (Swan & Brown, 2005, p. 3).

Wust (2006) explored the attitudes of researchers in the field of education towards publishing in open access and institutional repositories. The participants in that study expressed their interest toward open access publishing, and they considered publishing in open access venues as a viable alternative to the traditional system. Importantly, most of the participants in that study neither had experience with depositing work in IRs nor knew about IRs. However, they had discussed the advantages and disadvantages and the types of documents that they would willing to share through IRs based on the researcher's brief explanation of the concept of the e-print server. While some scholars felt that IRs might help to foster a growing number of

interdisciplinary projects as they housed and showcased a variety of work produced by researchers in many departments in an institution, some of them feared that they might lose control over their work and expressed concern about the copyright issue. Some also mentioned that IRs might suffer from the lack of a search function that could facilitate cross-discipline searching and cross-institutional searching. The participants also indicated that the usability of the system and the ease of use might affect their willingness to participate and deposit their materials. One participant mentioned that she might not be willing to deposit work if the user interface was too complicated. Therefore, providing support to assist faculty members in overcoming this problem would be an appropriate solution to this issue.

Different from previous studies, Pickton and McKnight (2006) focused on studying 34 research students, from the Faculty of Engineering, the Faculty of Sciences, and the Faculty of Social Sciences and Humanities, rather than on faculty members. The research students were viewed as important potential users of an institutional repository, since this group of researchers was considered as both academic authors (IR contributors) and users (readers) of the Loughborough University Institutional Repositories (LUIR). The structured interview was used to gather background information (e.g. search behavior, publication history, and reasons for publishing), as well as information on students' current understanding of open access publishing, practical issues surrounding their use of the LUIR, and students' motivations and deterrents from depositing work in the LUIR. The majority of students stated that they were influenced by supervisors or colleagues, research funders, and co-author to make their work publicly available. Fewer students agreed with the deterrent statements and expressed concern that if they published their works in the LUIR, they might not be able to publish those works elsewhere later. In addition, some of them feared that others might use and copy their work without permission or

were worried about the copyright issue, plagiarism, and confidentiality of their work. These reasons were cited as deterrents to depositing work in the LUIR.

In the following year, Davis & Connolly (2007) conducted an evaluative study of Cornell's DSpace in order to discover the reasons for faculty members' non-use of Cornell's DSpace. The researchers conducted in-depth interviews with eleven faculty members from various disciplines, including the sciences, social sciences, and humanities. The purposes of the study were to explore the faculty's attitudes, motivations, and behaviors regarding the use of IRs. The findings indicated that Cornell's Dspace was underpopulated and underused by the faculty and found that the faculty had little knowledge of it and little motivation to use it. Nine out of eleven participants stated that they used personal or research group Web pages for disseminating their scholarly work, since these two types of media were easier to use and control. Some faculty members used both personal/group Web pages and other digital repositories and cited permanence (data migration), policy required by granting agencies and publishers, timeliness for disseminating scholarly work, and the registration of new ideas as reasons for using digital repositories, particularly for a discipline specific repository such as arXiv. On the other hand, faculty members cited several reasons such as the learning curve, copyright concerns, publishing of original work (redundancy with other modes of dissemination), fear of plagiarism, and concern about the quality of other work published in IRs as reasons for not using or participating in any IRs. Regarding the specific questions on Cornell's DSpace, only four faculty members knew about the repository, while only one faculty member (the historian) had deposited work there. The reasons for non-use were the use of subject repositories and the lack of functionality on DSpace, and some faculty viewed institutional repository as a separate entity isolated from other university information sources. Moreover, the researchers concluded that the faculty's

behavior and perception of IRs might be shaped by the disciplinary norms and their reward structure. Thus, understanding these considerations may provide an effective strategy for encouraging faculty to participate in and contribute to IRs.

Faculty and researchers' concerns about the quality of work published in IRs are reflected in other studies. Theodorou (2010) sought to determine the reasons why the acceptance and growth of open access repositories had been slow by analyzing researchers' opinions about the open access IRs of 20 social and natural science academic institutions in Europe and North America. While 532 e-mail questionnaires were sent out, only192 answered questionnaires were returned. Although the majority of researchers considered themselves as experienced users of OA journal and IRs, fewer of them had published in OA journals and deposited works in OA IRs. The majority of them indicated that they would willing to publish in those OA IRs if they used the same selection criteria as high-reputation subscription-based journals. Some participants (six percent) in the study expressed concern about the quality of work in open access IRs and did not consider an open access repository as a prestigious place to publish. This group of researchers indicated unwillingness to participate in IRs. Clearly, the selection procedure is essential for open access institutional repository development, since it helps to establish not only researchers' (contributors') but also readers' trust toward repositories.

It is clear that studies focusing on authors' behavior and attitude toward open access and IRs and their self-archiving practice help researchers to gain a greater understanding of this important group of institutional repository stakeholders. Their reasons for and against depositing work in institutional repositories found in these studies have been used in many later studies focusing on understanding the factors affecting authors' participation.

2.2.3   Factors Affecting Authors' Participation

Since understanding academic authors' behavior and the factors surrounding their contribution may provide guidelines and criteria for content recruitment, researchers are attempting to study this major group of IRs stakeholders. Many empirical studies in this area have been conducted in different contexts. While some researchers attempt to understand authors in a variety of disciplines and the factors affecting their contribution, others focus on studying authors in a certain discipline and are interested in more specific factors.

From a review of the literature, Shearer (2003) identified critical success factors affecting the growth and use of IRs. Those factors include input activity (e.g. the number of documents deposited into an IR), disciplines, activities, archiving policies, copyright policies, content types, staff support, quality control policies, software, and the use of the repository. It should be noted that there are other factors or characteristics such as organizational culture that might affect the growth of IRs and their use. Some factors in this study, particularly disciplinary differences, copyright, and quality control, have been used widely in many studies in an attempt to understand the reasons underlying faculty contribution.

Park and Qin (2007) employed grounded theory to explore factors affecting the decisions of scholars in the social sciences and information-related field to publish and use articles in open-access journals. They identified seven factors, perceived journal reputation, perceived topical relevance, perceived availability, perceived career benefit, perceived cost, perceived content quality, and perceived ease of use, pertaining to the scholars' willingness to publish in open-access journals. The first three factors are common factors affecting scholars' willingness to publish and use open-access journals. The researchers concluded that perceived content quality was an essential factor that affected scholars' willingness to publish. They also found an

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interrelationship between factors affecting scholars' willingness to publish and use of OA journals. The perceived availability positively affected perceived career benefit and perceived ease of use. The availability of the OA journals can enhance accessibility and bring about wider recognition. The model also showed a negative relationship between perceived availability and perceived content quality. The authors explain that the negative relationship happens because "scholars tend to perceive high availability as low rarity, resulting in the less embedded value" (p. 78). Since the participants in this study were scholars from social sciences and information-related fields, their behavior, attitudes, needs, and acceptance of OA might differ from those of scholars from hard sciences, such as mathematicians, physicists, and biomedical scientists. The authors acknowledge that their findings might not be applicable to other academic disciplines, due to the differences in idiosyncrasies of communication within their disciplines. Thus, understanding discipline differences is essential. Further research focusing on scholars in a single discipline or covering multiple disciplines would be of great benefit to this area. The researchers confirm that understanding the factors influencing user acceptance would provide criteria for content recruitment for OA journals and IRs. Park and Qin's study was the first study to focus on scholars seen as both authors and content creators, as well as users of open access journals. Their study provides a research framework for studying scholars as both authors and users of not only open access journals but also other venues considered as alternative ways of scholarly communication.

In another empirical study, Kim (2008) investigated the motivational factors affecting faculty members' decisions to participate in various forms of self-archiving practices based on a socio-technical network framework proposed by Kling et al. (2003). Based on this framework, self-archiving behavior is viewed as a type of socio-technical activity that takes place in

electronic scholarly communication forums. Kim (2008) focused on six out of eight features of the model: 1) system interactors, 2) core interactor groups (faculty members who performed self-archiving), 3) excluded actors/undesired interactions, 4) existing communications, 5) resource flows, and 6) incentive structure. Authors (faculty members) were viewed as core interactors, and IRs were considered as one of the existing communication systems. The incentive for self-archiving consisted of both extrinsic and intrinsic benefits, which were considered as motivating and impeding factors for self-archiving.

A survey and follow-up interviews were employed to study faculty members from 17 Carnegie Research Universities with DSpace-based IRs. The participants were 684 faculty members. The researcher identified four motivators and three barriers that had a significant impact on faculty self-archiving in various media, including IRs, and proposed a model for factors affecting faculty self-archiving, shown in Figure 2.1.
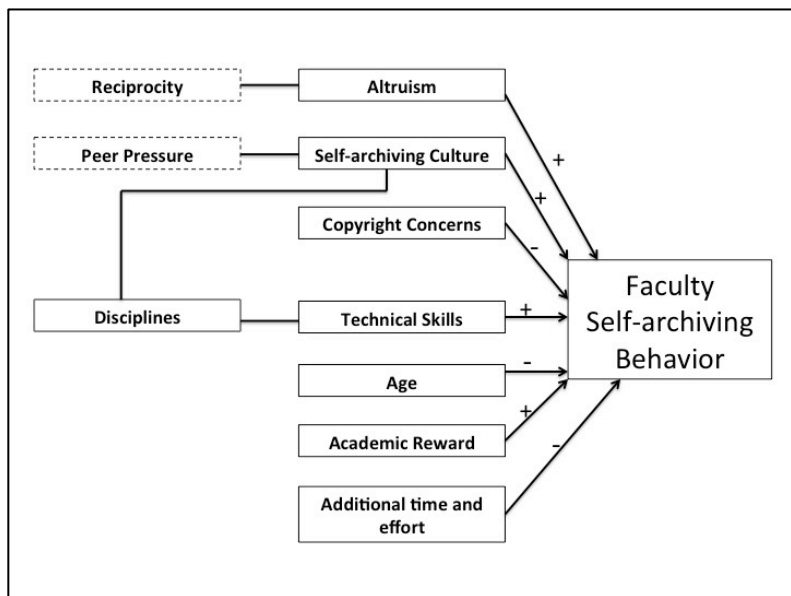
Figure 2.1. Factors affecting faculty self-archiving. Adapted Kim (2010).

According to Kim's model, altruism is the most powerful motivator for self-archiving. Altruism is operationalized as "satisfaction in helping others through knowledge sharing" (Kim,

2008, p. 20). It is driven by the authors' interest in making their work easily accessible and the expectation that other researchers, particularly ones who have limited access, will benefit from their work. The second and third most powerful motivators were self-archiving culture and the required technical skills. These two motivators are related to academic discipline or discipline differences, which have been identified as an important factor in studies on authors' acceptance of and contribution to IRs (Creaser et al., 2010; Davis & Connonlly, 2007; Dulle, 2010; Park & Qin, 2007; Yakel et al., 2013). The last motivator was academic reward, the belief that self-archiving has a positive impact on promotion, tenure, and funding. In essence, if the faculty members believe that self-archiving enhances, rather than impedes, academic rewards, then they will be willing to self-archive and contribute to IRs.

Kim (2010) also found that copyright, age, and time and effort required for self-archiving were negatively associated with self-archiving. The copyright issue has also been identified in previous studies as an important factor for IR contribution. Age is the second most significant barrier to self-archiving. Kim found that younger faculty members tended to self-archive a greater percentage of their work than did older faculty, since they were more familiar with publishing and disseminating their work on the Internet. The third most significant barrier, time and effort, is also seen as a barrier for IR deposition (Chan, 2004; Foster & Gibbons, 2005).

Kim's (2008) study was the first large scale study focusing on motivational factors affecting faculty members' decisions to self-archive in not only IRs and disciplinary repositories but also other forums, such as personal websites. Her study provides the theoretical framework for the present study. She suggests, and confirms, that altruism (an intrinsic benefit) and academic reward (an extrinsic benefit) are powerful motivators for self-archiving. In addition,

other factors found in her study can be used to study faculty participation and contribution in other contexts.

Following previous studies, Creaser et al. (2010) found from a large-scale quantitative study of European researchers (a questionnaire returned by 3,139 respondents) that accessibility and availability of the scholarly outputs was a key factor influencing authors to contribute to open access repositories. The increased accessibility of the scholarly information and expanded readership helped to increase the impact of the scholarly works. On the other hand, the copyright issue and infringement of publishers' copyright were the two most important concerns expressed by the majority of European research authors. Even though, recently many publishers have begun to support open access and allow authors to deposit their work, particularly stage-two manuscripts (authors' final peer-reviewed manuscripts), in open access repositories. Similar to other researchers, Creaser et al. (2010) also reported findings on disciplinary differences in European scholarly authors' awareness and attitudes toward open access repositories. Researchers in different disciplines, including the Medical Sciences, Life Sciences, Physical Sciences and Mathematics, Social Sciences and Humanities and Arts, and Interdisciplinary Sciences, had different understanding and awareness of open access repositories and distinct motivations for depositing scholarly work. For instance, authors in the fields of Physics and Economics have a long tradition of experience in self-archiving pre-print work in subject-based repositories. The results also show that authors from Physics and Mathematics were more likely to deposit their work into a repository than were authors from any other disciplines, since self-archiving to them is viewed as the norm and a part of routine work. The study identified many factors such as accessibility and availability of the scholarly outputs which in turn are related to

academic reward, disciplinary differences, and copyright issues that should be considered as important factors in the present study.

Yakel, Faniel, Kriesberg, and Yoon (2013) employed a qualitative approach to study trust in digital repositories among archaeologists and quantitative social scientists. Disciplinary similarities and differences associated with trust in digital repositories were discovered. Even though researchers in both disciplines focused on structural assurance guarantees (i.e., factors affecting one's sense of security) associated with trust in digital repositories, they emphasized different aspects. While almost half of the archaeologists viewed the guarantee of preservation and sustainability as a major factor, the social scientists mentioned institutional reputation more frequently when discussing trust. They also found a distinction between novice and expert social scientists. The novice social scientists were more likely to discuss institutional reputation as a trust factor than were the experts. In addition, among the social scientists, novices mentioned colleagues as a social factor influencing their decisions to trust a repository more than they mentioned experts. Long-term preservation is considered as a motivating factor for IR contribution. Both archaeologists and quantitative social scientists cited preservation and sustainability guarantees when discussing trust in digital repositories. They noted that the guarantees of preservation and sustainability were important factors to all IR stakeholders, particularly for faculty members, as reflected in the interviewees' dialog:

> Long-term preservation is important so to know that it's kind of a sustainable practice and it's going to be there in the long run…what happens when the NEH or the NSF funding runs out? Who's going to take care of the collection, who's going to run it? So for using a repository, I'd want to know that there was a long-term plan for it. That's really important. (Yakel et al., 2013, p. 151)

It is essential for academic libraries and other IR developers to explicitly communicate the strategy for long-term preservation and sustainability of the IRs to the users or designated

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communities, as this can help to establish trust in IRs. This in turn will lead to more deposition and use. On the other hand, uncertainty regarding the long-term preservation and sustainability of scholarly content and of IRs themselves might make some authors reluctant to deposit their work into IRs.

Different from previous studies, Dulle (2010) employed the Unified Theory of Acceptance and Use of Technology (UTAUT model) to study factors contributing to the acceptance and usage of open access by academic researchers in six public universities in Tanzania. The UTAUT model has rarely been used in open access and IR related study. As in prior empirical studies, questionnaires and interviews were used as data collecting methods. The questionnaires were used to study academic researchers in six public universities in Tanzania. In addition, sixty-nine policy makers in those universities were interviewed. The UTAUT model is suitable for studying the adoption of open access in the context of the public university in Tanzania (Dulle, 2010; Dulle & Minishi-Majanja, 2011). Attitudes toward open access, awareness, effort expectancy (EE), and performance expectancy (PE) were key determinants of the researchers' intention to use open access outlets, while awareness, behavioral intention (BI), facilitating conditions (FC), and social influence (SI) significantly affected their actual usage of open access outlets, including IRs. While EE, PE, BI, FC, and SI are major factors in the original UTAUT model, attitude toward open access and awareness were added to test whether they had an effect on faculty members' behavioral intention and usage behavior. The findings also indicated that both researchers and policy makers were aware of open access. The majority of researchers (62%) indicated that they accessed and used open access outlets, while only 20% of them disseminated their scholarly contents through open access venues. As this study was conducted in a developing region, issues related to technology were cited as important factors in

relation to both depositing and access. For instance, low Internet self-efficacy such as inadequate information search skills was cited as the main hindrance for many researchers to access and use open access outlets. In addition, slow network connectivity and inadequate online publishing skills were major factors deterring the researchers from disseminating their scholarly work through open outlets (Dulle, 2010; Dulle, Minishi-Majanja, & Cloete, 2010).

In Dulle's 2010 study, open access publication was viewed as technology, and open access outlets were considered as technological tools that scientists or researchers coul use to distribute their scholarly work as well as to access and use scholarly content distributed by others. Thus, the UTAUT was used to study factors contributing to the acceptance and usage of this technology in this context. Some constructs (factors) in the UTAUT are similar to the constructs in Kim's proposed model. For instance, effort expectancy (EE) in the UTAUT model refers to "the degree of ease associated with the use of the system" (Venkatesh et al., 2003, p.450). This construct is similar to "additional time and effort" in Kim's (2008, 2010) studies. In addition, one of the independent variables among the contextual factors in Kim's (2008) study, influence of external actors, refers to as "the extent to which professors perceive the influence of co-authors, grant-awarding bodies, and universities on the decision to self-archive" (p. 76). This factor is similar to social influence (SI) in the UTAUT model, the notion that an individual's intention to use a new technology is influenced by other individuals who are important to her or him such as peers and superiors. However, the influence of external factors was found not significant in Kim's (2008) study. Therefore, this independent variable was disregarded and excluded from Kim's model of factors affecting faculty members' self-archiving. The integration of these two models provides a better framework for this present study, which will focus on

factors that might affect faculty members' use of IRs in the Thai higher education context. (The UTAUT model is discussed in detail in Chapter 3).

Similar to Dulle (2010), Singeh et al. (2013a) also employed the UTAUT model to study Malaysian authors' acceptance of self-archiving in institutional repositories and found that performance expectancy, effort expectancy, social influence, and facilitating conditions did not influence Malaysian authors' behavioral intention to self-archive in IRs. It is interesting to note that even though the four constructs of the UTAUT model, performance expectancy, effort expectancy, social influence, and facilitating condition, were not significant and did not influence behavioral intention, they were significant relative to each other. For instance, there was a positive significant relationship of effort expectancy, social influence, and facilitating condition with performance expectancy. Performance expectancy is "the degree to which an individual believes that using the system will help him or her to attain gains in job performance" (Venkatesh et al., 2003, p. 447). This relationship can be explained by saying that the faculty would consider effort expectancy (i.e., the degree of ease associated with self-archiving), social influence (i.e., the degree to which a faculty member perceived that important others believed he/she should self-archive), and facilitating condition (i.e., the degree to which technical infrastructure existed to support self-archiving) as the conditions that helped them to self-archive. These factors were significantly positive related to performance expectancy, which means for example that faculty members believed that self-archiving in open access repositories was useful for disseminating their research, increasing their benefit, and making their work more visible. From this study, we can see that authors' contributions still remain a major challenge for IRs and self-archiving. Future studies are needed to make possible a better understanding of

authors and to determine the factors affecting their adoption of self-archiving and use of institutional repositories.

Most of the research has studied faculty members as IR authors, content depositors, and contributors, while few studies have been done from the perspective of the access side, which views faculty members as users of IRs. Among those studies, Park and Qin (2007) employed a qualitative approach to study factors affecting scholars' decisions to publish and use articles in open-access journals. In addition, Dulle (2010) studied the factors influencing the adoption of open access scholarly communication by researchers both as users and as contributors to open access outlets. Yakel et al. (2013) studied trust in digital repositories among archaeologists and quantitative social scientists and found that trust is important for both authors and users of institutional repositories.

The literature shows that since the early stage of IR development, many researchers have attempted to understand IR users, particularly faculty members, who are considered the major contributors to IRs. Many factors that might affect their decision to participate and contribute to IRs have been identified and tested. Some factors may be considered as facilitating factors, while others are impeding factors. Those factors might affect users' acceptance and usage of IRs differently, particularly in different situations and contexts. The present study investigates faculty members as both IR contributors and users and to fill the gap in our knowledge about the individual level of acceptance and use of IRs and the factors affecting faculty members' acceptance and use of IRs in the Thai Research University context. The results will deepen our understanding not only in the institutional repository field but also in the area of technology acceptance and adoption.

CHAPTER 3

THEORETICAL FRAMEWORK

This chapter discusses two theories as a basis for formulating a suitable research model for the present study. The unified theory of acceptance and use of technology (UTAUT) and Kim's model of factors affecting faculty self-archiving are discussed, as they serve together as the theoretical framework for this study. The integration of the two models is presented.

3.1   The Unified Theory of Acceptance and Use of Technology

Information technology acceptance and adoption has become a research area that has received considerable attention as part of the process of information system implementation. According to Dillon and Morris (1996), user acceptance is "the demonstrable willingness within a user group to employ information technology for the tasks it is designed to support" (para. 4). More importantly, lack of user acceptance is a significant impediment to the success of new information systems.

A number of theories/models have been proposed to study factors affecting the acceptance and use of technologies. Some well-known technology acceptance models have emerged from different approaches, such as the Theory of Reasoned Action (TRA), the Technology Acceptance Model (TAM), the Motivational Model (MM), the Theory of Planned Behavior (TPB), the Combined TAM and TPB (C-TAM-TPB), the Model of PC Utilization (MPCU), the Innovation Diffusion Theory (IDT), and the Unified Theory of Acceptance and Use of Technology (UTAUT). A comparison of the proposed theories/models and their main constructs can be seen in Table 3.1.

From Table 3.1, it is clear that among the competing models, the UTAUT model contributes to a better understanding of user acceptance and use of technology than other

competing models, due to its high rate of prediction (Venkatesh et al., 2003). In fact, the UTAUT

model is able to explain almost 70 percent of variance ($R^2 = 0.69$) in user intentions to use

information technology, compared with other competing models that explain only less than 53

percent of variance (Venkatesh et al., 2003).

Table 3.1

Technology Acceptance Theories/Models

Theory/Model	Developers	Main Constructs	Explained Variance (R^2)
Theory of Reasoned Action (TRA)	Fishbein and Ajzen (1975)	- Attitude Toward Behavior - Subjective Norm	0.36
Technology Acceptance Model (TAM)	Davis (1989)	- Perceived Usefulness - Perceived Ease of Use	0.53
Motivational Model (MM)	Davis et al. (1992)	- Extrinsic Motivation - Intrinsic Motivation	0.38
Theory of Planned Behavior (TPB)	Ajzen (1991) adapted from TRA	- Attitude Toward Behavior - Subjective Norm - Perceived Behavioral Control	0.36
The Combined TAM and TPB (C-TAM-TPB)	Taylor and Todd (1995) adapted from TRA/TPB and TAM	- Attitude Toward Behavior - Subjective Norm - Perceived Behavioral Control - Perceived Usefulness	0.39
Model of PC Utilization (MPCU)	Thompson, Higgins, and Howell (1991)	- Job-fit - Complexity - Long-term Consequences - Affect Toward Use - Social Factors - Facilitating Conditions	0.47
Innovation Diffusion Theory (IDT)	Rogers (1995, 2003); Moore and Benbasat (1991) refined a set of constructs for studying individual technology acceptance.	- Relative Advantage - Ease of Use - Image - Visibility - Compatibility - Results Demonstrability - Voluntariness of Use	0.40
Social Cognitive Theory (SCT)	Baudura (1986); Compeau and Higgins (1995) applied SCT to the context of computer utilization.	- Outcome Expectation-Performance - Outcome Expectation-Personal - Self-efficacy - Affect - Anxiety	0.36
Unified Theory of Acceptance and Use of Technology (UTAUT)	VenKatesh et al. (2003)	- Performance Expectancy - Effort Expectancy - Social Influence - Facilitating Conditions	0.69

The UTAUT was developed based on an empirical comparison of eight technology acceptance models and longitudinal studies. First Venkatesh et al. (2003) conduced a comprehensive comparison of eight technology acceptance models. They identified limitations of those models and found that technologies that had been studied in some studies were relatively simple and individual-oriented rather than complex and sophisticated organizational technologies. In addition, the participants were mainly from academic settings, and were often students, rather than employees in organizations. Moreover, the proponents of most of the eight models conducted studies after their participants had decided to accept or reject the technologies rather than in the active adoption decision-making process. The last limitation in those models is the voluntary vs. mandatory context. Some models were tested in a voluntary usage context; therefore, it is difficult to generalize those results to mandatory settings. After identifying the limitations from the previous models, Venkatesh et al. (2003) conducted a longitudinal study in four different organizational contexts—entertainment, telecom services, banking, and public administration—where a new technology was introduced in real workplace settings. The questionnaires, which contained items used to measure constructs from all eight models, were administered at three different points of time (at one month, three months, and six months). Then findings from all of the studies were compared. Constructs found not significant were deleted. The final model, consisting of four major determinant factors (main constructs) and four major key moderators, was developed and cross-validated using data from two new organizations.

The major determinant factors are performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating conditions (FC). All four determinants "play a significant role as direct determinants of user acceptance and usage behavior" (Venkatesh et al., 2003, p. 447). The model has four moderating factors, which are gender, age, experience, and

voluntariness of use. According to the model, the performance expectancy, effort expectancy, and social influence factors have a positive direct effect on behavioral intention, while both behavioral intention and facilitating conditions factors have a direct effect on use behavior, as can be seen in Figure 3.1. The following section discusses each construct in detail.
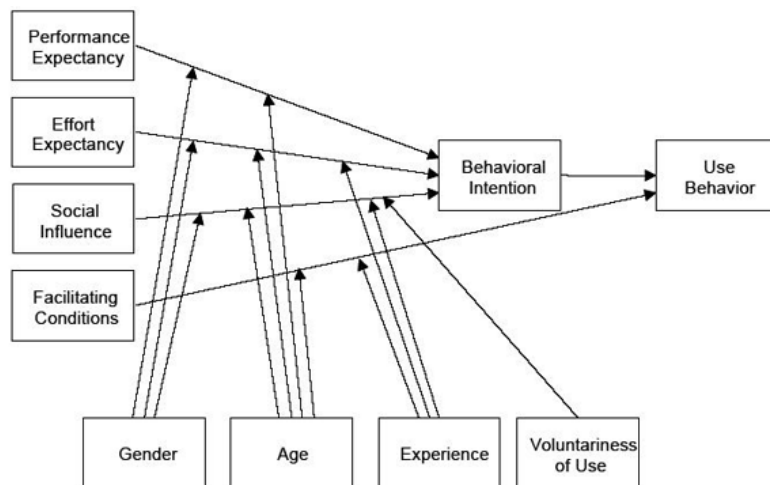
Figure 3.1. The UTAUT model. Adapted from Venkatesh et al. (2003).

3.1.1 Performance Expectancy (PE)

According to Venkatesh et al. (2003), performance expectancy (PE) is "the degree to which an individual believes that using the system will help him or her attain gains in job performance" (p. 447). This construct is similar to perceived usefulness in the technology acceptance model, extrinsic motivation in the motivational model, job-fit in the model of PC utilization, relative advantage in the innovation diffusion theory, and outcome expectations in the social cognitive theory. The authors suggested that performance expectancy was the strongest predictor of individual usage intention. They also found that the effect of performance expectancy on usage intention was moderated by age and gender.

3.1.2 Effort Expectancy (EE)

Venkatesh et al. (2003) explain that effort expectancy is "the degree of ease associated

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with the use of the system" (p. 450). The model postulates that effort expectancy (EE) has a significant positive direct effect on intention to use a technology. According to the model, the effect of effort expectancy on behavioral intention to use a particular system is moderated by experience, age, and gender. The authors found that the effect of EE is greater for women, older workers, and those who have limited experience with a particular information system.

3.1.3 Social Influence (SI)

Social influence is "the degree to which an individual perceives that others whose opinions are important to them believe he or she should use the new system" (Venkatesh et al., 2003, p. 451). This can be understood as meaning that an individual's intention to use a new technology is influenced by other important individuals' opinions that he/she should use the new technology. The important individuals can be either peers or superiors. Venkatesh et al. (2003) also state that the social influence factor is significant in mandatory environments, but it is not significant in voluntary environments. In addition, the effect of social influence on acceptance and adoption of technology is complex and depends upon a wide variety of group influences.

3.1.4 Facilitating Conditions (FC)

According to Venkatesh et al. (2003), the term facilitating conditions (FC) refers to "the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system" (p. 453). This construct is conceptualized similarly to constructs in other models such as perceived behavioral control in the Theory of Planned Behavior (TPB); facilitating conditions in the Model of PC Utilization (MPCU); and compatibility in the Innovation Diffusion Theory (IDT). Venkatesh et al. (2003) also suggest that the facilitating conditions will become insignificant in predicting usage intention when both effort expectancy and performance expectancy are present. According to the model, facilitating conditions have a

significant direct effect on usage behavior. It has been postulated that the usage of technology depends on the availability of an enabling environment for its application.

Effort expectancy (EE), performance expectancy (PE), and social influence (SO) are direct determinants of behavioral intention (BI), while behavioral intention (BI) and facilitating conditions (FC) are significant direct determinants of use behavior (US). It has been theorized that some determinants, such as self-efficacy, anxiety, and attitude toward technology, are not direct determinants of usage intention, although these determinants were found significant in other models. Among these three determinants, attitude presents an interesting case. Attitude was found to be significant across models (TRA, TPB/DTPB, and MM) and was theorized to be the strongest predictor of behavioral intention in those models, while this construct was not significant in other models, including C-TAM-TPB, MPCU, and SCT (Venkatesh et al., 2003). Since any knowledge in this area can contribute to a better understanding of behavioral intention and usage of a particular technology, it is interesting to study the role of attitude in explaining faculty members' behavioral intention and use of IRs.

The UTAUT model was developed based on an empirical study of the other existing technology acceptance models. This model contributes to a better explanation of behavioral intention and use of technology over the other existing technology acceptance models. Therefore, the UTAUT has been widely adopted and used as a theoretical framework for technology acceptance research conducted in different contexts.

3.2   Studies Using the UTAUT Model

Due to its effectiveness, the UTAUT model has been applied to study users' acceptance and use of various technologies in different contexts and cultures within various disciplines. The model has also been used in the library and information science field. This section presents some

of the technology acceptance studies that have utilized the UTAUT model as their theoretical framework.

Tibenderanna and Ogao (2008) applied the UTAUT model to study end-users' acceptance and use of e-library services in eight universities in Uganda. Self-administered questionnaires were developed based on a pre-existing tool employed by Venkatesh et al. (2003) and were used to collect data from participants, including undergraduate students, postgraduate students, faculty, and staff. Expected benefit (perceived benefit) was added to the model, and it was postulated that usage behavior would account for a significant percentage of variation on expected benefit. Results from the study indicated that all dependent constructs, including behavioral intention ($R^2 = 0.30$), use behavior ($R^2 = 0.09$), and expected benefit ($R^2 = 0.18$), had a significant positive inclination to end-users' acceptant and usage of e-library services. However, effort expectancy (PE) and voluntariness, found not relevant in the e-library context, were eliminated and replaced with relevance and awareness. The robustness and efficiency of the UTAUT model helps to determine end-users' acceptance and use of e-library services, particularly the context of less developed countries.

In a large-scale study of 1,433 scientists from 49 countries, Mann, Walter, Hess, and Wigand (2009) focused on 481 researchers from three different disciplines: information systems, German literature, and medical science. The researchers defined Open Access publication media as "technology that provides scientists with a tool to reach their goals of distributing research results and documenting copyright" (p.138). They sought to uncover the reasons for the relatively low-level use of Open Access publishing. Based on the UTAUT model, they hypothesized performance expectancy, effort expectancy, and social influence to be predictors of behavioral intention to use Open Access publishing. Attitude was added to the research model

based on the theory of Planned Behavior. Significant predictors of the scientists' behavior intention to use Open Access publishing were identified. However, the researchers found that among the original UTAUT constructs, performance expectancy (PE) not only was a construct that could be verified as a significant predictor of behavioral intention but also had the largest predictive power in comparison to other factors, including peer use and attitude. In contrast with the original model, the researchers identified attitude as a significant predictor of behavioral intention. However, it should be noted that this study was conducted when the Open Access model was already at a developed stage. The web-based questionnaires were distributed between July and August 2006, when the attitude toward Open Access publishing was extremely positive. This might have affected the participants' behavior intention as shown in the result that attitude was one of the significant predictors of behavioral intention along with other predictors.

Dulle (2010) studied the extent to which researchers in Tanzanian public universities believed that open access facilitated the accessibility and dissemination of scholarly content, utilizing the UTAUT model. They modified the UTAUT model by adding attitude toward open access and Internet self-efficacy to the main constructs and academic position and awareness as moderators in the research model, since these were considered as just as important as other factors in the research environment regarding open access. They found that not only were effort expectancy and performance expectancy key determinants and predictors of Tanzanian researchers' behavioral intention to use open access, but attitude and awareness were as well. On the other hand, Internet-self efficacy was not significant. In addition, behavioral intention, social influence, and facilitating conditions were found to be significant and had direct effects on researchers' actual usage of open access outlets. By testing the direct effects of moderators including age, gender, awareness, experience, and position (rank), the researcher found that

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participants' awareness was the only factor that had a direct effect on behavioral intention. This implies that researchers who were not aware of open access were less likely to use this mode of scholarly communication in the future. The finalized version of the open access scholarly communication model consists of five key constructs: attitude, performance expectancy, effort expectancy, social influence, and facilitating conditions. It is evident that the findings from this study contradict those of Venkatesh et al. (2003), who postulated that attitude would not have a significant effect on behavioral intention. Thus, it will be interesting to study and include this factor in the present study.

Orji, Cetin, and Ozkan (2010) extended the UTAUT model in a multicultural context. They developed the Nationality based UTAUT model (NUTAUT), adapted from the UTAUT model. Nationality was introduced based on the assumption that the independent variables in the UTAUT model would have an impact on behavioral intention and use behavior differently when moderated by nationality, which was then added as a new modulating variable. The NUTAUT was tested and used to study critical factors in electronic library system acceptance by national and international students in the Middle East Technical University (METU) in Turkey. The results from 116 (58 national and 58 international student) participants showed that the NUTAUT was robust in predicting acceptance by both National and International students (91% and 98%, respectively). The researchers also found that each independent variable (construct) affected each group differently. While effort expectancy and facilitating conditions were significant factors for both groups, performance expectancy and social influence were significant factors for International student participants. The findings also showed that facilitating conditions had the highest contribution to acceptance and use. This construct remained the most important factor across groups (Orji, 2010; Orji et al., 2010). It is evident from this study that

different groups of users of a particular technology have different usage behavior. In addition, the constructs in the UTAUT model affected users of a particular technology differently. Identifying the most influential factors for acceptance and usage of a particular technology will facilitate well-informed decision making in the design and improvement of that technology.

The UTAUT model has also been used to study technology acceptance and use in the Thai context. Kripanont (2007) examined the extent to which academics used and intended to use the Internet in their work and investigated the extent to which using the Internet helped academics in improving their professional practice, professional development, and quality of working life. The author formulated a research model of technology acceptance in relation to Internet usage by Thai academics with five core determinants: performance expectancy, effort expectancy, social influence, facilitating conditions, and self-efficacy. Self-efficacy was added as a direct determinant. The questionnaire survey was used to gather data from 920 academics in 20 business schools at 20 public universities. The response rate was 49% with 455 completed questionnaires. The model was tested and modified. The final model successfully explained academics' use and intention to use the Internet in teaching. Perceived usefulness (PU), perceived ease of use (PEOU), and self-efficacy played important roles in determining usage behavior in teaching, while only perceived usefulness (PU), and self-efficacy (SE) played important roles in determining usage behavior in other tasks. Kripanont also found that some moderators, age, research university plan, and level of reading and writing, impacted the influence of key determinants toward usage behavior and behavior intention. The majority of moderators, including gender, education level, academic position, experience, and Thai language usage did not impact the key determinants. Therefore, all of the moderators were eliminated from the final model.

Boonsong (2013) studied instructors' adoption of a web-based learning system at Rajabhat universities in Thailand by testing whether the four main constructs of the UTAUT model would have a positive effect on usage intention and adoption of web-based learning systems and whether experience of use, age, and gender would have moderating effects on the adoption of the system. A self-administered paper questionnaire was used to collect data from participants. A total of 725 surveys were sent out, and 454 questionnaires were returned, representing a 62.62% response rate. After 14 questionnaires were eliminated as outliers, a total of 440 samples were retained for the analysis. Findings from this study revealed several factors that can affect instructors' adoption of a web-based learning system. Performance expectancy, effort expectancy, and social influence had significant positive direct effects on usage intention, while facilitating conditions and usage intention had direct positive effects on usage behavior. Gender, age, and experience were confirmed as essential attributes of the UTAUT model. Among the key determinants, facilitating conditions had the strongest direct effect on usage behavior, and social influence had the highest effect on the usage intention for a web-based learning system on the part of instructors.

The literature clearly shows that various researchers have validated the UTAUT model (Boonsong, 2013; Oye et al., 2014), while others have extended it in different contexts (Kripanont, 2007; Dulle, 2010; Orji, 2010; Orji et al., 2010). The flexibility of the model allows researchers to modify and introduce new variables into it. Those variables can be both direct determinants and moderators. For instance, self-efficacy and Internet self-efficacy were integrated into the research model as direct determinants (Kripanont, 2007; Dulle, 2010). In addition, attitude toward technology, found to be non-significant by Venkatesh et al. (2003), was

added and confirmed to be significant and to have direct effects on behavioral intention in studies by Mann et al. (2009) and Dulle (2010).

Due to the effectiveness of the UTAUT model, the present study adopted this model as a theoretical framework. In addition to its effectiveness, the flexibility of the model allowed for the inclusion of more determinants in the model, as derived from the literature review and particularly in regard to open access and institutional repositories. The integration of direct determinants is discussed in Section 3.4, The Conceptual Model.

3.3   Model of Factors Affecting Faculty Self-Archiving

In Kim (2008), the model of factors affecting faculty self-archiving was developed based on an empirical study of 684 professors from 17 universities classified as Carnegie Doctorate-granting Universities. The self-archiving behavior was measured as two dependent variables. One variable was concerned with general self-archiving of research work on any publicly accessible web sites; the other focused on self-archiving in university IRs, which was considered as the only type of general self-archiving venue. Two methodologies, including a large scale survey and follow up interviews, were used to gather data from the participants. The researcher found that although the population of the study was limited to faculty members in universities having DSpace-based IRs, the majority of participants, 400 (out of 684 (58.5%) were not aware of the IRs in their universities, while only 274 (40.1%) had some awareness of IRs, and 10 (1.5%) did not answer. Kim also found that 109 (15.9%) respondents had contributed to their university IR.

Four factors with eleven independent variables were included in the proposed research model: the costs factor (copyright concern and additional time and effort), extrinsic benefits (accessibility, publicity, trustworthiness, academic reward, and professional recognition),

intrinsic benefits (altruism), and contextual factors (trust, self-archiving culture, and influence of external actors). However, four motivating factors and three impeding factors were retained in the final updated model, presented in Figure 3.2. The + and - signs represent the positive and negative relationships between the factors and faculty self-archiving behavior. The four motivating factors of self-archiving behavior were altruism, self-archiving culture, technical skills, and academic reward, while the three impeding factors were copyright concerns, age, and additional time and effort (Kim, 2010).
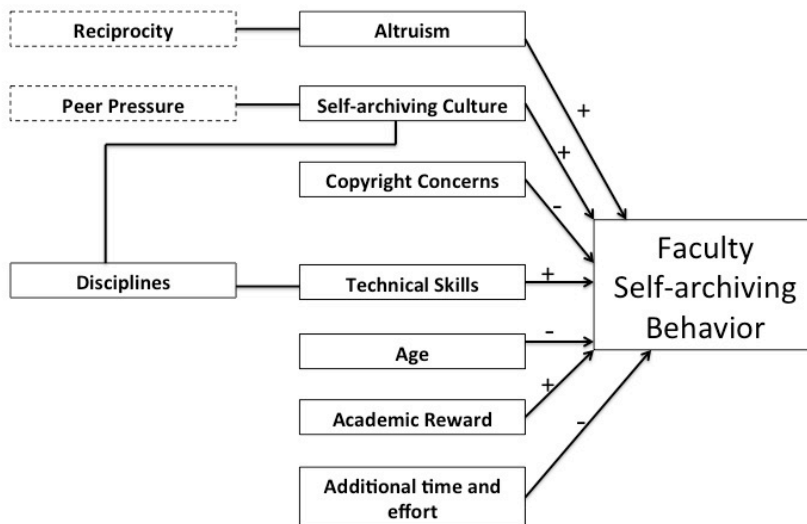
Figure 3.2. Factors affecting faculty self-archiving (Updated model). Adapted from Kim (2010).

   After factors affecting the extent of self-archiving in general had been identified, logistic regression analysis was conducted to provide an understanding of the factors that influenced whether or not respondents deposited their research work in IRs. Four factors, 1) copyright concerns, 2) accessibility, 3) altruism, and 4) trust, were found to positively associate with IR contribution.

3.3.1 Copyright Concerns

Kim (2008) explained that the term copyright concerns refers to "the extent to which professors perceive requirements to ask permission from publishers, possibilities of copyright infringement, and frictions among co-authors in self-archiving researcher works" (p. 75). This factor was measured based on faculty members' perception of the copyright concerns.

3.3.2 Accessibility

Accessibility is "the extent to which professors perceived self-archiving materials to be available in a stable manner, over time" (Kim, 2008). This factor was measured by the extent to which the participants agreed with statements regarding ease of access to self-archived research work and increasing possibility of communicating research findings to peers (Kim, 2011).

3.3.3 Altruism

Altruism refers to professors' altruistic motivation to self-archive. This factor was measured based on the extent to which faculty reported having clear perception of the principle of Open Access and having notions about helping others to access and build on research work, particularly for those who had difficulty in accessing scholarly work.

3.3.4 Trust

The definition of trust is "the extent to which professors perceive readers' good intentions and competence in using self-archived materials" (Kim, 2008, p. 76). This factor was examined from two aspects, 1) participants' attitudes toward the end-users of their self-archived materials and 2) the extent of the participants' trust in how their institutions maintained the publicly accessible IRs.

Among these four factors, accessibility had the highest odds ratio (1.30), followed by altruism (1.16), trust (1.14), and copyright concerns (1.10). The odds ratio can be used to explain

the size of the factors' effects on IR contribution. For instance, accessibility had the greatest odds ratio. This means the respondents who agreed more strongly with the idea of accessibility of self-archived materials in IRs were more likely to contribute or publish their research work to their universities' IRs.

Among the four factors, copyright concerns presented a particularly interesting issue. This factor was found to be negatively associated with general self-archiving; however, it was positively related to IR contribution. Thus, it is crucial to study this factor in depth and determine if it can be used to explain faculty contribution to IRs in other contexts.

Kim's study was conducted in research universities in the US context. However, the patterns of self-archiving and faculty contribution to IRs may not be generalizable to the entire population in research universities (Kim, 2008, p. 222). It may or may not be possible to use these patterns to explain faculty members' self-archiving behavior and their contribution to IRs in other settings. Thus, using the factors identified in this study to study self-archiving in general or in the use of specific venues may be of benefit as IRs in different contexts may provide a deeper understanding that can lead to practical implications for the improvement of the functions and services of IRs on a global level.

3.4   The Conceptual Model

The previous discussion shows that although the UTAUT can help researchers to gain a better understanding of technology acceptance and use and may help them to determine factors affecting behavioral intention and usage behavior in relation to those technologies, the model still needs modification to suit specific research settings as suggested by Venkatesh et al. (2003) and other researchers (Boonsong, 2013; Dulle, 2010; Kripanont, 2007; Orji et al., 2010). In addition, Kripanont (2007) mentioned that instruments that have been developed and repeatedly

tested in the business context may not be equally valid and useful to explain technology

acceptance and usage in other settings, particularly professional and academic settings.

The flexibility of the UTAUT model offers the opportunity for the integration of direct

determinants (factors) that might affect behavioral intention and usage behavior. Additionally,

results from the citation analysis and systematic review of 450 articles citing the UTAUT model

show that various external variables have been added to the model. In fact, 22 out of the 43

articles that made use of the UTAUT model included external variables, while the remaining

employed the original constructs (Williams, Rana, Dwivedi, & Lal, 2011).

The basic concept underlining the research model for the current study was adapted from

Venkatesh et al.'s (2003) basic concept underlying their user acceptance model (p. 427). The

researcher postulated that faculty members' reaction toward IRs may influence their actual usage

of them. It is also postulated that the faculty members' actual usage of IRs will determine their

stance toward the continuing use of IRs. Figure 3.3 presents the basic concept underlining the

proposed research model.
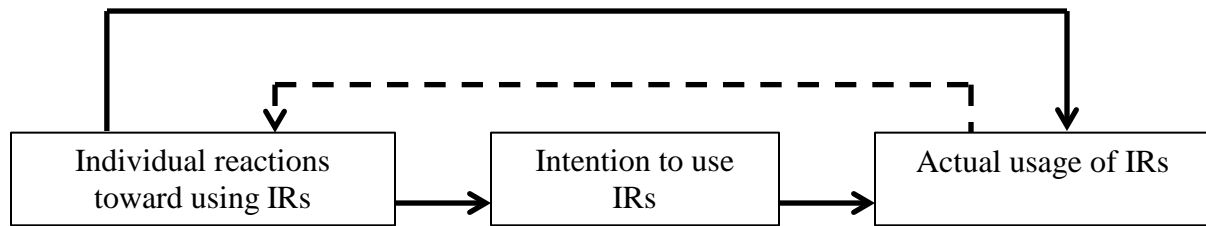
Figure 3.3. The basic concept underlining the proposed research model.

For this study, more determinants (factors) identified in the literature regarding Open

Access and IRs will be included in the proposed model. Although some of the determinants were

introduced, studied, and found significant in Kim's (2008, 2010, 2011) studies, they have never

been tested in other contexts outside the US. Also, other determinants such as attitude and

resistance to change will be included in the model. The proposed research model is shown in

Figure 3.4. As shown in Figure 3.4, the proposed research model of this study consists of 9

factors. Each factor is discussed in detail in the following sections.
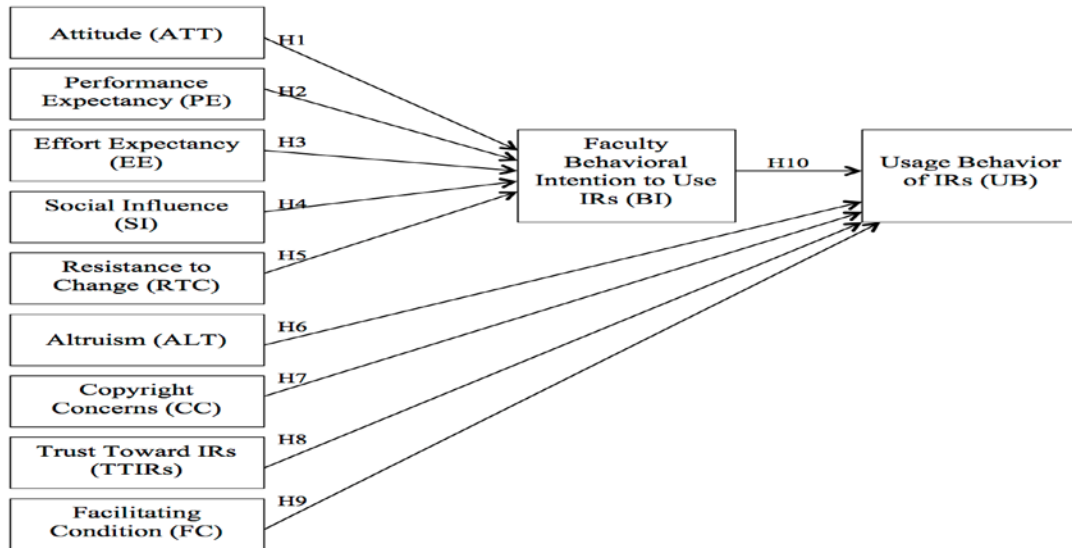
Figure 3.4. A path diagram of the proposed theoretical research model.

3.4.1   Attitude (ATT)

Attitude toward technology is defined as "an individual's overall affective reaction to

using a system" (Venkatesh et al., 2003, 455). Because Venkatesh et al. (2003) found that

attitude does not have a direct influence on behavioral intention due to its interaction effects with

performance expectancy (PE) and effort expectancy (EE), this determinant was not included as a

direct determinant in the original UTAUT model. However, this determinant was found

significant in other technology acceptance studies utilizing other technology acceptance models

such as the Theory of Planned Behavior, the Theory of Reasoned Action, and the Motivational

Model. Attitude is one of the most common external variables employed by researchers to study

users' acceptance of a various technologies such as a web-based learning system in Taiwan (Jong

& Wang, 2009), Internet banking services in Malaysia (YenYuen & Yeow, 2009), and online

banking services in Australia (Yeow et al., 2008). In addition, this determinant was included in

two studies related to Open Access conducted in different contexts and was found to be

significant and to have direct effects on behavioral intention in both studies (Mann et al., 2009; Dulle, 2010). However, Dulle (2010) found that it did not have a direct effect on actual usage. Since individual attitude has been proven to have a significant and direct effect on users' behavior intention toward technology, the first hypothesis (H1) states that the faculty members' attitudes toward IRs are expected to influence their behavioral intention.

3.4.2   Performance Expectancy (PE)

Performance expectancy (PE) is "the degree to which an individual believes that using the system will help him or her attain gains in job performance" (Venkatesh et al., 2003, p. 447). The authors verified that performance expectancy is the strongest construct for predicting individual usage intention. It is expected that IR users will find that IRs are useful since they allow users to deposit and disseminate their scholarly content in trusted repositories. At the same time, users will gain benefits from accessing and using those contents for their scholarly activities, which in turn will help to enhance the effectiveness of teaching and learning.

Many studies, including studies related to Open Access and IRs, have confirmed that PE has a significant direct effect on behavioral intention (Dulle, 2010; Dulle, Minishi-Majanja, & Cloete, 2010). Dulle, (2010) and Dulle et al. (2010) confirmed that performance expectancy is a predictor of usage intention. This implies that the future adoption of OA is highly dependent on the expected benefits of OA in improving accessibility. This construct was found to be strong for predicting behavioral intention (Mann et al., 2009; Van Schaik, 2009; Wang, Wu, & Wang, 2009). In contrast, Singeh et al. (2013a) found that none of the factors in the UTAUT model, including performance expectancy, influenced Malaysian authors' behavioral intention to self-archive in IRs. However, this might have happened because their study had a small sample size

(108 participants) as compared to the 215 participants in Venkatesh et al.'s (2003) study and the 398 participants in Dulle's (2010) study.

Academic reward and accessibility factors are categorized with PE since these two factors in Kim's study present characteristics similar to other factors that are categorized in PE. Accessibility is the main benefit that many scholars have cited as an important reason for contributing to IRs and open access outlets (Parker, 2007; Swan & Brown, 2005; Kim, 2008; Kim, 2010; Watson, 2007), and academic rewards have also been cited as a factor associated with scholars' willingness to publish in open access media (Park & Qin, 2007). This suggests that if users think that they can gain career benefits through depositing their work into IRs, they will be willing to do so. Following the original model, the second hypothesis (H2) states that PE will have a significant direct effect on behavioral intention.

3.4.3   Effort Expectancy (EE)

Venkatesh et al. (2003) define effort expectancy as "the degree of ease associated with the use of the system" (p. 450). The model postulates that effort expectancy (EE) has a significant positive direct effect on behavioral intention. According to the model, in the application of the concept of effort expectancy to the context of IRs, it is expected that individual adoption of IRs will depend on the level of ease of use of the IRs.

The concept of effort expectancy or ease of use or usability has been mentioned in the review of literature related to IRs and open access. For instance, Park and Qin (2007) found that perceived ease of use was one of the factors influencing scholars' willingness to use open access journals. In addition, time consumption in the content depositing process has been cited as a major barrier to IR contributions by researchers practicing self-archiving as well as researchers who do not practice self-archiving (Foster & Gibbons, 2005; Singeh et al., 2013b). Various

studies have also confirmed that the effort expectancy (EE) has a significant positive direct effect on technology usage intention. Dulle (2010) found that EE was one of the key determinants for researcher behavioral intention to use open access outlets. Many respondents in that study also mentioned that they were unlikely to face difficulties when using open access outlets to publish and access scholarly work. Similar to the empirical evidence found in the literature, the current study expects that EE will have a positive direct effect on faculty members' behavioral intention to use IRs. Thus, the third hypothesis (H3) states that Effort Expectancy will have a significant direct effect on faculty members' behavioral intention to use IRs.

3.4.4   Social Influence (SI)

Social influence is the degree to which an individual perceives that other people who are important to him/her believe that he or she should use the new system. An individual's intention to use a new technology may be influenced by other important individuals' opinions that he/she should use the new technology. The important individuals can be either peers or superiors. This factor has characteristics similar to those of "peer pressure" in the self-archiving context. Kim (2008) defined peer pressure as the influence of external actors whose opinions the faculty members thought might affect their decision of whether or not to self-archive. Peers, grant-awarding bodies, and universities or departments are some examples of those external actors. Although findings from the survey data of this study indicate that peer pressure did not have a direct relationship to faculty decisions to self-archive, seven interviewees from a variety of disciplines reported some degree of peer pressure was involved in their decision making process to self-archive (Kim, 2010). Similarly to Kim (2010), Yoon's (2014) study of end users' trust toward data repositories found that social influence was an important factor that the participants cited as associated with trust. Yoon (2014) concluded that "If users hear about a repository from

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sources with more authority, they tend to trust it more" (p. 27). In essence, social influence not only affects authors' intention to publish in IRs but also affects end users' use of IRs.

Venkatesh et al. (2003) state that the social influence factor is significant in mandatory environments, but it is not significant in voluntary environments. In addition, the effect of social influence on acceptance and adoption of technology is complex and depends upon a wide variety of group influences. Since the deposit of scholarly works in IRs by faculty members in Thailand is mostly voluntary, it would be of interest to determine whether or not this factor can be used to explain behavioral intention to use IRs in the Thai higher education context. Thus, the fourth hypothesis (H4) states that social influence will have a significant direct effect on behavioral intention to use IRs.

3.4.5 Resistance to Change (RTC)

Resistance to change (RTC) is "an individual's dispositional inclination to resist changes" (Oreg, 2003, p. 680). It is one aspect of the personality that is highly critical for technology adoption (Venkatesh, Morris, & Ackerman, 2000). Oreg (2003) found that people who exhibited higher levels of resistance to change were less likely to try to use a new technology. The author concluded, "the resistance to change scale can be successful at predicting such disinclination to adopt new products" (Oreg, 2003, p. 691). Oreg tested whether or not the RTC scale could predict the resistance of faculty members at Cornell University to try CourseInfo, a template for creating course Web sites. Professors who exhibited a higher level of resistance to change were less likely to try out the CourseInfo system. In addition, Nov and Ye (2008, 2009) confirmed that users with higher RTC have higher effort expectancy toward new technology, particularly in the digital libraries adoption context. Resistance to change has also been mentioned in some studies conducted at the early stage of Open Access and IR

development. For instance, Chan (2004) found that many faculty members cited cultural inertia, which refers to a resistance to change or reluctance to adopt new culture or technology, as a reason for the slow adoption of self-archiving (Chan, 2004; Kim, 2008).

A review of literature in the area of technology acceptance indicates that although many researchers have found that RTC is a direct antecedent of effort expectancy (Nov & Ye, 2008, 2009; Thong, Hong, & Tam, 2002), rarely has research been conducted to determine whether RTC has a direct effect on individuals' behavioral intention to use a technology. Sargent, Hyland, and Sawang (2012) extended the UTAUT construct by adding RTC to study factors affecting the behavioral intention to adopt a document control system. However, while they found that RTC did not play a role in document control system adoption, this factor should not be ignored. RTC should be tested to determine whether to confirm or to disregard it as a determinant of behavioral intention. Thus, the fifth hypothesis (H5) states that resistance to change will have a significant direct effect on behavioral intention.

3.4.6   Altruism (ALT)

Altruism refers to "satisfaction in helping others through knowledge sharing" (Kim, 2008, p. 20). An individual's altruism is driven by his interest in making his work easily accessible and the expectation that other researchers, particularly ones who have limited access, will benefit from that work. This factor was identified as one of the motivating factors in self-archiving behavior in general open access venues and as one of the factors influencing faculty to contribute their work to their university IRs. However, Kim's (2008) study was conducted only within the American research university context; this factor also has never been tested in other studies. Using this factor to study faculty members in different situations and contexts might give different results that may help to expand knowledge in this area. For the present study, altruism

will be studied to determine whether it has a direct effect usage behavior. Based on the findings from the previous study, the sixth hypothesis (H6) states that altruism will have a significant direct effect on actual usage of IRs.

3.4.7   Copyright Concerns (CCs)

From the literature, we can see that copyright concerns (CCs) are frequently cited as a major barrier to self-archiving and to IR contribution (Casey, 2012; Creaser et al., 2010; Kim, 2007, 2008, 2010, 2011; Singeh et al., 2013b; Swan & Brown, 2005; Xia et al., 2012). Copyright concerns have been mentioned by both researchers practicing self-archiving and those who do not practice self-archiving (Singeh et al., 2013b). In addition, Kim (2008, 2010, 2011) found that IR contributors were more concerned about this issue than were those considered IR non-contributors in her studies. However, CCs present a contradictory issue in Kim's (2008, 2010) studies. Kim found that CCs had a negative effect on the faculty members' self-archiving behavior in general publicly accessible sources, while CCs were found to have a positive effect on faculty members' contribution to their university IRs. Also, the odds ratio in her study indicates that "professors who have greater concerns about copyright issues are more likely to contribute to IRs" (Kim, 2010, p. 252). It is of interest to study this factor and determine if it can be used to explain faculty members' behavioral intention to use IRs and their usage behavior of IRs in the Thai context. Thus, the seventh hypothesis (H7) states that copyright concerns will have a significant direct effect on actual usage of IRs.

3.4.8   Trust toward IRs (TTIRs)

Trust is viewed as a critical element of the digital repository infrastructure (Prieto, 2009). Kim (2008, 2011) viewed trust as a contextual factor associated with faculty self-archiving in IRs and defined it as "the extent to which professors perceive readers' good intentions and

competence in using self-archived materials" (Kim, 2008, p. 76). There are two aspects related to studying trust: 1) the participants' attitudes toward the end-users of their self-archived materials and 2) the participants' trust regarding the way in which their institutions have maintained the publicly accessible IRs. Professors who have stronger trust in users and institutions are more inclined to self-archive in IRs. The interview data from Kim's study make possible a more in-depth understanding of trust toward IRs. On one hand, trust is related to the professors' concerns about the improper use of their self-archived materials. For example, issues such as fear of plagiarism and users' misinterpretation of research work were mentioned. On the other hand, long-term preservation is another issue related to trust. Yoon (2014) found that repository processes or data curation processes (documentation, data cleaning, and quality checking) are one of the factors influencing users' trust in digital repositories.

These curating processes ensure the quality of work and long-term preservation of work deposited in the depositories. The quality of work deposited in IRs has been cited as a major concern by participants in many studies and is considered a major factor related to users' contribution (Dulle, 2010; Park & Qin, 2007; Singeh et al., 2013a,b; van Westrienen & Lynch, 2005). For instance, Dulle (2010) found that some authors in IR and OA studies mentioned that they did not use articles published in IRs and open access journals due to the lack of quality control of the content. In addition, some scholars in other studies have expressed concern that the low quality of some material in a repository could somehow taint their own research (Casey, 2012; Davis & Connolly, 2007). This issue affects those scholars' decisions to publish or not to publish their work in IRs. Thus, the repository processes and quality of work were taken into account in the present study through the addition of more survey items regarding repository

processes in the TTIR factors. Based on the literature, the eighth hypothesis (H8) in this study states that TTIRs will have a significant direct effect on actual usage of IRs.

3.4.9   Facilitating Conditions (FCs)

According to Venkatesh et al. (2003), the term facilitating conditions (FCs) refers to "the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system" (p. 453). This factor is conceptualized as "perceived behavioral control (Theory of Planned Behavior); facilitating condition (Model of PC Utilization); and compatibility (Innovation Diffusion Theory)" (Venkatesh et al., 2003, p. 453). The authors also suggest that the facilitating conditions will become insignificant in predicting usage intention when both effort expectancy and performance expectancy are present. According to the model, facilitating conditions have a significant direct effect on usage behavior. It has been postulated that the usage of technology depends on the availability of an enabling environment for its application. The availability of technology and other issues related to technology have been considered as facilitating conditions for IR and open access adoption (Ambruster, 2011; Dulle, 2010; Duranceau & Kriegsman, 2013). In some geographical areas, such as Africa and Asia, technological issues contribute to the slow adoption of IRs and open access (Dulle, 2010; Hirwade & Rajyalakshmi, 2006).

Previous studies in a variety of contexts support the UTAUT expectation that facilitating conditions will have a significant positive direct effect on usage behavior (Dulle, 2010; Dulle & Minishi-Majanja, 2011). Dulle (2010) and Dulle and Minishi-Majanja (2011) found that facilitating conditions were a factor influencing Tanzanian researchers' usage behavior of open access outlets. According to the UTAUT model, it is expected that facilitating conditions are a significant key determinant of individual usage behavior with regard to institutional repositories.

For this study, the ninth (H9) hypothesis states that facilitating conditions will have a significant direct effect on IR usage behavior.

3.4.10 Behavioral Intention (BI)

Based on the UTAUT model, Venkatesh et al. (2003) suggested that behavioral intention or usage intention has a significant positive effect on an individual usage of a particular technology. This statement has been confirmed in many empirical studies regarding technology acceptance in many contexts (Boonsong, 2013; Dulle, 2010; Dulle & Minishi-Majanja, 2011). In the context of the Web-based learning system, Boonsong (2013) found that usage intention had a positive effect on the usage behavior of instructors in the Department of Education at the Rajabhat Universities in Thailand. Dulle and Minishi-Majanja (2011) also confirmed that usage intention was the strongest factor affecting Tanzanian researchers' usage behavior of open access outlets. Thus, the tenth hypothesis (H10) states that faculty members' behavioral intention will have a positive direct effect on their usage behavior.

The summary of the main constructs (factors) of the proposed research model and a summary of the hypotheses are presented in Table 3.2. Each construct (factor) in the proposed research model can be measured by the use of three to seven items presented as statements, followed by 5-point Likert scales in the questionnaire. Items corresponding to each factor were adapted from previous studies, mainly from Vankatest et al. (2003), Dulle (2010), and Kim (2008, 2011). Each factor and its corresponding items are presented in Chapter 4.

Table 3.2

The Main Constructs of the Proposed Research Model and a Summary of the Hypotheses

Constructs (Factors)	Hypotheses
Attitude Toward IRs (AT)	H1: Faculty members' attitude toward IRs will have a significant direct effect on behavioral intention.
Performance Expectancy (PE)	H2: Performance expectancy will have a significant direct effect on behavioral intention.
Effort Expectancy (EE)	H3: Effort expectancy will have a significant direct effect on behavioral intention.
Social Influence (SI)	H4: Social influence will have a significant direct effect on behavioral intention.
Resistance to Change (RTC)	H5: Resistance to change will have a significant direct effect on behavioral intention.
Altruism (ALT)	H6: Altruism will have a significant direct effect on actual usage of IRs.
Copyright concerns (CCs)	H7: Copyright concerns will have a significant direct effect on actual usage of IRs.
Trust toward IRs (TTIRs)	H8: Faculty members' trust toward IRs will have a significant direct effect on actual usage of IRs.
Facilitating Conditions (FCs)	H9: Facilitating conditions will have a significant direct effect on actual usage of IRs.
Behavioral Intention (BI)	H10: The faculty members' behavioral intention will have a significant direct effect on actual usage of IRs.

CHAPTER 4

RESEARCH DESIGN

4.1   Introduction

This chapter explains the ways in which the theoretical models have been broken down into concepts and how the research instrument was developed. This chapter includes an overview of the research design, as well as a description of the faculty members who participated in the study, the instrument items, the data collection and analysis procedures, and the statistical analysis methods.

The primary propose of this study was to determine the factors affecting faculty acceptance and use of university-based institutional repositories in Thailand. The study aimed to explore the relationships among and the relative importance of factors that influence a user's behavioral intention to accept and use IRs. It attempts to answer the following research questions:

RQ1: To what extent do faculty members in Thai research universities accept and use institutional repositories?

RQ2: What are the factors that affect faculty members' acceptance and use of institutional repositories in the Thai research university context?

RQ3: To what extent do these factors affect faculty members' acceptance and use of institutional repositories (IRs) in the Thai research university context?

4.2   Research Design

This study employed a mixed methods design to understand faculty members' acceptance and use of Institutional Repositories in the Thai research university context. My intent was to explore the relationships among and the relative important of factors that influence a user's behavioral intention to accept and use IRs by using a combination of quantitative and qualitative methods.

The mixed methods design included the following components:

1) A quantitative method was used to determine the factors affecting faculty acceptance and use of IRs and the relation of each factor that affected the faculty members' behavioral intention and use behavior. The quantitative method allowed for generalization.

2) A qualitative method of content analysis was used to extend the findings from the quantitative methods. That method helped the researchers gain in-depth understanding of the phenomena identified in the quantitative part. Also, it allowed the researcher to study the participants' views of institutional repositories and open access in depth. It also allowed for gathering the participants' suggestions and comments about institutional repositories.

The mixed methods research design used in this study was "validating the quantitative data model triangulation" (Creswell & Clark, 2010, p.65). This research design is a methodological triangulation research design. According to Teddlie & Tashakkori (2009), researchers employ more than one research method and data collection technique in this form of triangulation research design. For this study, the researcher employed a QUAN+QUAL, in which more weight was placed on quantitative data, and tried to collect different but complementing data using both quantitative and qualitative methods. A quantitative method was used to determine the factors affecting faculty acceptance and use of IRs and the relation of each factor that affected the faculty members' behavioral intention and usage behavior. While the quantitative method allowed for generalization, the follow up semi-structured interview with some participants allowed the researcher to study faculty members' acceptance and use of IRs and the reasons behind those factors in more detail.

4.3   Population and Sample

4.3.1   Population

The target population for this study included all of the faculty members of selected

research universities in Thailand. While IRs have been accepted and implemented by many

universities around the world, particularly in North America, Europe, and some Asian countries,

not all universities in Thailand provide IRs, and this includes some of the research universities.

There are 144 higher education institutions in Thailand. Among those higher education

institutions, there are nine research universities, six of which have operated IRs, and among

those only a few are open-access. Research universities were selected since some of them have

institutional repositories in place. The other criterion for selection was the approximate year that

an IR became operational, since the year of operation can be used to determine the stage of

institutional repository development and deployment, which is important in any evaluation of

IRs (Thibodeau, 2007). Although it has been stated that there were six research universities

operating IRs, the number of participating repositories for the present study were four

institutions. These institutions were considered as early adopters of IRs.

Two university-based IRs, Khon Kaen University Institutional Repository (KKUIR) and

Thammasat University Publications Knowledge-Based, did not meet the selection criteria.

Responding to the email question, the reference librarian of the KKU library stated that the KKU

library did not officially and fully implement the KKUIR. Therefore, the faculty members might

not have known about the existence of KKUIR and would not have been able to participate in

this study (KKU Librarian, personal communication, February, 2016). In the other case,

Thammasat University library had developed the TU Publications Knowledge-Based using

DSpace in 2008. The purpose of TU Publication Knowledge-Based was for knowledge

management and the collection of data on faculty members' scholarly publications, and amost of

the works had been done by librarians. The TU library did not promote Thammasat University

Publications Knowledge-Based, nor did they allow self-archiving. By the end of 2015, the library

had stopped adding content to the TU Publication Knowledge-Based and moved all content

collected before 2015 to new knowledge management system (Thammasat University Reference

librarian, personal communication, February 3, 2016). As of August 2016, the Thammasat

University Publications Knowledge-Based was used only for knowledge management for

Thammasat University Research and Consultancy Institute, the primary agency providing

research management and research consulting services on the behalf of the university. At the

time of this study, the content size had decreased from a total of 7,245 to 264 records

(Thammasat Univeristy Publications, 2016).

Based on the selection criteria, the population for this study was limited to faculty

members in four research universities located in different regions. Altogether, 8,399 faculty

members were currently teaching in the four research universities. This information was gathered

from a recent annual report or from the website of each university. Table 4.1 shows the

participating repositories and their relevant characteristics.

Table 4.1

Participating Repositories

No.	University/Repository	IR Creation Date	Content Size (2015)	Content Size (2016)	No. of Faculty Members
1	Chulalongkorn University (CU)/ CUIR	2006	42,048	45,746	*2,821*
2	Mahidol Universty (MU)/(MUIR)*	2009	3,087	7,068	*3,722*
3	Prince of Songkla University (PSU)/PSU Knowledge Bank	2010	7,873	8,489	*1,482*
4	Suranaree University of Technology (SUT)/SUTIR	2008	4,268	6,216	*374*

Note. *MUIR is a home to scholarly works from Mahidol University faculty members, researchers, and staff members. Therefore, theses and dissertations are not available in MUIR.

4.3.2   Samples

The target population for this study included all faculty members in research universities in Thailand that had developed and implemented IRs, which was a total of 8,399 faculty members across four universities located in three different regions. According to Krejcie and Morgan (1970), the sample size representative of the population of 8,399 faculty members in this study is 367. Table 4.2 shows the total number of faculty members broken down by universities and the total numbers of the responses. Researchers suggest that an acceptable and adequate response rate in social science research is approximately 50-60 % or larger (Nutly, 2008; Richardson, 2005). Therefore, oversample surveys were sent out to obtain a larger response rate.

Table 4.2

Total Number of Faculty Members Broken Down by Universities and the Total Number of the Responses

Geographic Location/ Institution	No. of Population	%	No. of Samples	No. of Surveys Sent Out	No. of Respondents (%)
Central					
Chulalongkorn University (CU)	2,821	33.59	123	170	48 (27.3)
Mahidol University (MU)	3,722	44.31	163	240	68 (38.8)
Northeastern					
Suranaree University of Technology (SUT)	374	4.45	16	70	11 (6.3)
Southern					
Prince of Songkla University (PSU)	1,482	17.64	65	120	49(27.8)
Total	8,399	100.00	367	600	176

4.4   Instrumentation

The survey questions were developed based on the literature regarding institutional repositories, self-archiving practices, and technology acceptance theories and were modified based on the particular focus of this study. Specific questions were adapted from studies related

to technology acceptance (Venkatesh et al., 2003) and institutional repositories and self-archiving behavior (Dulle, 2010; Dulle, Minish-Majanja, & Cloete, 2010; Kim, 2008).

4.4.1   Translation

To maintain equivalence between the English and Thai versions of the questionnaire, this study adopted a back-translation procedure, which is the most common and highly recommended procedure for translation of a questionnaire (Brislin, Lonnerand, Thorndike, 1973; Chapman & Carter, 1979). Brislin et al. (1973) recommend that an instrument be back-translated at least three times, each time by a different translator. To translate the questionnaire instrument, three bilingual experts—myself (interdisciplinary information science Ph.D. candidate), one Assistant Professor (in Library and Information Science) who was Director of the Center of Academic Resources at Chulalongkorn University, and one Ph.D. candidate from the University of Glasgow—were involved in the forward and backward translation process. First, the English version of the questionnaire was independently translated into the Thai language by each translator, and then the translations were combined together to create the initial Thai version. Second, the questionnaire was translated backward from Thai into English. Then the experts compared the two versions of the questionnaire for concept equivalence, semantic equivalence, and normative equivalence (Brislin et al., 1973). If an error was found, the item was retranslated. This process was continued until the team of bilingual experts agreed that the questionnaires were identical between the two versions and that there were no errors in meaning.

4.4.2   Questionnaire

The questionnaire consisted of three sections as follow:

Section 1 addressed faculty members' awareness and usage of university-based IRs and their self-archiving experience. Multiple-choice questions and open-ended questions were

employed.

Section 2 focused on factors affecting faculty members' acceptance and use of institutional repositories that could not be observed directly. The scales (questionnaire items) used in this study were adopted from previous studies. The items in each construct were based on items developed and validated in previous studies relating to technology acceptance, institutional repositories, and self-archiving. For instance, some items in the questionnaires were from Oreg (2003), Oreg et al. (2008), Nov and Ye (2009), Venkatesh et al. (2003), Kim (2008), Dulle (2010), Dulle et al. (2010), and Boonsong (2014). Each item was phrased to suit the current study context. In addition, some items were developed based on empirical studies in related fields. Items (survey questions) in this section were grouped by constructs, following the main constructs of the theoretical models.

This section consisted of a series of items using a 5-point Likert-scale, ranging from (1) *strongly disagree* to (5) *strongly agree*. The items corresponding to each factor are presented in Table 4.3 to Table 4.13.

Table 4.3

Modification of Items Corresponding to Attitude toward IRs

Original Item	Sources	Modified Item
Publishing in open access outlets is a good idea.	Dulle, 2010	ATT1: Publishing in IRs is a good idea.
Publishing in open access outlets would make my work more interesting.	Dulle, 2010	ATT2: Publishing in IRs would make my work more interesting and accessible.
Accessing and use of open access materials is a good idea.	Dulle, 2010	ATT3: Accessing and use of works in IRs is a good idea.
Open access content is beneficial to scholarly communication.	Dulle, 2010	ATT4: Content in IRs is beneficial to scholarly communication.

Table 4.4

Modification of Items Corresponding to Performance Expectancy

Original Item	Sources	Modified Item
I would find <u>the system</u> useful in my job.	Venkatesh et al., 2003	PE1: I would find <u>IRs</u> useful in my job.
<u>Open Access outlets</u> enable scholars to publish more quickly.	Dulle et al., 2010	PE2: <u>IRs</u> enable me to publish my teaching and scholarly work more quickly.
Using <u>the system</u> increases my productivity.	Venkatesh et al., 2003	PE3: Using <u>IRs</u> increases my teaching and scholarly productivity.*
Posting my <u>research work</u> on <u>publicly accessible web sites</u> will increase the chance to communicate my <u>research finding</u> to peers.	Kim, 2008	PE4: Posting my <u>teaching and scholarly work</u> on <u>the university IRs</u> will increase the chance to communicate my <u>work</u> to peers.
<u>Open access outlets</u> enable researchers from <u>developing countries</u> to access literature more easily.	Dulle et al., 2010	PE5: <u>IRs</u> enable researchers from <u>other countries</u> to access <u>my work</u> more easily.
My university will accept research work on <u>publicly accessible web sites</u> as an alternative to publication for tenure/promotion.	Kim, 2008	PE6: My university will accept work on <u>IRs</u> as an alternative to publication for promotion.

* Faculty's scholarly productivity can be categorized into five areas: including books, journal articles, citations, grants, and honors/awards (Mock, 2012).

Table 4.5

Modification of Items Corresponding to Effort Expectancy

Original Item	Sources	Modified Item
My interaction with <u>the system</u> would be clear and understandable. I expect interaction with the <u>open access publication system</u> to be clear and understandable.	Venkatesh et al., 2003 Dulle et al., 2010	EE1: I expect interaction with <u>IRs</u> to be clear and understandable.
I would find <u>the system</u> easy to use.	Venkatesh et al., 2003	EE2: I would find <u>IRs</u> easy to use.
Learning to operate <u>the system</u> is easy for me.	Venkatesh et al., 2003	EE3: Learning to use <u>IRs</u> is easy for me.
It is (I will find it) easy to access <u>open access scholarly content</u> from the Internet.	Dulle et al., 2010	EE4: It is easy to access <u>works published in IRs</u> from the Internet.
Posting my materials on <u>publicly accessible web sites</u> takes time away from my <u>research and writing</u>.	Kim, 2008	EE5: Posting my materials on <u>IRs</u> takes time away from my <u>work.</u>
Additional time and effort is required to make my materials <u>publicly accessible</u> on the Internet.	Kim, 2008	EE6: Additional time and effort is required to make my materials <u>available through IRs</u>.

Table 4.6

Modification of Items Corresponding to Social Influence

Original Item	Sources	Modified Item
People who influence my behavior think that I should use the system.	Venkatesh et al., 2003	SI1: People who influence my behavior think that I should use IRs.
If close colleagues publish in open access outlets.	Dulle et al., 2010	SI2: My colleagues think that I should use and publish IRs.
If my research funding agency require me to publish in open access outlets.	Dulle et al., 2010	SI3: My funding agency requires me to use and publish in IRs.
If my institution requires me to publish in open access outlets.	Dulle et al., 2010	SI4: My institution requires me to use and publish in IRs.
The senior management of this business has been helpful in the use of the system.	Dulle et al., 2010	SI5: The administration of this university has been supportive in the use of IRs.
In general, the organization has supported the use of the system.	Venkatesh et al., 2003	SI6: In general, the university has supported the use of IRs.

Table 4.7

Modification of Items Corresponding to Resistance to Change

Original Item	Sources	Modified Item
I generally prefer to use computer software with which I am familiar over starting to use a new program.	Nov & Ye, 2009	RTC1: I generally prefer to use other traditional scholarly communication media with which I am familiar over starting to use IRs.
I find it's exciting to try out new computer software.	Nov & Ye, 2009	RTC2: I find it's exciting to try out and use IRs.
I often feel a bit uncomfortable trying out new computer software, even though it may be beneficial to me.	Nov & Ye, 2009	RTC3: I often feel a bit uncomfortable about trying out/using IRs, even though it may be beneficial to me.
If I were to be informed that there is going to be a significant change regarding the way things are done at work, I would probably feel stress.	Oreg, 2003	RTC4: If I were to be informed that there is going to be a significant change regarding the way things are done at work, I would probably feel stress.

Table 4.8

Modification of Items Corresponding to Altruism

Original Item	Sources	Modified Item
I will continue posting my work on <u>publicly accessible web sites</u> even if others in my field do not.	Kim, 2008	ALT1: I will continue posting my work on <u>IRs</u> even if others in my field do not.
Posting my materials on <u>publicly accessible web sites</u> will help other researchers build on my research findings.	Kim, 2008	ALT2: Posting my materials on <u>IRs</u> will help other researchers build on my research findings.
Posting my materials on <u>publicly accessible web sites</u> allows other scholars to access those that they could not otherwise use.	Kim, 2008	ALT3: Posting my materials on <u>IRs</u> allows other scholars to access items that they could not otherwise use.

Table 4.9

Modification of Items Corresponding to Copyright Concerns

Original Item	Sources	Modified Item
I need to ask permission from publishers to post my work on <u>publicly accessible web sites</u>.	Kim, 2008	CC1: I need to ask permission from publishers to post my work on <u>IRs</u>.
If I post my work on <u>publicly accessible web sites</u> without permission, I may infringe on copyright.	Kim, 2008	CC2: If I post my work on <u>IRs</u> without permission, I may infringe on copyright.
I need permission from co-authors or collaborators to post my work on <u>publicly accessible web sites</u>.	Kim, 2008	CC3: I need permission from co-authors or collaborators to post my work on <u>IRs</u>.
I cannot publish my work if I post it on <u>publicly accessible web sites</u> before publication.	Kim, 2008	CC4: I cannot publish my work if I post it on <u>IRs</u> before publication.

Table 4.10

Modification of Items Corresponding to Trust toward IRs

Original Item	Sources	Modified Item
If I post my materials on publicly accessible web sites, readers may plagiarize or fail to cite my work.	Kim, 2008	TTIRs1: If I post my materials on IRs, readers may plagiarize or fail to cite my work.
If I post my materials on publicly accessible web sites, the integrity of my work will be compromised.	Kim, 2008	TTIRs2: If I post my materials on IRs, the integrity of my work will be compromised.
Materials on publicly accessible web sites are not maintained securely.	Kim, 2008	TTIRs3: Materials on IRs are not maintained securely.
I trust the quality of the repository process (documentation, data cleaning, and quality checking).	Yoon, 2014	TTIRs4: I trust the quality of the repository process (documentation, data cleaning, and quality checking).

Table 4.11

Modification of Items Corresponding to Facilitating Conditions

Original Item	Sources	Modified Item
I have the knowledge necessary to use the system.	Venkatesh et al., 2003	FC1: I have the knowledge necessary to use IRs.
I have the resources necessary to use the system. I have the necessary resources (e.g. Internet access) to publish on open access outlets.	Venkatesh et al., 2003 Dulle et al. (2010)	FC2: I have the resources (e.g. Internet access) necessary to use IRs.
Guidance is available for me to use the Internet for publishing my research output.	Dulle et al. (2010)	FC3: A specific person (or group) is available to give me guidance to publish in IRs.
Guidance is available for me to use the Internet effectively for information access	Dulle et al. (2010)	FC4: A specific person (or group) and guidance is available for me to access IRs.

Table 4.12

Modification of Items Corresponding to Behavioral Intention

Original Item	Sources	Modified Item
I intend to use a web-based learning system to perform teaching-related activities and to communicate with my students.	Boonsong (2014)	BI1: I intend to use IRs.
I intend to increase my use of a web-based learning system in the future.	Boonsong (2014)	BI2: I intend to increase my use of IRs in the future.
I plan to use the system in the next <n> months.	Venkatesh et al., 2003	BI3: I plan to use IRs in the next few months.

Table 4.13

Modification of Items Corresponding to Usage Behavior

Original Item	Sources	Modified Item
I use a web-based learning to communicate with my students.	Boonsong (2014)	UB1: I use IRs to communicate with other researchers.
I use a web-based learning system to distribute assignment to my students.	Boonsong (2014)	UB2: I use IRs to distribute /disseminate scholarly works.
I use a web-based learning system to distribute course materials to my students.	Boonsong (2014)	UB3: I use IRs to distribute /disseminate teaching-related materials.
		UB4: I use IRs to access scholarly literature and other teaching-related materials.

After appropriate attributes and their represented items had been derived to suit the research context, the final research instrument in Section 2 reflected 11 factors. Four factors, effort expectancy (EE), performance expectancy (PE), social influence (SI), and facilitating conditions (FCs), were derived from the integration of the UTAUT model (Venkatesh et al., 2003) and the faculty's self-archiving model (Kim, 2008; Kim, 2010). Altruism (ALT), trust toward IRs (TTIRs), and copyright concerns (CCs) were derived from the Faculty's Self-Archiving Model (Kim, 2008; Kim, 2010) and the literature on that model. The other two factors, attitude (ATT) and resistance to change (RTC), were derived from the literature regarding other technology acceptance theories. ATT was derived from the theory of reasoned action (Davis, 1989; Devis et al., 1989) and the open access scholarly communication research model (Dulle, 2010), and RTC was derived from resistance to adopt the innovation (Oreg, 2003; Oreg et al., 2008) and digital library acceptance (Nov & Ye, 2008, 2009). The questionnaire in Section 2 consisted of 48 items, including ATT (4 items), PE (6 items), EE (6 items), SI (6 items), RTC (4 items), ALT (3 items), CCs (4 items), TTIRs (4 items), FC (4 items), BI (3 items), and UB (4 items). Several items corresponding to certain factors were reverse coded.

Those were two items from effort expectancy (EE5 and EE6), one item from resistance to change (RTC2), and three items from trust toward IRs (TTIRs1, TTIRs2, and TTIRs3).

Each of these factors was treated as a separate factor. ATT, PE, EE, SI, RTC were treated as independent variables (or exogenous variables) of behavioral intention (BI). BI was treated as an independent variable of behavioral intention (UB) along with other independent variables including ALT, CCs, TTIRs, and FC.

The survey questions were grouped by the main constructs of the UTAUT model and the faculty's self-archiving model. Grouping questionnaire questions by constructs helps to reflect the true picture. On the other hand, intermixing them may cause confusion and frustration and may result in the introduction of more error into all of the questions. In addition, if the respondents confuse the intermixed questions, it is likely that there will be lower reliability and weaker relationships between constructs (Davis & Venkatesh, 1996). To prevent this, the researcher decided to follow the procedure of grouping survey questions by constructs.

Section 3 was the demographic section of the questionnaire. This section consisted of 10 questions, regarding personal information such as gender, age, education, research discipline, academic position, scholarly activity, number of articles published per year, and Internet usage skills. At the end of the self-completion questionnaire, the participants were asked whether they would be willing to participate in the follow-up semi-structured interview.

4.4.3   The Semi-Structured Interview

This phase of the study aimed to gain deeper understanding of the participants' view of institutional repository acceptance and use, as well as the reasons behind their contribution and non-contribution. Also, their suggestions and comments on IRs were gathered. Some of the questions were borrowed from Kim's study (Kim, 2008) and were modified to suite the recent

study context. The interview protocol for participants who consider themselves as IR contributors was slightly different from that for non-contributors. A draft of interview protocol can be seen in Appendix C. Each participant was interviewed individually, and all interviews were digitally recorded, transcribed, and translated into English. The interview script was reviewed immediately after each interview section was finished. To ensure confidentiality, neither the participants nor their institutions have been identified in the report on the study. Member checking was employed by sharing interview transcripts with the participants and having them read their interview transcripts to ensure that their thoughts were interpreted accurately.

4.5   Pilot Study

The pilot study was conducted in November-December, 2015 for the purpose of ensuring that the measurements were reliable in the target population and to improve the research process by testing the survey instrument on a similar but smaller group of participants. Although items corresponding to each factor had been tested in previous studies, there was a need to confirm the instrument internal validity by conducting a pilot study in the present study context. The pilot study also allowed for testing an additional item (TTIRs4) which had never been tested. This item had been newly developed based on a qualitative empirical study. A pilot study was conducted with a sample of 20 faculty members in two Thai public universities that were not considered to be research universities. These universities had also developed and implemented IRs. Out of 20, only five faculty members who were lecturers completed the survey. However, none of the respondents had contributed to their university-based IR. The respondents provided feedback about the survey regarding survey completion time, the clarity of direction, and the wording of the survey. Then the self-administered questionnaire and interview protocol were

edited based-on the participants' comments to ensure the validity of the resulting data. For instance, some questions were rephrased due to the presence of grammatical errors. Some duplicate statements were also deleted. The definition of institutional repositories, open access, and self-archiving in the Thai language were included in the final version of the questionnaire to facilitate understanding of the concepts. Some respondents who were not in the LIS field asked for the clarification of these concepts, while one of the respondents in the LIS field mentioned that even though she was in LIS, she had a hard time understanding some concepts relating to self-archiving and IRs. This respondent also mentioned that the questionnaire seemed to be directed to those who had self-archiving experience and had prior knowledge of open access and institutional repositories.

4.6   Data Collection

The self-administered questionnaire was used for data gathering in this study. According to Bryman (2008), the major issue and limitation of the Internet-based questionnaire is that not everyone is online or has the technical ability to handle a questionnaire online. Also, there is growing evidence that the online survey typically generates lower response rates than the mailed questionnaire (Bryman, 2008). Therefore, both traditional mailed questionnaires and Internet-based questionnaires were used as data gathering tools in order to obtain a high response rate and to avoid the limitations of the Internet-based questionnaire.

The survey invitation letters with the enclosed online survey links were distributed by mail and email to 600 faculty members at four research universities from February-July 2016. Two weeks following each mailing date, the following up e-mails were sent out. This process continued for six months before the online survey was closed on July 31, 2016. The number of survey responses originally submitted was 214, including incomplete responses. The incomplete

responses were deleted, leaving a total of 176 survey responses to be used for analysis.

Table 4.14 presents the respondents by universities. The names of the universities are

presented by using the abbreviations.

Table 4.14

The Total Number of Respondents

Institution	No. of Population	Percentage	No. of Samples	No. of Surveys Sent Out	No. of Respondents (%)
CU	2,821	33.59	123	170	48 (27.27)
MU	3,722	44.31	163	240	68 (38.79)
SUT	374	4.45	16	70	11 (6.25)
PSU	1,482	17.64	65	120	49(27.84)
Total	8,399	100.00	367	600	176

The questionnaire provided a question asking whether the respondents would be willing

to participate in the follow-up semi-structured interview. The participants who indicated they

would be willing to participate in the semi-structured interview were asked to provide contact

information. A total of 26 respondents indicated that they agreed to participate in the interview.

Among them, six participants did not provide contact information. Therefore, the recruiting

emails were sent to 20 participants, only five of whom responded to the email. Semi-structured

interviews were conducted using Skype (3) and email (2) with five participants during May 19 -

August 20, 2016. It took approximately one hour to conduct the semi-structured interview using

Skype. All interviews were digitally recorded and transcribed. Three interviews were conducted

in English, while the other two interviews were conducted in Thai. Then the two interview

transcripts were translated into English.

4.7   Data Analysis Procedure

4.7.1   Quantitative Data Analysis Procedure

Survey results for all items were coded and imported into SPSS version 23.0 for data

cleaning and subsequent analysis. The collected data were assessed to provide an overview of the sample, to determine the reliability of the measurement tool (questionnaire), and to test the assumptions underlying the statistical technique used.

Descriptive statistics and inferential statistics were used for data analysis. A Chi-square test was used to test whether there was a relationship among the categorical variables. As the assumption of univariate normality was not met, the Kruskal-Wallis H test, a nonparametric test, was used to determine if there were statistically significant differences between two or more groups of independent variables on ordinal dependent variables (a 5-point Likert scale). Additionally, the Mann-Whitney U test was also used as a post hoc procedure to evaluate pairwise differences between two independent groups.

4.7.1.1 Data Screening

The first step of the data analysis was to examine the data. In total, 214 survey responses were returned, including incomplete responses. In a procedure of casewise deletion, the empty and incomplete responses were deleted, leaving a total of 176 survey responses to be used for descriptive statistics on the demographic data and IR usage.

The data were then examined for the outliers from the influential data points before path analysis was processed. Schumacker and Lomax (2004) define outliers as "data values that are extreme or atypical on either the independent (X variables) or dependent variables (Y variables). Since outliers could affect the mean, the standard deviation, and correlation coefficient values, they should be explained, accommodated, or deleted" (p. 32).

There are two type outliers, univariate outliers and multivariate outliers. According to Tabachnick and Fidell (2007), the univariate outliers are cases in which there is a high value on one variable, whereas multivariate outliers are cases with unusual combinations of extreme

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scores on more than one variable. For this study, both univariate outliers and multivariate outliers were examined.

Univariate outliers are cases with very large standardized scores (z scores) on one or more variables that are disconnected from other z scores. If a particular case has a standardized score greater than 3.29 ($p < .001$, two tailed test), it has potential to be an outlier (Tabachnick & Fidell, 2007). Based on this assumption, two cases (ID037 and ID170) were excluded from further analysis. Then the Mahalanobis distance (D^2) for every case was computed to detect multivariate outliers. The D^2 is "the distance of a case from the centroid of the remaining cases where centroid is the point created at the intersection of the means of all the variables" (Tabachnick & Fidell, 2007, p. 74). A case with a D^2 value that lies outside and at a distance from the other cases can be considered as an outlier (Tabachnick & Fidell, 2007). One case (ID036) had D^2 value ($D^2 = 68.05$) that distinctively stood apart from the other cases. This case was deleted as a multivariate outlier. In total, three cases were deleted, leaving 173 cases for further analysis.

4.7.1.2 Scale Assessment

Scale assessment was conducted by using principle factor analysis and reliability analysis (Cronbach's coefficient alpha).

4.7.1.3 Principle Factor Analysis

This study employed the exploratory factor analysis (EFA) approach. According to Matsunaga (2010), EFA is used "to identify a set of unobserved variable factors that reconstruct the complexity of the observed data" (p. 98). EFA was conducted using principle factor analysis (PFA) or principle axis factoring (PAF in SPSS) as a factor extraction method, since the underlying assumption of this study was that latent factor(s) drive the observed variables.

Additionally, PAF is recommended as an extraction method for factor analysis "when the data violate the assumption of multivariate normality" (p. 84) as in the current study (Costello & Osborn, 2005 as cited in Yong & Pearce, 2013). After factors were extracted, the numbers of components (factors) were retained based on theory. Velicer and Jackson (1990) suggested that if the PAF is used for factor extraction, the numbers of factors can be retained based on prior theory. A factor analysis was conducted for each scale; in total, 11 factors were conducted. Results from factor analysis are presented in Chapter 5. The factor scores for each factor were retained for use in the subsequent path analysis.

4.7.1.4 Reliability Analysis

Scale reliability refers to the internal consistency of responses that are provided by the participants. According to Case (2007), reliability is presented if "…measures are repeated under the same conditions and yield highly similar measurement each time" (p. 182). It is necessary to assess the items' and constructs' reliability in a model that contains many constructs and variables, as can be seen in the proposed research model (Figure 4.1).

Cronbach's alpha coefficient was used to measure the internal consistency of multiple items (variables) for a construct (factor). Cronbach's alpha coefficient is considered the most common measure of scale reliability (Kline, 2005). It has been used as a guideline in the process of determining internal consistency in many studies (Alajmi, 2011; Dulle, 2010; Kim, 2008; Kripanont, 2007; Orji, 2010). A Cronbach's alpha value above 0.70 is considered acceptable, and over 0.80 is good (Field, 2009). The Cronbach's alpha values were used as the main basis for judging items for deletion or retention.

Additionally, the item-to-total correlations were also examined to assess internal consistency. Items with low corrected item-total correlation (less than .3) were dropped, as this

means a particular item does not correlate very well with the scale overall (Field, 2009). Once

poor items were removed from the scales, the overall Cronbach's alpha was computed for each

scale. Table 4.15 presents the Cronbach's alpha coefficients and item-to-total correlations.

Several items were dropped, including EE5, EE6, RTC2, and TTIRs4, to increase the reliability.

As shown in the table, the Cronbach's alpha value for each construct was greater than .70. They

ranged from .72 for resistance to change (RTC) and trust toward IRs (TTIRs) to .91 for social

influence (SI). Additionally, item-to-total correlations were used to determine whether each item

exhibited measurement issues or did not correlate very well with other items in the same

construct. After deleting some items, all items had item-to-total correlations ranging from .40

to .86. All of them had item-to-total correlations above the minimum recommendation value

of .30. Results from the reliability test showed that all constructs had satisfactory reliability

values.

Table 4.15

Reliability Values

Variable	No. of Items*	Cronbach's α	Item-to-total correlations	No. of Items Deletion	Cronbach's α	Item-to-total correlations
ATT	4	**.89**	**.74-.76**			
PE	6	**.84**	**.40-.75**			
EE	6	.65	.17-.60	2	**.82**	**.59-.69**
SI	6	**.91**	**.62-.86**			
RTC	4	.49	-.23-.45	1	**.72**	**.50-.61**
ALT	3	**.84**	**.63-.76**			
CCs	4	**.80**	**.44-.76**			
TTIRs	4	.53	-0.13-.51	1	**.72**	**.50-.58**
FCs	4	**.80**	**.45-.77**			
BI	3	**.90**	**.77-.83**			
UB	4	**.85**	**.65-.77**			

Note. N = 173

4.7.1.5 Validity

The validity of the instrument is the extent to which the data collection instrument actually measures what the researcher intends to assess. For the present study, content validity and construct validity were employed.

According to Kline (2005), content validity concerns the extent to which the test items are representative of the given construct. For this study, content validity was achieved by borrowing validated items from previous studies for the measurement of the research models, as presented in Tables 4.3 to 4.13. Additionally, two experts in information science were asked to provide judgments on the questionnaire (in Thai), particularly on items corresponding to each construct in the second part of the questionnaire, concerning factors affecting faculty members' acceptance and use of IRs. The content validity was also assessed through examination of results from the pilot study.

C*onstruct validity* can be determined through the assessment of convergent validity (Kripanont, 2007). According to Teddlie and Tashakkori (2009), convergent validity is "the degree to which the measurement outcomes representing a construct agree [are consistent] with other indicators of the same construct" (p. 208). For the current study, the Pearson's correlation matrix approach was used to assess the convergent validity of the 44-item survey instrument, in particular 11 factors.

Table 4.16 presents correlations between the measure of each construct and a number of other measures that should, theoretically, be associated with it. Results showed that the behavioral intention variable was positively correlated with seven predictor variables, with magnitude of correlation coefficients of 0.16 to 0.63. The predictor variables with the highest correlation with behavioral intention were performance expectancy ($r = 0.63$, $p < .01$), altruism

($r = 0.61$, $p < .01$), effort expectancy ($r = 0.52$, $p < .01$), attitude ($r = 0.49$, $p < .01$), facilitating

conditions ($r = 0.46$, $p < .01$), social influence ($r = 0.38$, $p < .01$), and trust toward IRs ($r = 0.16$,

$p < .05$). Usage behavior was positively correlated with seven predictor variables. The

magnitude of the correlation coefficients was in the range of 0.33 to 0.62, indicating a medium to

high correlation. The predictor variables with the highest correlation with usage behavior were

behavioral intention ($r = 0.62$, $p < .01$), followed by performance expectancy ($r = 0.54$, $p < .01$),

altruism ($r = 0.52$, $p < .01$), effort expectancy ($r = 0.50$, $p < .01$), attitude ($r = 0.49$, $p < .01$),

social influence ($r = 0.49$, $p < .01$), and facilitation conditions ($r = 0.33$, $p < .01$). These

correlations evidenced good convergent validity.

Table 4.16

Mean, Standard Deviation, and Correlation Matrix of the Measures of Convergent Validity

	M	*SD*	α	ATT	PE	EE	SI	RTC	ALT	CCS	TTIRs	FC	BI	UB
ATT	16.90	2.53	0.89	-										
PE	22.97	4.09	0.84	.73**	-									
EE	14.26	2.62	0.82	.38**	.54**	-								
SI	19.22	5.33	0.91	.31**	.36**	.44**	-							
RTC	9.35	5.04	0.72	.09	.06	-.08	.12	-						
ALT	11.31	2.07	0.84	.62**	.62**	.46**	.45**	.02	-					
CCS	15.51	2.84	0.80	.13	.06	.06	.12	.18*	.13	-				
TTIRs	8.86	2.31	0.72	.05	.00	.01	.00	-.29**	.05	-.04	-			
FC	14.36	2.81	0.80	.16*	.18*	.38**	.29**	.05	.29**	.16*	.01	-		
BI	10.71	2.32	0.90	.49**	.63**	.52**	.38**	-.09	.61**	.05	.16*	.46**	-	
UB	13.03	3.30	0.85	.49**	.54**	.50**	.49**	.07	.52**	.07	.07	.33**	.62**	-

Note. ATT = Attitude; PE = Performance Expectancy; EE = Effort Expectancy; SI = Social Influence; RTC = Resistant to Change; ALT = Altruism; CCS = Copyright Concerns; TTIRs = Trust Toward IRs; FC = Facilitating Condition; BI = Behavioral Intention; and UB = Usage Behavior. *$p < .05$ (2-tailed), **$p < .01$ (2-tailed).

4.7.1.6 Path Analysis

This study utilized a path analysis to address the second research question "What are the

factors that affect faculty members' acceptance and use of institutional repositories in the Thai

research university context?" Path analysis is a method for studying the direct and indirect

effects of variables. It is not a method for discovering causes; rather, it can be used to test the

relationships among variables (Kline, 2005; Schumacker & Lomax, 2004). Path analysis is a useful method for examining the web of relationships among observed variables (exogenous variables) and unobserved variables (endogenous variables). According to Hackett (1985, as cited in Sherven, 2016), path analysis consists of three stages. The first is the development of the path model. Then the path coefficients are computed to identify and eliminate non-significant paths in the original model. The final process is to specify a reduced path model and determine whether the just-identified model fits the data.

For this study, a path analysis was used to evaluate the contribution of the combination of paths to the overall fit of the structural model. Precisely, it was used to examine the explanatory power of nine exogenous variables in relation to two endogenous variables, as presented in Figure 4.1. The exogenous variables included 1) attitude toward IRs (ATT); 2) performance expectancy (PE); 3) effort expectancy (EE); 4) social influence (SI); 5) resistance to change (RTC); 6) altruism (ALT); 7) copyright concerns (CCs); 8) trust toward IRs (TTIRs); and 9) facilitating condition (FC). Endogenous variables included behavioral intention (BI) and usage behavior (UB). BI had dual roles; specifically, BI was accounted for by five factors (ATT, PE, EE, SI, and RTC), and it also served as a predictor of the usage behavior (UB) along with other independent variables including ALT, CCs, TTIRs, and FC. In the proposed research model, there were five different indirect effects. For instance, one corresponded to the path ATT → BI → UB, indicating that attitude toward IRs affected faculty behavioral intention to use IRs, which in turn influenced their actual usage.
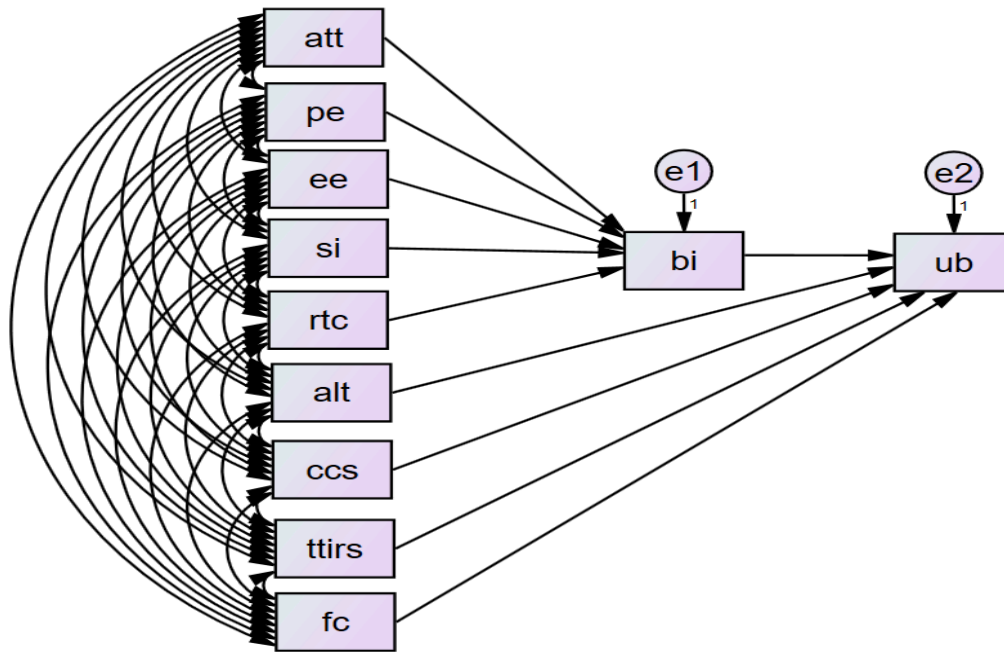
Figure 4.1. A proposed path model of faculty's acceptance and use of IRs (e1 and e2 are error variances).

4.7.2 Qualitative Data Analysis Procedure

Once the data gathering process had been completed, qualitative data from the interview scripts were transcribed, coded, and analyzed to identify themes. Basic content analysis was used for analyzing the qualitative data. The goal of the analysis was to gain an in-depth understanding of the faculty's acceptance and use of IRs, their self-archiving practice, and barriers that affected their use or non-use of IRs. Moreover, the analyzed data from the qualitative part was used to support the analyzed data from the quantitative part to yield the results of the study.

CHAPTER 5

DATA ANALYSIS AND RESEARCH FINDINGS

The present study investigated the factors affecting faculty acceptance and use of

institutional repositories in Thailand. While the survey data captured statistical details about the

faculty acceptance and use of IRs, the interview data yielded more in-depth explanations of the

subjects' behavior and the reasons behind their contributions or delays in contributing to IRs.

The results from the survey are reported first, followed by those from the semi-structured

interviews.

5.1   Quantitative Data Analysis

5.1.1   Demographic Information

The target population for this study was faculty members in four research universities in

Thailand. All of the institutions had implemented institutional repositories. The total population

for this study was 8,399, and the sample size representative of the total population was 367. A

total of 600 questionnaires were distributed to faculty members in four research universities in

Thailand. The number of survey responses originally returned was 214, including incomplete

responses. The overall response rate was 36% (214 out of 600 recipients). Using casewise

deletion, the empty and incomplete responses were deleted, leaving a total of 176 survey

responses to be used for analysis.

In this section, the descriptive statistics on the survey participants are presented. This

study included eight items relating to demographic information on the respondents: gender, age,

education, research discipline, academic position, scholarly activity, number of articles published

per year, and Internet usage skills.

Table 5.1 presents demographic information on the respondents. The total number of respondents in this study was 176 faculty members from four research universities in Thailand, including Chulalongkorn University (CU) (n = 48), Mahidol University (MU) (n = 68), Prince of Songkla University (PSU) (n = 49), and Suranaree University of Technology (SUT) (n = 11). The number of respondents from SUT was very small due to the small size of the university and the small size of the total population of SUT, which was only 374 faculty members. The participants included 99 (56.2%) females and 77 (43.8%) males. The demographic data show an interesting range in the participants' ages. The distribution of the respondents by age reveals that the age of the respondents ranged from 25 to 66 years. The largest number of the respondents (84, 47.7%) was aged 25-39 years, followed by 40-49 years (58, 33.0%) and 50 years and over (24, 13.6%); the remaining ten participants (5.7%) did not report their age.

In terms of the participants' highest academic qualifications, more than three-fourths (138, 79.5%) had earned doctoral degrees, while the remainder had Master's degrees (35, 19.9%). Only one respondent had a Bachelor degree (1, 0.6%).

With regard to academic position, more than half of the participants were instructors and lecturers (101, 57.4%), followed by assistant professors (48, 27.3%), associate professors (21, 11.9%), professors (3, 1.7%), and researchers (3, 1.7%). For the current study, lecturers and instructors were considered as faculty members in the Thai higher education context. This group represents the largest group among the respondents. As in the current study, in a survey of a technology acceptance model of Internet usage by academics at Thai business schools, Kripanont (2007) also found that most of the respondents were instructors and lecturers.

Table 5.1

*The Frequency and Percentage of Demographic Categories (*N = *176)*

Characteristic	Institution				Total N = 176	Percentage
	CU (n = 48)	MU (n = 68)	PSU (n = 49)	SUT (n = 11)		
Gender						
Male	21	29	19	8	77	43.8
Female	27	39	30	3	99	56.2
Age						
25-39 years	21	35	22	6	84	47.7
40-49 years	18	20	17	3	58	33.0
50 years and over	7	8	7	2	24	13.6
N/A	2	5	3	0	10	5.7
Education						
PhD	36	52	41	11	138	79.5
Master Degree	11	16	8	0	35	19.9
Bachelor Degree	1	0	0	0	1	0.6
Academic Position						
Professor	3	0	0	0	3	1.7
Associate Professor	7	5	8	1	21	11.9
Assistant Professor	14	16	11	7	48	27.3
Instructor/lecturer	22	47	29	3	101	57.4
Researcher	2	0	1	0	3	1.7
Discipline						
Medical and Health Sciences	13	47	9	0	49	27.8
Other Sci. and Technology	11	26	27	7	71	40.3
Humanities and Social Sci.	24	10	12	4	50	28.4
N/A	0	5	1	0	6	3.4

The participants were categorized into three major disciplines: medical and health

sciences, other sciences and technology (other STEM disciplines), and humanities and social

sciences, based on the Royal Society of Thailand's academic discipline codes and the NSF

discipline codes. Table 5.2 presents the main disciplines and sub-disciplines of the respondents in detail.

Table 5.2

Disciplines and Sub-disciplines of the Respondents (N = 176)

Main Discipline	Sub Discipline	Frequency	Percentage
Medical and Health Sciences	Pharmacy	14	8.0
	Nursing	8	4.6
	Medical science	7	4.0
	Health science	7	4.0
	Biomedical science/Biomedical engineering	3	1.7
	Veterinary medicine	2	1.1
	Dentistry/Oral biology	2	1.1
	Physical therapy	2	1.1
	Tropical medicine	2	1.1
	Epidemiology	1	0.6
	Immunology	1	0.6
Other Science and Technology	Engineering & Computer Science	25	14.2
	Life sciences and biological sciences	14	8.0
	Agricultural sciences	12	6.8
	Environmental science	7	4.0
	Physical Science	7	4.0
	Science & technology	5	2.8
	Renewable Energy	1	0.6
Humanities and Social Sciences	Library and Information Science	8	4.6
	Jurisprudence	7	4.0
	Business & Management	7	4.0
	Education	7	4.0
	Fine Art & Architectural Art	5	2.8
	Psychology & Behavioral Science	5	2.8
	Economics	3	1.7
	Linguistics	3	1.7
	Political science	2	1.1
	Demography	1	0.6
	Occupational therapy	1	0.6
	Social studies	1	0.6
N/A		6	3.4
Total		176	100

The largest number of faculty members were from other sciences and technology (71, 40.3%),

including seven sub disciplines: engineering and computer science (n = 25), life sciences and

biological sciences (n = 14), agricultural sciences (n = 12), environmental science (n = 7),

physical science (n = 7), science and technology (n = 5) and renewable energy (n = 1). The

numbers of faculty members in the humanities and social sciences and in the medical and health

sciences were nearly the same at 50 (28.4%) and 49 (27.8%), respectively. The fifty faculty

members in the humanities and social sciences were from library and information science (n =

8), business and management (n = 7), jurisprudence (n = 7), fine art and architectural art (n = 5),

psychology and behavioral science (n = 5), economics (n = 3), linguistics (n = 3), political

science (n = 2), and social studies (n = 1). The forty-nine faculty members in the medical and

health sciences were from pharmacy (n = 14), nursing (n = 8), medical science (n = 7), health

science (n = 7), biomedical science and biomedical engineering (n = 3), veterinary medicine (n =

2), dentistry/oral biology (n = 2), physical therapy (n = 2), tropical medicine (n = 2),

epidemiology (n = 1), and immunology (n = 1). It should be noted that six (3.4%) participants

did not indicate their disciplines; therefore, they were excluded from future analysis and treated

as missing values in the discussion of research disciplines.

In the area of scholarly activities carried out by the respondents in the past year, the

majority of the respondents (97, 55%) reported having served as a referee or a reviewer of a

journal, followed by those who had been an author of a journal article (78, 44.3%) or had served

as an editorial board member for a journal (28, 15.9%), as presented in Table 5.3. Among the

participants who selected "other" (47, 26.7%), 40 stated that none of the scholarly activities

listed applied to them, whereas seven respondents did not provide additional information

regarding their current scholarly activities. Interestingly, more than three-fourths of the

respondents (136, 77.3%) indicated that they had published at least 1-2 articles per year, while only 26 (14.8%) of the respondents stated that they had never published any papers. Only one professor indicated that he had published more than five articles per year.

Table 5.3

*Respondents' Scholarly Activities and Number of Articles Published per Year (*N *= 176)*

Characteristic	Institution				Total	Percentage
	CU (n = 48)	MU (n = 68)	PSU (n = 49)	SUT (n = 11)		
Scholarly Activities						
Author of a journal article	21	32	19	6	78	44.3
Referee/reviewer of a journal.	33	26	28	10	97	55.0
Editorial board member of a professional association	1	2	0	1	4	2.3
Editorial board member of a journal	9	9	8	2	28	15.9
Editor of a journal	1	1	1	2	5	2.8
Other	5	25	16	1	47	26.7
Number of articles						
0	6	12	7	1	26	14.8
1-2 articles/year	35	54	40	7	136	77.3
3-4 articles/year	6	2	2	3	13	7.4
More than 5 articles/year	1	0	0	0	1	0.6

Regarding Internet usage skills in accessing and disseminating scholarly information, the respondents were asked to self-rate their Internet usage skills. The scale represented the respondent's level of confidence, ranged from one to five. One (strongly disagree) represented no confidence at all, and five (strongly agree) indicated high confidence. Table 5.4 presents respondents' Internet usage skills for accessing and disseminating scholarly information. Based on the mean scores, it appears that all statements received responses of agreement, ranking from "I feel confident in searching and accessing for scholarly information on the Internet" ($M = 4.17$, $SD = .67$), followed by "I feel confident in publishing and disseminating scholarly information on the Internet" ($M = 3.77$, $SD = .83$), "I feel confident in publishing on the Internet whether

there is no one around to show me how to do it" (*M* = 3.58, *SD* = .93), and "I feel confident in creating and editing my personal website" (*M* = 3.52, *SD* = .93).

Table 5.4

Respondents' Internet Usage Skills in Terms of Accessing and Disseminating Scholarly Information

Internet Usage Skill	N	Minimum	Maximum	*Mean*	*SD.*	Interpretation
I feel confident in searching for and accessing scholarly information on the Internet.	176	2	5	4.17	.671	Agree
I feel confident in publishing and disseminating scholarly information on the Internet.	176	2	5	3.77	.826	Agree
I feel confident in creating and editing my personal website.	176	1	5	3.52	.926	Agree
I feel confident in publishing on the Internet whether or not there is no one around to show me how to do it.	176	1	5	3.58	.929	Agree

Note. The means range from 1 = Strongly Disagree to 5 = Strongly Agree.

The Kruskal-Wallis H tests with the age, discipline, and academic position categories as independent variables were conducted to see whether there were statistically significant differences among group in-term of Internet usage skills. Ten participants who did not verify their age and discipline were excluded from the analysis. Table 5.5 presents results from the Kruskal-Wallis H test. Regarding age, the Kruskal-Wallis H test showed that there was a significant difference across age groups in the first statement, "*I feel confident in searching and accessing for scholarly information on the Internet,*" *H*(2) = 7.11*, p* = .029, with a mean rank of 86.25 for faculty members whose age 25-39 years, 88.42 for those who were 40-49 years, and 61.91 for respondents whose age 50 years and over. Mann-Whitney test were conducted to evaluate pairwise differences among the three groups. The result of this test indicated that faculty members aged 50 years and over expressed significantly lower agreement in-term of confidence in searching and accessing scholarly information on the Internet than those who were 25-39 years (*U* = 711.50, *p* = .013, *r* = - 0.23) and 40-49 years (*U* = 476.00, *p* = .012, *r* = - 0.27). This

indicates that the level of confidence in searching for and accessing scholarly information on the Internet varies by age. With regard to discipline and academic position, the Kruskal-Wallis H test showed that there was no significant difference in terms of Internet usage skills across discipline and academic position in all statements. It can be concluded that the respondents' Internet usage skills in the areas of accessing and disseminating scholarly information were not statistically significantly different across disciplines and academic positions.

Table 5.5

Respondents' Internet Usage Skill by Age, Discipline, and Academic Position

Variable	Chi-square	*df*	*p*-value
Age (*N* = 166)			
I feel confident in searching for and accessing scholarly information on the Internet.	7.11	2	.029*
I feel confident in publishing and disseminating scholarly information on the Internet.	1.94	2	.380
I feel confident in creating and editing my personal website.	0.47	2	.789
I feel confident in publishing on the Internet whether or not there is no one around to show me how to do it.	3.21	2	.201
Discipline (*N* = 170)			
I feel confident in searching for and accessing scholarly information on the Internet.	2.65	2	.266
I feel confident in publishing and disseminating scholarly information on the Internet.	2.73	2	.256
I feel confident in creating and editing my personal website.	4.93	2	.085
I feel confident in publishing on the Internet whether or not there is no one around to show me how to do it.	2.72	2	.257
Academic Position (N = 176)			
I feel confident in searching for and accessing scholarly information on the Internet.	5.31	4	.257
I feel confident in publishing and disseminating scholarly information on the Internet.	2.22	4	.696
I feel confident in creating and editing my personal website.	4.14	4	.387
I feel confident in publishing on the Internet whether or not there is no one around to show me how to do it.	3.39	4	.494

Note. * *p* < .05

5.1.2 IR Awareness and Usage

This study also sought to determine whether faculty members in Thai research universities accept and use institutional repositories, particularly university-based institutional repositories. The respondents were asked whether they had been aware of institutional

repositories (or knowledge banks in the Thai research university context) developed by their institutions before participating in this study, and how they had been informed about them.

Table 5.6 shows data on faculty members' awareness of IRs by discipline. The Chi-square test shows that there was no statistically significant relationship between research discipline and whether faculty members were aware of IRs, χ^2 (2, $N = 170$) = 3.16, $p = .206$. The larger proportion of faculty members in all research disciplines indicated that they had been aware of university-based IRs developed by their universities. Overall, 82% ($n = 41$) of faculty member from the humanities and social sciences had been aware of university-based IRs, followed by 71.4% ($n = 33$) of faculty members from the medical and health sciences and 67.60% of faculty members from other science and technology fields. By contrast, a smaller proportion of respondents in all disciplines, including other science and technology fields (32.40%, $n = 23$), the medical and health sciences (28.60%, $n = 14$), and the humanities and social sciences (18%, $n = 9$) had not been aware of university-based IRs.

Table 5.6

Awareness of IRs by Research Discipline (N = 170)

Research Discipline	Aware of IR N = 124		Not Aware of IR N = 46	
	n	*%*	*n*	*%*
Medical & health sciences	35	71.4	14	28.6
Other sci. & technology	48	67.6	23	32.4
Humanities & social sciences	41	82.0	9	18.0
Total	124	73.0	46	27.0

Note. χ^2 (2, $N = 170$) = 3.16, $p = .206$

      Table 5.7 presents data on faculty members' awareness of IRs by academic position. Among the 176 participants, 129 (73%) of the respondents stated that they had been aware of institutional repositories; the remaining 47 (27%) participants had not been aware of them. Fisher's exact test yielded $p = .075$, indicating that there was no statistically significant

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association between academic position and whether or not faculty members had been aware of institutional repositories. It appears that while none of the full professors had been aware of IRs, the greater proportion of respondents in other academic positions, including 100% ($n = 3$) of researchers, 76.20% ($n = 77$) of instructors and lecturers, 71.40% ($n = 15$) of associate professors, and 70.80% of assistant professors, indicated that they had been aware of the IRs developed by their universities. A smaller proportion of faculty members in all academic positions indicated that they had not been aware of them.

Table 5.7

Awareness of IRs by Academic Position (N = 176)

Academic Position	Aware of IRs $N = 129$		Not Aware of IRs $N = 47$	
	n	*%*	*n*	*%*
Professor	0	0.0	3	100.0
Associate Professor	15	71.4	6	28.6
Assistant Professor	34	70.8	14	29.2
Instructor/Lecturer	77	76.2	24	23.8
Researcher	3	100.0	0	0.0
Total	129	73.0	47	27.0

Note. 4 cells (40%) have an expected count less than 5. Fisher's exact test was applied.

With regard to how the faculty members had heard about IRs, the majority of respondents (93, 29.3%) indicated that they had heard about IRs from IR staff members and librarians, followed by the library/university websites (91, 28.0%), and colleagues (45, 14.0%), as shown in Table 5.8. Beside the ways presented in Table 5.8, 26 (8.0%) respondents also mentioned some other ways through which they had heard about IRs. Three respondents mentioned that they had accidentally found their university-based IRs while they were carrying out Google searches. Three respondents had learned about IRs via personal contact by email. Two participants indicated that they had learned about their university-based IRs while taking the survey for the

current study. One faculty member mentioned that she was a co-founder and served on the

committee for the university's IR project. The remaining 17 participants stated that they had not

had any information about IRs before participating in the current study.

Table 5.8

Ways in which the Faculty Members Learned about IRs

Source of Information	Responses	
	Frequency	*Percentage*
IR staff and librarian	93	29.0
Library/university websites	91	28.3
Colleagues	45	14.0
Dean/director of the library	25	7.8
Dean of the faculty/college	10	3.1
President/Vice president of the university	6	2.0
University/faculty meeting	12	3.7
International conference	8	2.5
National conference	5	1.6
Others	26	8.0
Total	321	100.0

* The respondents were allowed to choose multiple answers.

5.1.3   IR Contributors and Non-Contributors

The present study also aimed to investigate whether the faculty members had deposited

their work in IRs. Although nearly three-fourths of the respondents (129, 73%) indicated that

they had been aware of IRs, only one-fourth of the respondents (44, 25%) had deposited their

work into IRs. Interestingly, 132 (75%) respondents had never deposited any of their work in a

university-based IR. A Chi-square test with awareness of IRs, academic position, and discipline

category as independent variables was conducted to see whether there were any relationship

between these categorical variables and depositing of content.

Table 5.9 shows data on IR contributors and non-contributors by respondents' awareness

of IRs. The Chi-square test showed that there was a statistically significant relationship between

the respondents' awareness of IRs and whether they contributed to the university-based IRs, χ^2 (1, N = 176) = 5.12, p = .024, ϕ = .17.

While only 29.5% (n = 38) of respondents who had been aware of IRs had contributed, the greater portion of them (70.5%, n = 91) had never deposited any work and considered themselves as non-contributors. About 87% (n = 41) of the respondents who had not been aware of IRs had never deposited any work, compared to 12.8% (n = 6) of respondents who had not been aware of university-based IRs, but had deposited their work. Interestingly, most of the contributors (38 out of 44, 86.4%) were faculty members who had been aware of IRs, as compared to six (13.6%) respondents who had not been aware of IRs but who considered themselves as contributors. It can be implied from results of the Chi-square test that faculty members who had been aware of IRs were more likely to contribute and deposit their work.

Table 5.9

IR Contributors and Non-contributors by Awareness of IRs (N = 176)

Aware of IRs	Contributors N = 44		Non-Contributors N = 132	
	n	*%*	*n*	*%*
Yes	38	29.5	91	70.5
No	6	12.8	41	87.2
Total	44	25.0	132	75.0

Note. χ^2 (1, N = 176) = 5.12, p = .024

Table 5.10 presents data on IR contributors and non-contributors by discipline, a chi-square test indicates that there was no statistically significant relationship between discipline and whether faculty members contributed to university-based IRs, χ^2 (2, N = 170) = .27, p = .903. It is clear that the greater proportion of faculty members in all academic disciplines considered themselves as non-contributors. In total, 74.0% (n = 126) of the respondents were non-contributors, as compared to 26.0% (n = 44) contributors. Those who were non-contributors

included 76.0% (n = 54) of faculty members from other science and technology fields, followed

by 73.5% (n = 36) of faculty members from the medical and health sciences and 72.0% (n = 36)

from the humanities and social sciences. Those who considered themselves as IR contributors

included 28.0% (n = 14) faculty members from the humanities and social sciences, 26.5% (n =

13) faculty members from the medical and health sciences, and 24.0% (n = 17) faculty members

from other science and technology fields.

When IR contributors from other science and technology disciplines and those from the

medical and health sciences are combined, the results show that faculty members from science

disciplines make up the overwhelming majority of IR contributors (30 out of 44, 68%),

compared with faculty members from the humanities and social sciences (14 out of 44, 32%).

Table 5.10

IR Contributors and Non-contributors by Discipline (N = 170)

Discipline	Contributors $N = 44$		Non-Contributors $N = 126$	
	n	*%*	*n*	*%*
Medical and Health Sciences	13	26.5	36	73.5
Other Sci. & Technology	17	24.0	54	76.0
Humanities & Social Sci.	14	28.0	36	72.0
Total	44	26.0	126	74.0

Note. χ^2 (2, $N = 170$) = .27, $p = .903$

Table 5.11 presents data on IR contributors and non-contributors by academic position.

The Fisher's exact test yields $p = .401$, indicating that there was no statistically significant

relationship between academic position and whether or not faculty members contributed to

university-based IRs. The greater proportion of faculty members in all academic positions

considered themselves as non-contributors, including 100% of professors (n = 3), followed by

77.2% (n = 78) of instructors and lecturers, 72.9% (n = 35) of assistant professors, 71.4% (n =

15) of associate professors, and 33.3% (n = 1) of researchers. Among those who considered

themselves as contributors were 66.7% (n = 2) of researchers, 28.6% (n = 6) of associate

professors, 27% (n = 13) of assistant professors, and 22.8% (n = 23) of instructors and lecturers.

It is interesting that none of the professors had contributed to university-based IRs although one

of them had published more than five papers a year.

Table 5.11

IR Contributors and Non-contributors by Academic Position (N = 176)

Academic Position	Contributors N = 44		Non-Contributors N = 132	
	n	*%*	*n*	*%*
Professor	0	0.0	3	100.0
Associate Professor	6	28.6	15	71.4
Assistant Professor	13	27.1	35	72.9
Instructor/Lecturer	23	22.8	78	77.2
Researcher	2	66.7	1	33.3
Total	44	25.0	132	75.0

* 4 cells (40%) have an expected count less than 5. Fisher's exact test was applied.

5.1.3.1 Content Types

As shown in Figure 5.1, among the 44 respondents who considered themselves to be IR

contributors, the largest number had deposited theses and/or dissertations (21, 47.7%), followed

by journal articles (17, 38.6% (pre-refereed articles *n* = 15 and final versions of refereed articles

n = 2) and research reports and technical reports (15, 34.1%). It is noteworthy that only one

participant had made a conference presentation available. Three respondents also mentioned that

they had deposited other work in university-based IRs, including abstracts (2) and a senior

project (1). The choice of data set was also on the survey; however, none of the IR contributors

had made a data set available to a university-based IR. The respondents were allowed to choose

multiple answers.
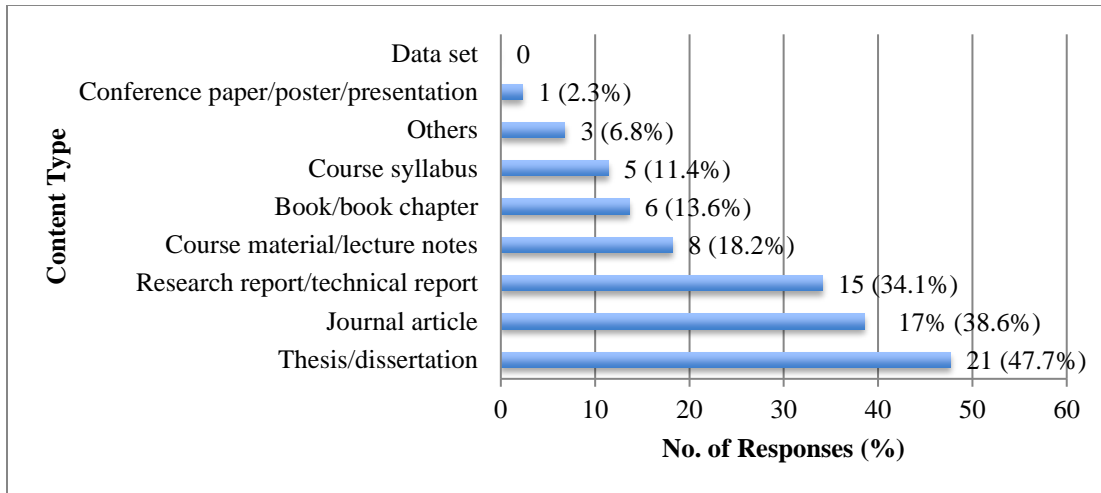
Figure 5.1. Types of content that the IR contributors had made available in university-based IRs.

Table 5.12 shows that out of 44 IR contributors, the majority of them (22, 37.3%) had self-archived their work. The participants also identified others who were currently involved in the content deposition process. Those included department staff members (20, 33.9%), librarians and library staff members (9, 15.3%), and assistants and teaching assistants (4, 6.8%). Only one IR contributor indicated that a colleague had helped them to deposit work into the university-based IR. In addition, three IR contributors (3, 5.1%) mentioned others who had helped them in the content deposition process, including the graduate school staff (2) and the faculty member's research unit staff (1).

Table 5.12

Who was Involved in the Content Depositing Process (N = 44)

	Responses	
	Frequency	Percentage
Self (Self-archiving)	22	37.3
Department staff	20	33.9
Colleague	1	1.7
Assistant/teaching assistant	4	6.8
Librarian/library staff	9	15.3
Others	3	5.1
Total	59	100.0

Note. The respondents were allowed to choose multiple answers.

The participants were asked about the last time that they had deposited their work in a university-based IR so that it would be possible to ascertain their most recent contribution; the largest number (17, 38.6%) indicated that the last time they had deposited their work was approximately 1-6 months previously, followed by 7-12 months previously (7, 15.9%) and 1-2 years previously (4, 9.1%). However, a number of IR contributors (14, 31.8%) could not remember when the last time they had deposited their work into a university-based IR had been, as shown in Table 5.13. To sum up, it is clear that while the majority of the respondents were currently making their work available through university-based IRs, some respondents were not making any new contributions, as indicated by the fact that the last time they had deposited work into the university-based IRs had been more than one year previously, and many of them also could not remember when the last time they had deposited their work had been. This finding suggests the university-based IRs were quite popular among the contributors.

Table 5.13

Most Recent Contribution (N = 44)

	Responses	
	Frequency	Percentage
1-6 months ago	17	38.6
7-12 months ago	7	15.9
1-2 years ago	4	9.1
More than 3 years ago	2	4.5
I cannot remember.	14	31.8
Total	44	100.0

5.1.3.2 IR Non-Contributors

Among the 132 non-contributors, 56 (42.4%) indicated that they would be willing to deposit their work in university-based IRs in the near future, while 23 (17.4%) said they would

not be willing to deposit their work. It is interesting that more than one third (53, 40.2%) remained uncertain about whether to contribute to university-based IRs.

The chi-square test for independence was used to determine differences in responses across three research disciplines. As shown in Table 5.14, the Chi-square test indicates that there was no statistically significant relationship between discipline and whether IR non-contributors were willing to contribute to university-based IRs, χ^2 (4, $N = 126$) = .58, $p = .965$. A greater proportion of respondents in the medical and health science (44.4%, n = 16) and other science and technology field (42.6%, n = 23) reported that they had not made any decision about whether to contribute to university-based IRs as compared to those who indicated that they would be willing to contribute, including 15 (41.7%) from the medical and health sciences and 21 (38.9%) from other science and technology fields. Different from other disciplines, a greater proportion of respondents in the humanities and social sciences (44.4%, n = 16) reported that they would be willing to contribute to university based IRs, as compared to 38.9% (n = 14) of those who had not made any decision regarding whether to contribute. The other respondents who did not want to contribute to university-based IRs included 18.5% (n = 10) of faculty members from other science and technology fields, followed by 16.7% (n = 6) of faculty members from the humanities and social sciences and 13.9% (n = 5) of faculty members from the medical and health sciences. It is clear that the greatest portion of respondents 42.0% (53 out of 126) had not decided whether to contribute to university-based IRs. If these groups of respondents had had a clearer picture about IRs and seen the benefit of the contribution, they might have changed their minds and made a contribution.

Table 5.14

IR Non-contributors and Their Willingness to Contribute to University-based IRs by Discipline (N = 126)

Discipline	Willingness to contribute					
	Yes N = 52		No N = 21		Uncertain N = 53	
	n	*%*	*n*	*%*	*n*	*%*
Medical & Health Sciences	15	41.7	5	13.9	16	44.4
Other Sci. & Technology	21	38.9	10	18.5	23	42.6
Humanities & Social Sci.	16	44.4	6	16.7	14	38.9
Total	52	41.3	21	16.7	53	42.0

Note. χ^2 (4, N = 126) = .58, *p* = .965

Regarding academic positions, among the 132 non-contributors, 42.40% (n = 56) reported that they would be willing to contribute, as compared to 17.40% (n = 23) of non-contributors who did not want to contribute at all, as shown in Table 5.15. Approximately 40.2% (n = 53) of non-contributors had not made any decision about whether to contribute to university-based IRs. The result from the Fisher's exact test, *p* = .326, indicates that there was no statistically significant relationship between academic position and whether non-contributors would be willing to contribute to university-based IRs. As shown in Table 5.16, the non-contributors who indicated that they would be willing to contribute to university-based IRs were 100% (n = 1) of researchers, followed by 46.0% (n = 36) of instructors and lecturers, 40.0% (n = 6) of associate professors, and 37.0% (n = 13) of assistant professors. It is interesting that none of the full professors indicated they would be willing to contribute. Other non-contributors, who answered that they did not want to contribute, were 20.0% (n = 2) of associate professors, 18.0% (n = 14) of instructors and lecturers, and 11.0% (n = 4) of assistant professors. The others, who remained uncertain, were 52.0% (n = 18) of assistant professors, 40.0% (n = 6) of associate professors, 36.0% (n = 28) of instructors and lecturers, and 33.3% (n = 1) of professors.

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Table 5.15

IR Non-contributors and Their Willingness to Contribute to University-based IRs by Academic Position (N = 132)

Academic Position	Willingness to contribute					
	Yes *N = 56*		No *N = 23*		Uncertain *N = 53*	
	n	*%*	*n*	*%*	*n*	*%*
Professor	0	0.0	2	66.7	1	33.3
Associate Professor	6	40.0	3	20.0	6	40.0
Assistant Professor	13	37.0	4	11.0	18	52.0
Instructor/Lecturer	36	46.0	14	18.0	28	36.0
Researcher	1	100.0	0	0.0	0	0.0
Total	56	42.4	23	17.4	53	40.2

Note. 7 cells (46.7%) have expected count less than 5. Fisher's exact test was applied.

Some respondents who were not willing to deposit their work and some who remained uncertain indicated their reasons and concerns about university-based IRs. Those reasons were translated, grouped, and presented as statements. Table 5.16 presents respondents' reasons for not contributing. Sixteen (out of 23, 7%) provided a variety of reasons to support why they did not want to contribute to university-based IRs. The three most common reasons, mentioned by equal numbers of respondents (3, 11%), were that they did not have any work to deposit in the university-based IRs, that there were no submission guidelines, and that there was a lack of information about the university-based IRs. A respondent from Bioinformatics stated, "I do not have sufficient information about the deposition process. I think learning how to self-archive takes additional time and effort" (ID009). The other reasons included concerns about their own work (n = 2), perceived absence of benefit (n = 2), not being required to do it (n = 2), there being no mandate policy (n = 1), preferring to publish only in prestigious journals (n = 1), preferring to use other sources (n = 1), believing that self-archiving takes time and effort (n = 1), and believing that other staff should be responsible for collecting faculty members' work and depositing it into the university-based IR (n = 1).

Table 5.16

Reasons for Not Contributing (N = 23)

Reason	Frequency	Percentage
Not having any work	3	11.1
Absence of submission guidelines	3	11.1
Lack of information about the university-based IRs	3	11.1
Concerns about the quality of their own work	2	7.4
Perceived absence of benefit	2	7.4
Not having to do it	2	7.4
There being no mandate policy	1	3.7
Preferring to publish in journals	1	3.7
Preferring to use other sources	1	3.7
The time and effort required by self-archiving	1	3.7
Belief that other staff should responsible for collecting the faculty's work	1	3.7
N/A	7	26.0
Total	27	100.0

Note. Some participants provided more than one reason.

As shown in Table 5.17, only 32 of the respondents (out of 53) who were not sure whether to contribute to the university-based IRs provided specific reasons and concerns. The most common reason mentioned by respondents (12 out of 32, 19%) was that there were no submission guidelines, followed by lack of information about the university-based IRs (6, 9.4%) and the belief that other staff or units should responsible to collect and deposit the faculty's work (4, 6.3%). One respondent, who was a faculty member from Physical Therapy, stated "I don't understand the importance of IRs. I do not have enough information regarding the depositing process" (ID107). While other faculty members mentioned lack of information and did not know whom they should contact if they wanted to deposit their work, one faculty member in Thai Linguistics stated, "I don't know how to deposit, particularly how to send the PDF file to the library and whom should I contact" (ID151). Additionally, a faculty member from Chemistry, who thought that other staff should be responsible for this work, said, "The faculty administrative staff should be responsible for depositing the faculty's work into the IR" (ID084).

Other reasons and concerns also mentioned by two to three respondents included that they

perceived no benefit (n = 3), depositing work into the university-based IRs was not a university

requirement (n = 3), they were concerned about the quality of their own work (n = 3), they were

concerned about plagiarism (n = 2), they were concerned about copyright (n = 2), there was no

mandate policy (n = 2), and deposition of work into the university-based IRs was not a high-

priority task (n = 2).

Table 5.17

Reasons for Uncertainty about Whether or Not to Contribute (N = 53)

Reason	Frequency	Percentage
No submission guideline	12	18.8
Lack of information about the university-based IRs	6	9.4
Other staff/unit should responsible to collect and post the faculty's works	4	6.3
Not a university requirement	3	4.7
No perceived benefit	3	4.7
Concerns about the quality of their own work	3	4.7
Concerns about plagiarism	2	3.1
Concerns about copyright issue	2	3.1
No mandate policy	2	3.1
Not a high-priority task	2	3.1
Not having any work	1	1.6
Not having potential users	1	1.6
Lack of technician support	1	1.6
IR is redundant	1	1.6
N/A	21	32.8
Total	64	100.0

Note. Some participants provided more than one reason.

Other reasons, mentioned by one respondent each, included that the respondent did not have any

work to deposit, the respondent did not know who the potential users would be, there was a lack

of technical support by the library, and the IR was redundant. A faculty member from Decision

sciences and engineering systems, who thought that the IR was redundant, stated "If I publish

something in a journal, the University should have it by default. I see no reason to do it. The IR

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is redundant" (ID013). This finding is similar to that of Davis and Connolly's (2007) study. According to that study, the redundancy of Cornell's DSpace with other modes of scholarly communication as subject repositories led some faculty members to not deposit their work in it.

5.1.3.3 The Importance of IR Development

Table 5.18 presents the participants' opinion on the importance of IR development by their awareness of IRs. Result from the Chi-square test indicates were χ^2 (1, N = 176) = 8.77, p = .003, ϕ = -.22. This means that there was a statistically significant association between respondents' awareness of IRs and their opinions on the importance of IR development. Based on results of the Chi-square test, respondents who had been aware of university-based IRs were more likely to agree that the development of IRs is important, as compared to those who had not been aware of IRs.

Table 5.18

Participants' Opinions on the Importance of IR Development by Awareness of IRs (N = 176)

Aware of IRs	Important N = 153		Not Important N = 23	
	n	*%*	*n*	*%*
Yes	118	91.5	11	8.5
No	35	74.5	12	25.5
Total	153	86.9	23	13.1

Note. χ^2 (1, N = 176) = 8.77, p = .003

Clearly, the greater proportion of respondents who had been aware of IRs agreed that the development of university-based IRs for archiving and disseminating scholarly work and teaching materials was important. In total, 153 respondents agreed that the development of IRs was important; they included 91.5% (n = 118) of respondents who had been aware of IRs and 74.5% (n = 35) of those who had not been aware of IRs. The smaller proportion of respondents thought that the development of IRs was not important. Among this group, 25.5% (n = 12) had

not been aware of IRs, and 8.5% (n = 11) indicated that they had been aware of them but disagreed that the development of IRs was important.

Taking research disciplines into consideration, Table 5.19 shows participants' opinions on the importance of the development of IRs for archiving and disseminating scholarly work and teaching materials. The Chi-square test of independence shows that there was no statistically significant association between disciplines and the participants' opinions toward the importance of IR development, χ^2 (2, N = 170) = 2.85, p = .241. The findings show that a larger proportion of the participants across all disciplines agreed that the development of IRs for archiving and disseminating scholarly work and teaching materials is important. This group includes 94% (n = 46) of participants from the medical and health sciences, followed by 84.5% (n = 60) of faculty members from other sciences and technology fields, and 84% (n = 42) of faculty members from the humanities and social sciences. In contrast, the smaller proportion of respondents who thought that the development of IRs was not important were 16% (n = 8) of respondents from the humanities and social sciences, 15.5% (n = 11) of faculty members from other science and technology fields, and 6% (n = 3) of respondents from the medical and health sciences.

Table 5.19

Participants' Opinions on the Importance of IR Development by Discipline (N = 170)

Discipline	Important N = 148		Not Important N = 22	
	n	*%*	*n*	*%*
Medical and health sciences	46	94.0	3	6.0
Other science and technology fields	60	84.5	11	15.5
Humanities and social sciences	42	84.0	8	16.0
Total	148	87.0	22	13.0

Note. χ^2 (2, N = 170) = 2.85, p = .241

Table 5.20 presents participants' opinions on the importance of IR development by academic position. In total, 87% (n = 153) of all respondents thought the development of IRs for

archiving and disseminating scholarly work and teaching materials was important, while only

13% (n = 23) of respondents thought that it was not important. A Fisher's Exact Test was

conducted to examine the relationship between academic position and whether the faculty

members agreed with the importance of IR development. A Fisher's exact test showed $p = .001$.

This means there was a statistically significant relationship between academic position and

whether the faculty members agreed with the importance of IR development.

As shown in Table 5.20, a higher proportion of faculty members across most academic

positions saw the importance of IR development; these included 100% (n = 3) of researchers,

followed by 96% (n = 46) of assistant professors, 87% (n = 88) of instructors and lecturers, and

76% (n = 16) of associate professors. By contrast, a smaller proportion of respondents in all

academic positions, with the exclusion of professors, thought that the development of IRs was

not important. It is interesting to note that none of the professors (100%, n = 3) thought that the

development of IRs was important. This may be the reason why this group of respondents

indicated that they did not want to contribute any of their work to university-based IRs. To be

precise, two of them indicated that they did not want to contribute, while the other did not know

whether to contribute to university-based IRs.

Table 5.20

Participants' Opinions on the Importance of IR Development by Academic Position (N = *176*)

Discipline	Important N = 153		Not Important N = 23	
	n	*%*	*n*	*%*
Professor	0	0.0	3	100.0
Associate professor	16	76.0	5	24.0
Assistant professor	46	96.0	2	4.0
Instructor/Lecturer	88	87.0	13	13.0
Researcher	3	100.0	0	0.0
Total	153	87.0	22	13.0

Note. 5 cells (50 %) have expected count less than 5. Fisher's exact test was applied.

5.1.3.4 Review of Repository Content

The participants were asked whether they agreed or disagreed with the idea that all work should undergo peer-review before being deposited into university-based IRs. Overall, two-thirds of the respondents (118, 67%) agreed that all work should be peer reviewed before being submitted to university-based IRs, while some respondents (58, 30%) disagreed with this idea. Chi-square tests of independence were used to test the statistical significance of the relationships.

Table 5.21 shows the respondents' agreement regarding the peer-review process for IR content by their awareness of IRs. A Chi-square test revealed that there was no statistically significant relationship between the respondents' awareness of IRs and whether they agreed or disagreed that any work should undergo peer-review before being deposited into the university-based IRs, χ^2 (1, N = 176) = .83, p = .363. This means the percentage of the respondents who agreed with the peer-review process for IR content did not differ with respondents' awareness of IRs.

Table 5.21

Respondents' Agreement on the Peer-review Process for IR Content by Awareness of IR (N = 176)

Aware of IR	Agree N = 118		Disagree N = 58	
	n	*%*	*n*	*%*
Yes	89	69.0	40	31.0
No	29	61.7	18	38.3
Total	118	67.0	58	33.0

Note. χ^2 (1, N = 176) = .83, p = .363

However, it is clear that the greater proportion of respondents who had been aware of IRs (69%, n = 89) agreed that any work should undergo peer-review before being deposited into university-based IRs, as compared to only 31% (n = 40) who reported that they did not agree with this idea. The data also show that among those who disagreed that there should be a peer-review process

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for IR content, the greater proportion was those who had not been aware of IRs (38.3%, n = 18), as compared to 31% (n = 40) who had been aware of IRs.

Regarding disciplines, a Chi-square test of independence showed that there was no statistically significant association between disciplines and whether the respondents agreed or disagreed that there should be a peer-review process for IR content, χ^2 (2, N = 170) = .75, p = .687. It appears that percentage of the respondents' agreement on the peer-reviewed process for IR content did not vary by research discipline, as shown in Table 5.22. A greater proportion of respondents across all disciplines agreed that any work should undergo peer-review before being deposited into university-based IRs. Those who agreed on the need for peer-review process of IR content were 70% (n = 35) of faculty members from the humanities and social sciences, followed by 69.4% (n = 34) of respondents from the medical and health sciences and 63.4% (n = 45) of faculty members from other sciences and technology fields. Among those who disagreed with the need for a peer-review process for IR content, the greater proportion of respondents were from other science and technology fields (36.6%, n = 26), as compared to 30.6% (n = 15) and 30% (n = 15) of respondents from the medical and health sciences and the humanities and social sciences, respectively.

Table 5.22

Respondents' Agreement on the Peer-review Process for IR Content by Discipline (N = 170)

Discipline	Agree N = 114		Disagree N = 56	
	n	*%*	*n*	*%*
Medical and health sciences	34	69.4	15	30.6
Other science and technology fields	45	63.4	26	36.6
Humanities and social sciences	35	70.0	15	30.0
Total	114	67.0	56	33.0

Note. χ^2 (2, N = 170) = .75, p = .687

Table 5.23 presents the respondents' agreement on the need for a peer-review process for IR content by academic position. A Fisher's Exact Test yielded $p = .785$, indicating that there was no statistically significant relationship between academic position and whether the faculty members agreed with the need for a peer-review process for IR content. It is clear that the greater proportion of respondents across most academic positions, with the exception of researchers, agreed that all work should undergo peer-review before being deposited into university-based IRs. Approximately 71.4% (n = 15) of associate professors agreed with the need for a peer-review process, followed by 68.8% (n = 33) of assistant professors, 66.7% of both instructors and lecturers (n = 67) and professors (n = 2), and 33.3% (n = 1) of researchers. Of those who disagreed with the need for a peer-review process for IR content, the greater proportions of respondents were from researchers (66.7%, n = 2), as compared to respondents in other academic positions. Although the Fisher's exact test showed that there was no statistically significant association between academic position and whether the faculty members agreed with the need for a peer-review process for IR content, the data indicate that the greater proportion of respondents across academic positions agreed with the need for a peer-review process for IR content.

Table 5.23

Respondents' Agreement on the Peer-review Process for IR Content by Academic Position (N = 176)

Academic Position	Agree N = 118		Disagree N = 58	
	n	*%*	*n*	*%*
Professor	2	66.7	1	33.3
Associate professor	15	71.4	6	28.6
Assistant professor	33	68.8	15	31.2
Instructor/Lecturer	67	66.7	34	33.3
Researcher	1	33.3	2	66.7
Total	118	67.0	58	33.0

Note. 4 cells (40%) have an expected count less than 5. Fisher's exact test was applied.

Participants who agreed that all work should undergo a reviewing process before being submitted were then asked to identify who should serve as reviewers for university-based IR content. As shown in Table 5.24, the largest number of the respondents (52, 44%) agreed that a faculty research committee should take this responsibility, followed by a university research committee (26, 22%) and a departmental research committee (19, 16%). Five out of nine participants who chose "others" also provided specific examples of particular groups that might serve as reviewers of the content, including suggestions that experts from a professional organization in a specific discipline should serve (n = 3), a departmental research committee should work collaboratively with IR staff (n = 1), and the IR should accept materials that have already been peer-reviewed by a journal or research grant (n = 1). The other four participants simply stated that it depended on each submitted piece of work.

Table 5.24

Proposed Reviewers for IR Content (N = 118)

Reviewer	Frequency	Percentage
Departmental research committee	19	16.0
Faculty research committee	52	44.0
University research committee	26	22.0
Library director and IR staff/librarians	6	5.0
Do not know	6	5.0
Others	9	7.6
Total	118	100.0

For the 42 participants who disagreed, 36 provided reasons to support their answers. The reasons were translated, grouped, and presented as the statements found in Table 5.25. As shown in Table 5.25, the most common reason that the participants mentioned was that the peer-review was not necessary if the work had already been approved or peer-reviewed before being deposited in the university-based IR. A faculty member from Accounting stated that "The peer

review is not necessary, since some pieces of work such as dissertations and theses have already been approved by the dissertation committee and the graduate school" (ID041), while the other faculty member, from Animal Nutrition and Reproduction, supported this idea by stating that "If the main purpose of the university-based IR is to archive and disseminate intellectual work of faculty members in the university community, the peer-review is not necessary" (ID042).

Table 5.25

Respondents' Reasons for Disagreeing with the Need for Peer-Reviewing (N = 42)

Reason	Responses	Percentage
Peer-review is not necessary	17	32.1
Peer-review is a time-consuming process	8	15.1
The peer-review process may demotivate faculty participation	4	7.5
IRs should be more open and accept a variety of works	3	5.7
IRs should accept only peer-reviewed works	3	5.7
Authors are responsible for the quality control over their works	3	5.7
Content recruitment policy is needed for quality control	3	5.7
It's difficult to conduct peer-review process	1	1.9
Some work does not need to undergo peer-review process	1	1.9
Concern about the quality of peer review process of the university	1	1.9
Peer review may delay the depositing process	1	1.9
Peer-reviewed works should be kept separately from other works	1	1.9
No incentive for depositing works on the university-based IR.	1	1.9
N/A	6	11.3
Total	53	100.0

Note. Some respondents provided more than one reason.

Eight respondents thought that the peer-review was a time-consuming process, while four respondents agreed that the peer-review process might demotivate faculty participation. Among these respondents, one faculty member from the Art History field said, "If the deposition process required more work and conditions, I would not be willing to participate and deposit my work in the university-based IR" (ID118), while another faculty member from Chemistry stated, "The peer-review process may demotivate faculty participation" (ID173). Evidently, participants had

different opinions about the work that should be deposited in the university-based IRs. For instance, while some (3, 5.7%) agreed that IRs should be more open and accept a variety of work, the same number of participants (3, 5.7%) stated that IRs should accept only peer-reviewed work. Additionally, three respondents agreed that a clear content recruitment policy was needed for quality control. One faculty member from Chemical Engineering said, "Peer-reviewed work should be kept separately from other work that has never been peer-reviewed, and it is necessary that the university library develop a clear content recruitment policy for quality control" (ID083).

5.1.4   IR Usage

Since the current study views faculty members as both authors and users of university-based IRs, it is of interest to know whether the faculty members make use of the university-based IRs. Slightly more than half of the respondents (97, 55%) indicated that they had used and searched the university-based IRs, while the remaining 79 (45%) respondents had never used them. Chi-square tests of independence were used to test if there were any statistically significant relationships existing among categorical variables.

Table 5.26 shows the percentage of respondents who had used university-based IRs by their awareness of IRs. A Chi-square test shows that there was a statistically significant relationship between the respondents' awareness of IRs and whether they made use of university-based IRs, χ^2 (1, N = 176) = 16.63, p = .000, ϕ = .31). The Phi is .31, indicating a strong association and allowing for confirmation that respondents who had been aware of IRs were more likely to use them. It can be seen in Table 5.26 that the greater proportion of respondents (64.3%, n = 83) who had been aware of IRs indicated that they had used university-based IRs, as compared to only 30% (n = 14) of those who had never been aware of IRs but

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indicated that they had used them. By contrast, a higher proportion of respondents who had not

been aware of IRs (70%, n = 33) indicated that they had never used university-based IRs, as

compared to 35.7% (n = 46) of those who had been aware of IRs but indicated that they had

never made use of them.

Table 5.26

Percentage of Respondents Who Had Used University-based IRs by Awareness of IR (N = 176)

Aware of IR	Yes N = 97		No N = 79	
	n	*%*	*n*	*%*
Yes	83	64.3	46	35.7
No	14	30.0	33	70.0
Total	97	55.0	79	45.0

Note. χ^2 (1, N = 176) = 16.63, *p* = .000

Table 5.27 shows the percentage of respondents who had used university-based IRs

broken down by research discipline. A Chi-square tests of independence shows that there was no

statistically significant association between discipline and whether the respondents made use of

university-based IRs, χ^2 (2, *N* = 170) = 1.77, *p* = .412. The proportion of respondents who had

used university-based IRs did not vary by research discipline.

A greater proportion of respondents across disciplines indicated that they had used

university-based IRs. In fact, the greatest proportion of respondents who had used university-

based IRs was 62% (n = 31) of faculty members from the humanities and social sciences,

followed by 51% (n = 25) from the medical and health sciences and 50.7% (n = 36) from other

science and technology fields. On the other hand, the smaller proportion of respondents who had

never used university-based IRs included an equal proportion of respondents from the medical

and health sciences (49%, n = 24) and other science and technology fields (49%, n = 35) and

38% (n = 19) of respondents from the humanities and social sciences.

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Table 5.27

Percentage of Respondents Who Had Used University-based IRs by Discipline (N = 170)

Discipline	Yes N = 92		No N = 78	
	n	*%*	*n*	*%*
Medical and health sciences	25	51.0	24	49.0
Other science and technology fields	36	51.0	35	49.0
Humanities and social sciences	31	62.0	19	38.0
Total	92	54.0	78	46.0

Note. χ^2 (2, N = 170) = 1.77, *p* = .412

Table 5.28 shows the percentage of respondents who indicated that they had used

university-based IRs broken down by academic position. The result of the Fishers's exact test

shows *p* = .103. This means there was no statistically significant association between academic

position and whether the respondents had used university-based IRs.

Table 5.28

Percentage of Respondents Who Had Used University-based IRs by Academic Position (N = 176)

Academic Position	Yes N = 97		No N = 79	
	n	*%*	*n*	*%*
Professor	1	33.3	2	66.7
Associate professor	7	33.3	14	66.7
Assistant professor	28	58.3	20	41.7
Instructor/Lecturer	58	57.4	43	42.6
Researcher	3	100.0	0	0.0
Total	97	55.0	79	45.0

Note. 4 cells (40.0%) have an expected count less than 5. Fisher's exact test was applied.

In other words, the proportion of respondents who had used university-based IRs did not vary by

academic position. Table 5.28 shows that the larger proportion of respondents in three academic

positions indicated that they had used university-based IRs, including 100% (n = 3) of

researchers, followed by 58.3% (n = 28) of assistant professors, 57.4% (n = 58) of instructors

and lecturers, and a smaller equal proportion from professors (33.3%, n = 1) and associate

professors (33.3%, n = 7). Meanwhile, those who stated that they had never used university-based IRs were professors (66.7%, n = 2) and associate professors (66.7%, n = 14), instructors and lecturers (42.6%, n = 43) and assistant professors (41.7%, n = 20).

Table 5.29 presents the numbers of participants using the university-based IRs in specific activities. Among the participants who reported using university-based IRs, 79 (81.4%) had used them for research-related activities, 56 (57%) participants had used IRs for teaching-related activities, 29 (30%) had used IRs for other scholarly productivity-related activities, and 11 (11.3%) participants indicated having used IRs in other activities. Of those eleven participants, seven provided detailed reasons for using university-based IRs, including using them to search for innovation ($n = 1$), to download administrative documents ($n = 1$), to find resources to prepare for a presentation ($n = 1$), to download e-books ($n = 1$), to search for information ($n = 1$), to browse through the university-based IR, and to seek more information about the university-based IR in order to inform others about it ($n = 1$).

Table 5.29

Number of Respondents Using the University-based IRs in Specific Activities ((N = 97)

Activities	Frequency	Percentage
Research-related activities	79	45.1
Teaching-related activities	56	32.0
Other scholarly productivity-related activities	29	16.6
Other activities	11	6.3
Total	175	100.0

Note. Participants were allowed to choose multiple activities.

Table 5.30 presents the number of participants who used the university-based IRs in research-related activities. While some of the respondents (30, 40.5%) who answered this question did not provide specific reasons, the other 49 respondents (62%) did state specific reasons for using IRs. The three most common reasons for using the university-based IRs were to

conduct a literature review for a research project or dissertation (23, 29%), to search and use full-text articles, theses, and dissertations (10, 12.7%), and to use content available in the university-based IRs to develop or write a research proposal or a final research report (8, 10%).

Table 5.30

Participants' Use of University-based IRs for Research-Related Activities (N = 79)

Reasons	Frequency	Percentage
To conduct literature reviews	23	29.1
To search/use full-text articles, theses, and dissertations	10	12.7
To develop/write a grant proposal or a research report	8	10.1
To cite works available in university-based IRs	4	5.1
Others	4	5.1
N/A	30	38.0
Total	79	100.0

The main purpose for IR development in Thailand's research universities is to collect and archive scholarly work. The majority of contents in all university-based IRs are research reports and full-text theses and dissertations. These are the reasons why many respondents in this study mentioned using the university-based IRs to search for and use full-text articles, theses, and dissertations and to use resources available in the IRs to develop and write grant proposals and research reports. A faculty member from Behavioral science (ID085) stated, "I use the contents in my university-based IR as examples to prepare for a research proposal," while a faculty member from Pharmaceutical science (ID134) said, "I use the repository when I need to prepare for writing a research project proposal." One faculty member from Economics who used full-text contents indicated, "I search for full-text articles and dissertations in the intellectual repository." Four respondents mentioned other reasons for using IRs, including "IRs are easy to use" (ID170 Education), "using research reports available in the university-based IRs as guidelines to review other research works" (ID148 Plant Sciences), "to check my work available in the university-

based IR" (ID153 Soil Science), and "checking and using free online scholarly publications" (ID044 Biochemistry).

As shown in Table 5.31, only 30 participants (out of 56) provided specific reasons why they used IRs for teaching-related activities. Two most common reasons for using the university-based IRs for teaching-related activities were to prepare for teaching and developing course materials (9, 16%) and to use contents available in the IRs (9, 16%). One faculty member from Physical Therapy stated, "I searched the university IR to see if I could use some available resources for preparing my lessons and teaching materials" (ID107).

Table 5.31

Participants Using the University-based IRs for Teaching-Related Activities (N = 56)

Reasons	Frequency	Percentage
To prepare for teaching & developing course materials	9	16.0
To use contents available in university-based IRs	9	16.0
To find some materials to be used in classes	6	11.0
To use university-based IRs as examples in classes	4	7.0
Others	2	3.6
N/A	26	46.4
Total	56	100.0

The other two reasons were to find materials to be used in classes (n = 6) and to use the university-based IR contents as examples for students in classes (n = 4). The former reason was mentioned by five respondents, and those who mentioned the latter reason were faculty members from Medical Science and other science and technology fields, including Entomology (ID162), Pharmaceutical Science (ID138), Health Sciences (ID137), Biomedical Engineering (ID114), and Microbiology (ID111), and one faculty member from the humanities and social sciences (Political Science-International Relations). A faculty member from Entomology stated, "I used the IR to find some case studies in Thailand," (ID162), while the Microbiology faculty member

indicated the purpose of "searching for current empirical studies conducted in the Thai context, since I want to use them in my classes" (ID111). The latter reason was mentioned by four faculty members from Humanities and Social Science fields (all of them from library and information science) and one faculty member from the computer science field. Two respondents who mentioned other reasons included a faculty member from nursing who gave the purpose "to keep track of new knowledge and ideas" (ID060) and a biochemistry faculty member whose purpose was "to find free e-books for students" (ID044).

Table 5.32 presents the number of participants who had used the university-based IRs in other scholarly productivity-related activities.

Table 5.32

Participants Using the University-based IRs for Other Scholarly Productivity-Related Activities (N = 29)

Reasons	Frequency	Percentage
To prepare a manuscript	5	17.2
To use university-based IRs for references	4	13.8
To use content available in university-based IRs	2	6.9
Others	3	10.3
N/A	15	51.7
Total	29	100.0

Only 14 participants (48%) provided explanations about how they had used the university-based IRs. The largest number of respondents (5, 17%) reported using IRs and the contents available in them to prepare a manuscript for publication (textbooks = 3 and articles = 2). One faculty member from social sciences (Law) stated, "I used content available in the university IR to prepare a journal article manuscript and an analysis of a Supreme Court judgment" (ID125). The other reasons were to use the university-based IRs for references ($n = 4$) and to use content in the university-based IRs such as books, journals, and articles ($n = 2$). In addition, three respondents

mentioned other reasons, including to search for information (ID159), to conduct literature reviews (ID051), and to track new knowledge in their field (ID060).

When asked how often they searched and used the university-based IRs, the largest number of respondents (25, 25.8%) indicated that they used the university-based IR less frequently than every month, followed by 2-3 times a week (19, 19.6%), and every month (18, 18.6%). More than a half of the participants who responded to this question indicated that they often used and searched the university-based IR. In fact, altogether 54 (56%) reported that they used the university-based IR every week or more than every week, while 43 (44%) used it every month or less often than once a month, as shown in Table 5.33.

Table 5.33

The Frequency of Search and Use of the University-based IRs Among the Respondents (N = 97)

Time	Frequency	Percentage
Many times a day	4	4.1
Every day	6	6.2
4-5 times a week	8	8.2
2-3 times a week	19	19.6
Every week	17	17.5
Every month	18	18.6
Less often than every month	25	25.8
Total	97	100.0

The 79 respondents who indicated that they had never used university-based IRs were asked if they intended to use them in the near future. Of these, 33 (42.0%) indicated that they were interested in using the university-based IRs in the near future, while 13 participants (16.0%) did not have any plan to do so. It is interesting that an equal number of participants (33, 42.0 %) also remained uncertain about whether to use to the university-based IRs. A Chi-square test of

independence was used to determine differences in response across research discipline and academic position.

Table 5.34 shows data on the willingness of the respondents to use and access the university based IRs in the near future broken down by discipline.

Table 5.34

Respondents' Willingness to Use University-based IRs by Discipline (N = 78)

Discipline	Responses					
	Yes N = 33		No N = 12		Uncertain N = 33	
	n	*%*	*n*	*%*	*n*	*%*
Medical & Health Sciences	12	50.0	3	12.5	9	37.5
Other Sci. & Technology	15	43.0	7	20.0	13	37.0
Humanities & Social Sci.	6	31.6	2	10.5	11	57.9
Total	33	42.0	12	15.0	33	42.0

Note. 2 cells (22.2%) have an expected count less than 5. Fisher's exact test was applied.

A Fisher's exact test yielded *p* = .572. There was no statistically significant association between discipline and whether the respondents intended to use university-based IRs. Table 5.35 shows that a greater proportion of respondents in all disciplines, including 50.0% (n = 12) from the medical and health sciences, 43.0% (n = 15) from other science and technology fields, and 31.6% (n = 6) from the humanities and social sciences, indicated that they were willing to use university-based IRs in the near future, as compared to those who expressed no intention to use university-based IRs in the near future. Among the 33 respondents who were uncertain whether they would use university-based IRs in the future, the greatest proportion were from the humanities and social sciences (57.9%, n = 11), followed by 37.5% (n = 9) from the medical and health sciences, and 37% (n = 13) from other science and technology fields. Respondents from the medical and health sciences and other science and technology fields were more likely to say they would probably use university-based IRs in the near future as compared to respondents from

the humanities and social science fields. However, a greater proportion of respondents in the humanities and social sciences than in any other disciplines expressed that they did know whether they would use IRs in the future.

Table 5.35 presents data on the willingness of the participants to use and access university based IRs in the near future broken down by academic position. A Fisher's exact test yielded $p = .110$, indicating that there was no statistically significant association between academic position and whether the respondents intended to use university-based IRs in the near future. This means that respondents' intention to use university-based IRs did not vary by academic position.

Table 5.35

Participants' Willingness to Use University-based IRs by Academic Position (N = 79)

Academic Position	Responses					
	Yes N = 33		No N = 13		Uncertain N = 33	
	n	*%*	*n*	*%*	*n*	*%*
Professor	0	0.0	2	100.0	0	0.0
Associate Professor	4	28.7	2	14.3	8	57.0
Assistant professor	10	50.0	1	5.0	9	45.0
Instructor/Lecturer	19	44.0	8	19.0	16	37.0
Total	33	42.0	13	16.0	33	42.0

Note. 5 cells (41.7%) have an expected count less than 5. Fisher's exact test was applied.

Those who expressed that they intended to use university-based IRs in the near future were 50% (n = 10) of assistant professors, followed by 44.0% (n = 19) of instructors and lecturers and 28.7% (n = 4) of associate professors. Only a small proportion of respondents in all positions, with the exception of professors, expressed no intention to use university-based IRs in the future. It is interesting that all full professors (100%) were in this category. This might be explained by the fact that none of them thought that the development of IRs was important, as discussed previously (Table 5.21). Of the respondents who did not know whether to use IRs in the near

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future, the greatest proportion were 57.0% (n = 8) of associate professors, followed by 45.0% (n = 9) of assistant professors and 37.0% (n = 16) of instructors and lecturers. It is evident that assistant professors and instructors and lecturers were more likely to use the university-based IRs in the near future, as compared to associate professors and professors.

To make clear the reasons behind the respondents' decisions, respondents who did not intend to use university-based IRs (n = 13) and those who did not know whether they would use them in the future (n = 33) were both asked to provide specific reasons.

Eight out of 13 respondents who stated that they did not intend to use university-based IRs provided reasons. The reasons related to quality of content ($n = 4$), using other sources and online databases ($n = 3$), perceiving no benefit ($n = 1$), and the functionality of IRs, particularly as search systems ($n = 1$). Among these reasons, the quality of content in IRs was the most common reason for non-use, mentioned by four respondents. They stated:

- I checked the university-based IR right after I had gotten the invitation email of this survey. However, I found that the repository was not up-to-date and had a poor search system (ID075).

- Other repositories are far better than my university IR (ID128).

- The university-based IR does not provide relevant information in my field (ID008).

- The university-based IR is not updated (ID175).

Those who used other sources and online databases stated, "I prefer using other online databases which provide more information" (ID045), "I've used other online databases and other sources which provide more relevant information in my field (ID065)," and "I use online databases to get research papers and journal articles. It would be more interesting if IRs contained and provided access to work-in-progress" (ID166). One respondent who perceived no benefit from using the university-based IRs stated, "I do not see any benefit of using the university-based IR" (ID017).

The highest numbers of respondents were not sure if they would use the university-based IRs in the near future. Fourteen participants out of 33 respondents in this group specified their reasons. The most common reason, mentioned by five participants, was using other sources of information or online databases. Some participants mentioned a specific database that they normally consulted, such as PubMed, Scopus, and ScienceDirect, as shown in the following statements:

- I always use PubMed or Scopus (ID063).

- Normally, I use other databases such as ScienceDirect (ID077).

- I've used other online databases (ID068).

- I use other information sources (ID072).

- The IR is a source of information that I rarely consult as compared with other information sources (ID011).

Quality of content was another reason mentioned by four ($n = 4$) respondents. Some participants expressed doubts about the content available in the university-based IRs. They mentioned:

- I believe that contents available in the IR may be not relevant to my field (ID079).

- I've tried using it, but I cannot find any content that is relevant to my interest (ID066).

- The university-based IR is not mature and up-to-date. It has a limited amount of content. The content is too generic. I don't really understand the purpose of the repositories (ID022).

- To date, the university-based IR contains a limited amount of content, particularly in my field (ID129).

In addition, lack of information and incomplete understanding of the university based IRs was another reason for uncertainty. Some respondents said, "I don't have any information about

the university-based IR" (ID131) and "I want to learn more about the benefit of using the university-based IR before using it" (ID032).

The user-interface design appeared to be an important issue. Two participants stated, "I don't want to use it due to the poor user interface design" (ID003) and "The IR was not built based on user-oriented idea and has a poor user interface" (ID022). Additionally, two participants simply stated, "I have never used it," (ID078) and "Currently, I do not work in any research project, so I don't use it" (ID076).

Two groups of respondents (those with no plan to use the IRs and the uncertain group) mentioned some similar issues that hindered them from using the university-based IRs. Those reasons included quality of content, the possibility of using other sources, and the functionality of IRs (the user interface and the search system). Different from those who did not plan to use university-based IRs, respondents who did not know whether they would use them mentioned that they lacked information on IRs and were concerned about the user interface design. Among the reasons given, quality of content was the most common reason mentioned by both groups.

5.1.4.1 Respondents' Opinions on the Usage of Contents Available in the University-based IRs

To study the participants' opinions on the allowable use of contents available in the university-based IRs, all participants were asked whether they agreed or disagreed with three statements regarding this issue. The mean agreement could range from 1 to 5, where 1 represented strongly disagree and 5 represented strongly agree. Based on a ranking of mean scores, the second and the third statements regarding the allowable use of contents available in the university-based IRs received an agreeable response, while the mean score of the first statement, that all users should be allowed to make any comments on work available in university-based IRs, was 3.35, which indicates neither agree nor disagree, as is shown in Table 5.36.

Table 5.36

Respondents' Opinions on the Usage of Contents Available in the University-based IRs (N = 176)

Statement	N	Minimum	Maximum	*Mean*	*SD.*	Interpretation
All users should be allowed to make any comments on work available in the university-based IRs.	176	1	5	3.35	1.11	NAND
Any use of a work deposited in the university-based IRs is acceptable as long as it is acknowledged and cited.	176	1	5	4.29	0.95	Agree
Individual users should register before using the university-based IRs, so that the usage statistics can be collected.	176	1	5	4.02	1.06	Agree

Note. The means range from 1 = *strongly disagree* to 5 = *strongly agree*

The Kruskal-Wallis H test with age, discipline, and academic position categories as independent variables were conducted to see whether the respondent' opinions on the usage of contents available in the university-based IRs differ among groups. Table 5.37 presents the results from the Kruskal-Wallis H test. Regarding age, the Kruskal-Wallis H test indicated that there was a significant differences across age group in the first statement, "All users should be allowed to make any comments on work available in the university-based IRs," $H(2) = 8.73, p = .013$. A Man-Withney U test was conducted to evaluate pairwise differences among three groups. The results indicated the significant difference between the respondents aged 25-39 and the respondents aged 40-49 years ($U = 1751.50, p = .003$, and $r = -0.24$). This indicates that these two groups have significant differences opinion on in the statement "All users should be allowed to make any comments on work available in the university-based IRs."

Regarding discipline, the Kruskal-Wallis H test indicated that there was no significant difference in respondents' opinions on the usage of contents available in university-based IRs across disciplines in any statement.

When academic position was considered, the Kruskal-Wallis H test indicated that there were significant differences in respondents' opinions on the usage of contents available in university-based IRs across academic position in all statement, including "All users should be allowed to make any comments on work available in the university-based IRs," $H(4) = 16.66$, $p = .002$; "Any use of a work deposited in the university-based IRs is acceptable as long as it is acknowledged and cited," $H(4) = 14.90$, $p = .005$); and "Individual users should register before using the university-based IRs, so that the usage statistics can be collected," $H(4) = 9.96$, $p = .041$). A Man-Whitney U test was then conducted for a post-hoc analysis to evaluate pairwise differences among groups in each statement. For the first statements, a Man-Whitney U test indicated that there were significant differences between associate professors and assistant professors ($U = 342.00$, $p = .029$, and $r = -0.26$), associate professors and instructors and lecturers ($U = 566.00$, $p = .000$, and $r = -0.31$), assistant professors and instructors and lecturers ($U = 1952.50$, $p = .045$, and $r = -0.16$).

The second statement was that, "Any use of a work deposited in the university-based IRs is acceptable as long as it is acknowledged and cited," a Man-Whitney U test showed there were significant differences in respondents' opinions between full professors and assistant professors ($U = 17.00$, $p = .015$, $r = -0.34$); full professors and instructors and lecturers ($U = 39.50$, $p = .015$, $r = -0.23$); professors and researchers ($U = 0.00$, $p = .037$, $r = -0.85$); associate professors and assistant professors ($U = 343.50$, $p = .023$, $r = -0.27$); associate professors and instructors and lecturers ($U = 717.00$, $p = .010$, $r = -0.23$); and associate professors and researchers ($U = 9.00$, $p = .038$, $r = -0.42$).

Regarding the last statement, which was "Individual users should register before using the university-based IRs, so that the usage statistics can be collected," a Man-Whitney U test

showed there were significant differences in respondents' opinions between full professors and researchers ($U = 0.00$, $p = .034$, $r = -0.86$); assistant professors and instructors and lecturers ($U = 1904.50$, $p = .025$, $r = -0.18$); instructors and lecturers and researchers ($U = 51.00$, $p = .040$, $r = -0.20$). To sum up, the respondents' opinion on the usage of contents available in university-based IRs varies greatly based on academic positions.

Table 5.37

Respondents' Opinions on the Usage of Contents in the University-based IRs by Age, Discipline, and Academic Position

Variable	Chi-square	*df*	*p*-value
Age (*N* = 166)			
All users should be allowed to make any comments on work available in the university-based IRs.	8.73	2	.013*
Any use of a work deposited in the university-based IRs is acceptable as long as it is acknowledged and cited.	0.59	2	.744
Individual users should register before using the university-based IRs, so that the usage statistics can be collected.	1.08	2	.584
Discipline (*N* = 170)			
All users should be allowed to make any comments on work available in the university-based IRs.	3.19	2	.203
Any use of a work deposited in the university-based IRs is acceptable as long as it is acknowledged and cited.	0.04	2	.979
Individual users should register before using the university-based IRs, so that the usage statistics can be collected.	1.11	2	.575
Academic Position (N = 176)			
All users should be allowed to make any comments on work available in the university-based IRs.	16.66	4	.002*
Any use of a work deposited in the university-based IRs is acceptable as long as it is acknowledged and cited.	14.90	4	.005*
Individual users should register before using the university-based IRs, so that the usage statistics can be collected.	9.96	4	.041*

Note. * $p < .05$

5.1.5   Current Self-Archiving Practice in OA Repositories and Other Venues

The present study also explored the current self-archiving practices and experience of the participants and their intention to self-archive in the near future. At the time, only 61 (34.7%) respondents had made their scholarly work and/or teaching materials available in other open access repositories and/or other publicly accessible web sites on the Internet, while a larger

proportion of respondents (115, 65.3%) reported that they had not made their work available in such a venue during the previous two years.

Table 5.38 shows the number of participants who had made their work publicly available in OA repositories and other venues by discipline. A Chi-square test showed that there was no statistically significant association between discipline and whether faculty members had made their work publicly available in OA repositories and other venues, χ^2 (2, $N = 170$) = 1.25, p = .490. As shown in Table 5.41, a larger proportion of faculty members in all disciplines had not made their work publicly available through such a venue. The greatest proportion of faculty members in this group were from the humanities and social sciences (72.0%, n = 36), followed by those from the medical and health sciences (63.3%, n = 31) and faculty members from other science and technology fields (62.0%, n = 44). Only a small proportion of respondents from each discipline had made their work publicly available, including faculty members from other science and technology fields (38.0%, n = 27), followed by faculty members from the medical and health sciences (36.7%, n = 18) and the humanities and social sciences (28.0%, n = 14).

Table 5.38

Number of Participants Making Their Work Publicly Available in OA Repositories and Other Venues by Discipline (N = 170)

Discipline	Yes ($N = 59$)		No ($N = 111$)	
	n	*%*	*n*	*%*
Medical & health sciences	18	36.7	31	63.3
Other science & technology field	27	38.0	44	62.0
Humanities & social sciences	14	28.0	36	72.0
Total	59	34.7	111	65.3

Note. χ^2 (2, $N = 170$) = 1.25, p = .490.

In relation to academic position, as presented in Table 5.39, the Fisher's exact test yielded p = .054, meaning that there was a statistically significant relationship between academic

position and whether the faculty members had made their work publicly available on OA

repositories and other venues. While all researchers (100%, n = 3) indicated that they had made

their work publicly available in OA repositories and other venues, larger proportions of

respondents in all other academic positions had not made their work publicly available in such a

venue, including instructors and lectures (71.3%, n = 72), associate professors (66.7%, n = 14)

and professors (66.7%, n = 2), and assistant professors (56.3%, n = 27). The smaller proportions

of respondents who indicated that they had made their work available were assistant professors

(43.8%, n = 21), followed by associate professors (33.3%, n = 7), one professor (33.3%, n =1),

and instructors and lecturers (28.7%, n = 29).

Table 5.39

*Number of Participants Making Their Work Publicly Available in OA Repositories and Other Venues by Academic Position (*N *= 176)*

Rank	Yes (*N* =61)		No (*N* = 115)	
	n	*%*	*n*	*%*
Professor	1	33.3	2	66.7
Associate Professor	7	33.3	14	66.7
Assistant professor	21	43.8	27	56.3
Instructor/Lecturer	29	28.7	72	71.3
Researcher	3	100.0	0	0.0
Total	61	34.7	115	65.3

Note. 4 cells (40.0%) have an expected count less than 5. Fisher's exact test was applied.

5.1.5.1 Current Self-Archiving Practice

Among the 61 respondents who indicated that they had made their work publicly

available in other OA repositories and web sites, only 40 (65.6%) were currently involved in

self-archiving, while the remaining 21 (34.4%) respondents did not self-archive their work. This

group of respondents indicated that other individuals made their work available on publicly

accessible sites on their behalf. A shown in Table 5.40, some respondents (14, 23%) indicated

that their departmental staff had helped them to post their work. Equal numbers of respondents

(5, 6.8%) reported that a) their colleagues, b) assistant/teaching assistant, and c) librarians or

library staff had helped to make their works publicly available. Four respondents specified

"others," including a staff member of the Institute of Research and Development, a journal

editorial team, a publisher, and a web master, that had helped them to publish their works. The

respondents were allowed to choose multiple answers.

Table 5.40

People Who Deposited Work in OA Repositories and Other Venues (N = 61)

	Responses	
	Frequency	Percentage
Self (Self archiving)	40	54.8
Departmental staff	14	19.2
Colleague	5	6.8
Assistant/teaching assistant	5	6.8
Librarian/library staff	5	6.8
Others	4	5.5
Total	73	100.0

Note. The respondents were allowed to choose multiple answers.

5.1.5.2 Venues for Self-Archiving

Figure 5.2 presents the distribution of venues that respondents had used for self-archiving

and posting their work. The respondents (n = 61) had made their work publicly available on the

Internet in a variety of venues. However, the two most commonly mentioned venues were

departmental/faculty websites (23, 37.7%) and open access journals (20, 32.8%), respectively.

Interestingly, a numbers of respondents reported that they had self-archived their works in social

media site (10, 16.4%). Other venues included personal web pages (8, 13.1 %) and research

group or laboratory websites (8, 13.1 %). The other venues, each represented by the same

number of respondents (6, 9.8%) included, discipline repositories, the Thailand National

Research Repository, the Thai Digital Collection, and eLibrary (the Thailand Research Fund).
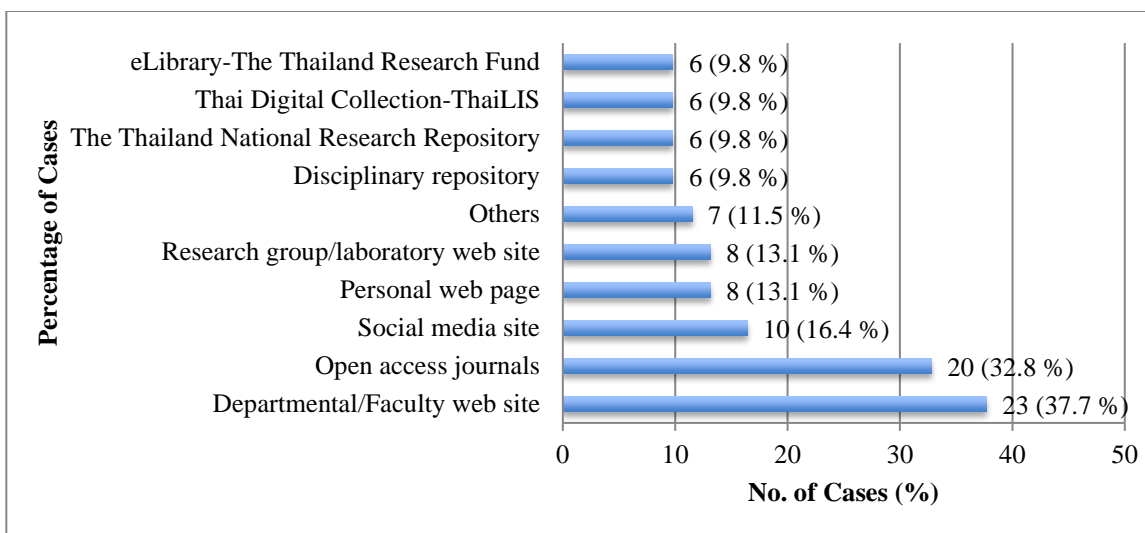
Figure 5.2. Venues for self-archiving.

The most commonly used venues for publishing work for public access were the departmental and faculty web sites. However, it is interesting to note that about one-third of respondents (20 out of 61) had already published their work through open access journals. The OA journals listed by the respondents were both international open access journals and open access journals published by professional organizations in Thailand. Examples of international OA journals included *BMC Genomics*, the *Journal of the Association for Information Research* (JAIS, http://aisel.aisnet.org/jais/authorinfo.html)*, Oncology Reports*, *PeerJ* (https://peerj.com*), PLOS One*, *Biomedical Research: An International Journal of Medical Sciences* (http://www.alliedacademies.org/biomedical-research), *Veterinary Parasitology*, and the *Southeast Asian Journal of Tropical Medicine and Public Health*. Two open access journals published in Thailand were mentioned: *Thai Journal of Pharmacy Practice* ($n = 2$) and *Thai Journal of Pharmaceutical Sciences* ($n = 1$). Most of the journals mentioned in the current study were journals in medical and biomedical fields; the exceptions were the *Journal of the Association for Information Research,* which is a journal in the field of information systems and

information technology, and *PLOS One,* a multidisciplinary open access journal. Both of the OA journals in Thailand were from the pharmaceutical science field.

Respondents who had published their work through disciplinary repositories cited PubMed Central ($n = 2$), BioMed Central ($n = 1$), and LSE Theses (London School of Economics and Political Science) as venues for publishing. A number of social media sites were also cited as publishing venues, including ResearchGate ($n = 7$), Facebook ($n = 1$), Academia.edu ($n = 1$), and Google Scholar ($n = 1$).

5.1.5.3 Content Types

Figure 5.3 shows the distribution of content types that the 61 respondents had made publicly available through open access repositories and other publicly accessible venues on the Internet. The majority of respondents (42, 69%) had made journal articles publicly available, followed by theses and dissertations (20, 23.8%) and research reports and technical reports (18, 29.5%). Despite the fact that many publishers do not allow authors to post the final versions of their articles in other places, the majority of participants responding to this question (38, 90.5%) had made final versions of their refereed articles available on the Internet. There were only four respondents who indicated that they had posted pre-refereed versions of their articles in other venues. Equal numbers of respondents (6, 9.8% for each content type) had published their conference papers, posters, and presentations through publicly accessible sites. Course syllabi and books or book chapters were less frequently made available on the Internet. Two respondents who chose "others" did not clarify the content types. Although there is an increasing demand for research data sharing at the global level, only one participant in the current study had made a data set available. This participant was a faculty member from the field of computer science. The participants were allowed to select multiple content types.
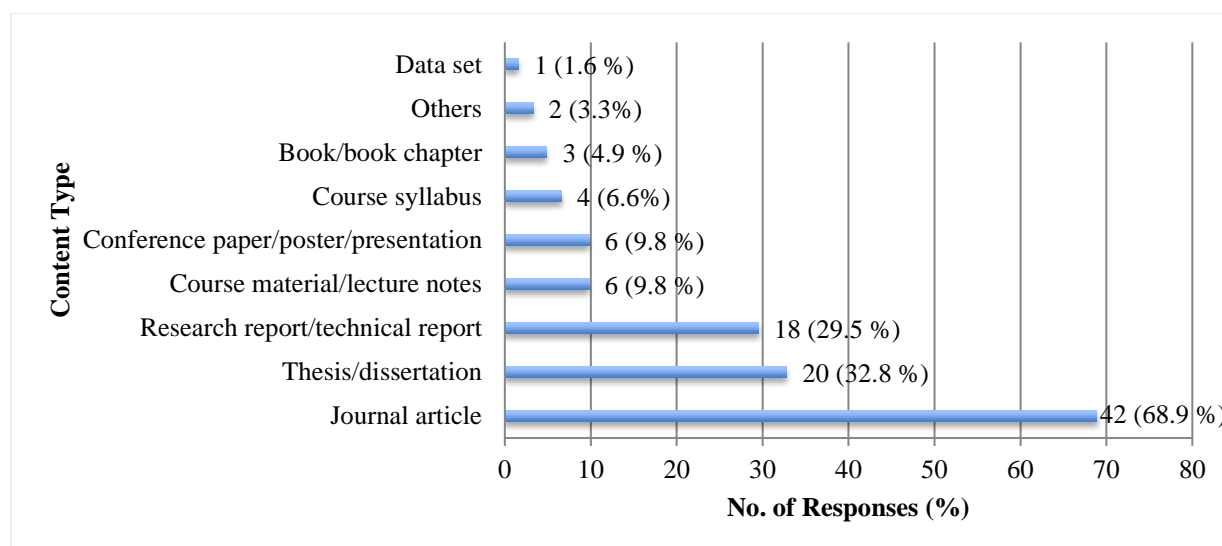
Figure 5.3. Content types deposited to OA repositories and other publicly accessible venues.

Sixty-one (61) respondents, who indicated that they had made their work available for public access, were then asked about how often they had made their work available during the previous two years. As shown in Table 5.41, slightly more than one-third of respondents had made their work available only one time in the previous two years, and a similar number had done so two or three times. The exact numbers were 23 (37.7%) and 21 (34.4%), respectively. Only 17 (27.9%) respondents had made their work publicly available through other publicly accessible web sites more than three times during the previous two years, and only four respondents indicated that they had posted their work more than five times in the past two years.

Table 5.41

Number of Times That the Respondents Had Made Their Work Publicly Available (N = 61)

Time	Responses (*N* = 61)	
	Frequency	Percentage
1 Time	23	37.7
2-3 Times	21	34.4
4-5 Times	13	21.3
More than 5 times	4	6.6
Total	61	100.0

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5.1.5.4 Planning for Self-Archiving in the Future

One hundred fifteen participants who did not have any experience in posting work to other publicly accessible venues (alternative scholarly communication channels) were asked whether they planned to self-archive or publish their work through other OA repositories and publicly accessible web sites in the near future. Findings showed that slightly more than one-third of the respondents (46, 40%) indicated they would be willing to publish their works through the other publicly accessible web sites, while 27 (23.5%) respondents said they would not be willing to do so. Interestingly, another slightly more than one third (42, 36.5%) did not indicate whether they planned to publish through these alternative channels.

A chi-square test for independence was conducted to test differences in responses across discipline. As shown in Table 5.42, a Chi-square test indicates that there was no statistically significant association between discipline and whether the respondent planned to publish in OA repositories or other publicly accessible venues on the Internet, χ^2 (4, $N = 111$) = 8.63, $p = .071$. Greater proportions of respondents in the humanities and social sciences (50.0%, n = 18) and the medical and health sciences (38.7%, n = 12) showed a willingness to publish in OA repositories and other public accessible venues on the Internet. Different from these two disciplines, a greater proportion of respondents from other science and technology fields (36.4%, n = 16) did not want to publish their work in these venues. Others who were in the same category were respondents from the medical and health sciences (25.8%, n = 8) and the humanities and social sciences (8.3%, n = 3). Those who remained uncertain included 41.7% (n = 15) of faculty members from the humanities and social sciences, 35.5% (n = 11) from the medical and health sciences, and 31.8% (n = 14) from other science and technology fields. It is interesting that the proportion of respondents who did not know whether to publish their work through these types of venues

(36.0%, n = 40) was nearly the same as the proportion of those who were interested in publishing

in OA repositories or other publicly accessible venues (40.0%, n = 44).

Table 5.42

Willingness to Publish in OA Repositories or Other Publicly Accessible Venues by Discipline (N = 111)

| Discipline | Willingness to publish in OAIR and other venues | | | | | |
| | Yes N = 44 | | No N = 27 | | Uncertain N = 40 | |
	n	*%*	*n*	*%*	*n*	*%*
Medical & Health Sciences	12	38.7	8	25.8	11	35.5
Other Sci. & Technology	14	31.8	16	36.4	14	31.8
Humanities & Social Sci.	18	50.0	3	8.3	15	41.7
Total	44	40.0	27	24.0	40	36.0

Note. χ^2 (4, N = 111) = 8.63, p = .071

When the data were broken down by academic position, the result from Fisher's exact

test indicated p = .002, meaning that there was a statistically significant relationship between

academic position and whether the respondents would be willing to publish in OA repositories or

other publicly accessible venues. In other words, the proportion of respondents who were willing

to publish in OA repositories or other publicly accessible venues varied by academic position. As

shown in Table 5.43, respondents who would be willing to publish their works were 53.0% (n =

38) of instructors and lecturers, followed by 21.4% (n = 3) of associate professors, and 19.0% (n

= 5) of assistant professors. As compared to other academic positions, a greater proportion of

instructors and lecturers were more likely to publish their work on OAIRs and other publicly

accessible venues than of those in others academic positions. By contrast, those who reported

uncertainty included 50.0% (n =1) of professors, 48.0% (n = 13) of assistant professors, 33.0%

(n = 24) of instructors and lecturers, and 28.6% (n = 4) of associate professors. Meanwhile,

respondents who did want to publish in these types of venues included 50.0% of professors (n =

1) and associate professors (n = 7), followed by 33.0% (n = 9) of assistant professors, and 14.0% (n = 10) of instructors and lecturers.

Table 5.43 shows that among 115 participants, the greater proportion of respondents (40.0%, n = 46) indicated they would be willing to publish their work, while nearly the same proportion of respondents (37.0%, n = 42) did not know whether they would publish their work in OA repositories or other publicly accessible venues in the future. The smallest proportion of respondents (27.0%, n = 27) did not want to publish through these channels at all.

Table 5.43

Willingness to Publish in OA Repositories or Other Publicly Accessible Web Sites by Academic Position (N = 115)

Academic Position	Willingness to contribute					
	Yes N = 46		No N = 27		Uncertain N = 42	
	n	*%*	*n*	*%*	*n*	*%*
Professor	0	0.0	1	50.0	1	50.0
Associate Professor	3	21.4	7	50.0	4	28.6
Assistant professor	5	19.0	9	33.0	13	48.0
Instructor/Lecturer	38	53.0	10	14.0	24	33.0
Total	46	40.0	27	23.0	42	37.0

Note. 4 cells (33.3%) have an expected count less than 5. Fisher's exact test was applied.

The participants who said they would not be willing to publish their work through OA repositories and other publicly accessible web sites, along with some of those who were uncertain, were asked to indicate the factors that might hinder or delay their decisions to do so. Half of the participants from both groups, 13 and 21 respectively, provided reasons. Those reasons were translated and analyzed by theme and are presented in Table 5.44. "I do not have any work to be published" was the reason most commonly cited by both groups of respondents, including four respondents who did not intend to publish and five respondents who were uncertain. While many respondents from both groups simply stated that they did not have any

work, one respondent from the former group stated, "I am a novice researcher and have just started working at this university as a lecturer. I don't have any work to publish" (ID073).

Other reasons mentioned by respondents in both groups included lack of information about OA publications, issues of trust toward OA repositories and the quality of content available in publicly accessible web sites, copyright concerns, and concerns about the quality of their own work. One participant (ID037) mentioned three reasons for his/her decision not to publish in such venues: "I don't understand the concept of open access and the benefit of open access publishing. I have concerns about the quality of open access publication and the security of the system." Others who did not trust OA repositories and OA journals and expressed concerns about the quality of the contents explicitly stated, "I do not trust the quality of open access" (ID017) and "Some OA journals have not been approved by the Office of the Higher Education Commission, Thailand" (ID014). In addition, those who addressed copyright concerns simply stated "I am not sure about the copyright issue" (ID161) and "I worry about the copyright issue. I think the publisher does not allow authors to publish their work in other sources" (ID152).

Respondents who said they would not be willing to publish mentioned two other reasons, preference for publishing in other sources and disciplinary norm. One respondent commented, "I prefer to publish in only high quality journals in my field" (ID166). Similarly, another respondent mentioned, "I published only in peer-reviewed journals and my works are not difficult to find. They are already 'out there.' Publishing in other sources is not necessary" (ID040). Another respondent who addressed the issue of disciplinary norms said, "Some scholars in my field do not accept open access publishing" (ID003).

Other reasons addressed by respondents who had not made up their minds about whether to publish their work in these alternative scholarly communication channels included depending on funding agency requirements, not supporting OA publishing, having concerns about the university policy on open access, perceiving a lack of technical support, and being in a decision-making process. The respondents mentioned:

- It depends on the requirements of funding agencies and their policies (ID140).

- I don't completely understand the concept of open access. Personally, I don't support the concept of open access (ID131).

- I'm not sure whether the university has an open access policy and supports open access publishing (ID159).

- I'm considering publishing my work in open access repositories, but I have not made a decision yet (ID111).

- There is lack of technical support from the department to publish in open access repositories and other web sites (ID117).

Some of these reasons have been identified in previous studies as factors hindering self-archiving. For instance, Kim (2008) found that copyright concerns were one of the factors that impeded self-archiving. Other reasons identified in the narratives of respondents can also be considered as factors that might have delayed the faculty members' decisions to publish in such venues. Some respondents (6 out of 69) in this study also indicated that they lacked information regarding OA publication. This may also be why two respondents explicitly stated that they did not support OA publishing. Therefore, there is a need to establish a greater understanding of OA and OA publishing.

Table 5.44

Reasons for Not Publishing and Being Uncertain About Whether to Publish in OA Repositories or Other Publicly Accessible Web Sites (N = 69)

Reason	Not to Publish (N = 27)		Uncertain to Publish (N = 42)	
	n	*Percentage*	*n*	*Percentage*
Not having any work.	3	10.3	5	11.4
Trust toward OA repositories and the quality of content.	3	10.3	2	4.5
Lack of information about OA publication.	2	6.9	5	11.4
Preferring to publish in other sources.	2	6.9		
Copyright concerns.	2	6.9	3	6.8
Disciplinary norms/Peer pressure.	1	3.4		
Funding agency requirements.			2	4.5
Not supporting OA publishing.			2	4.5
Concern about the quality of their own works.	1	3.4	1	2.3
Concern about the university policy on OA.			1	2.3
Lack of technical support.			1	2.3
In a decision-making process.			1	2.3
Perceiving no benefit.	1	3.4		
N/A	14	48.3	21	47.7
Total	29	100.0	44	100.0

Note. Some respondents provided more than one reason.

5.1.5.5 Usage of Scholarly Works in OA Repositories and Other Publicly Accessible Web Sites

As stated in the previous discussion, the current study views faculty members as both authors and users of scholarly work available in various sources. In this context, it is interesting to know whether the faculty members in Thai research universities make use of scholarly work available in OA repositories and other publicly accessible web sites during the course of specific activities. Findings showed that the majority of respondents (148, 84%) had already searched for and used scholarly work available in OA repositories and other publicly accessible web sites, while only 28 (16%) indicated that they had never searched for or used scholarly works from these sources.

Table 5.45 presents the numbers of faculty members that had used and not used contents available in OA repositories and other publicly accessible web sites broken down by discipline. A Chi-square test of independence shows that there was no statistically significant association between disciplines and whether the participants had searched for and used scholarly work available in OA repositories and other publicly accessible web sites, χ^2 (2, $N = 170$) = .85, p = .652. The greater proportion of respondents across disciplines indicated that they had searched for and used works available in OA repositories and other public access venues. In fact, greater than or equal to eighty percent of respondents in all disciplines indicated they were in this category. By contrast, a smaller proportion of respondents across disciplines had never searched for and used scholarly works available in those venues. This group included 20% (n =10) of faculty members from the medical and health sciences, 16% (n = 8) of respondents from the humanities and social sciences, and 14% (n = 10) from other science and technology fields.

Table 5.45

Participants Using Scholarly Work Available in OA Repositories and Other Publicly Accessible Web Sites by Discipline (N = 170)

Discipline	Yes N = 142		No N = 28	
	n	*%*	*n*	*%*
Medical and health sciences	39	80.0	10	20.0
Other science and technology fields	61	86.0	10	14.0
Humanities and social sciences	42	84.0	8	16.0
Total	142	84.0	28	16.0

Note. χ^2 (2, $N = 170$) = .85, p = .652.

Table 5.46 illustrates the numbers of faculty members that had used and not used contents available in OA repositories and other publicly accessible web sites broken down by academic position. A Fisher's exact test indicated that p = .248. This means there was no statistically significant association between academic position and whether the respondents had

searched for and used contents available in OA repositories and other publicly accessible venues.

A larger proportion of respondents across all academic positions indicated that they had searched

for and used scholarly works available in OA repositories and other venues, including 100% of

professors (n = 3) and researchers (n =3), 88% (n = 89) of instructors and lecturers, 79% (n = 38)

of assistant professors, and 71% (n =15) of associate professors. Meanwhile, those who stated

that they had never used scholarly work available through those venues were 29.0% (n = 6) of

associate professors, followed by 21% (n = 10) of assistant professors, and 12.0% (n = 12) of

instructors and lecturers.

Table 5.46

*Participants Using Scholarly Work Available in OA Repositories and Other Publicly Accessible Web Sites by Academic Position (*N = 176*)*

Academic Position	Yes N = 148		No N = 28	
	n	*%*	*n*	*%*
Professor	3	100.0	0	0.0
Associate professor	15	71.0	6	29.0
Assistant professor	38	79.0	10	21.0
Instructor/Lecturer	89	88.0	12	12.0
Researcher	3	100.0	0	0.0
Total	148	84.0	28	16.0

Note. 5 cells (50.0%) have an expected count less than 5. Fisher's exact test was applied.

Table 5.47 presents the number of respondents that had made use of scholarly work

available in OA repositories and other publicly accessible web sites in a specific activity. Among

148 respondents, 121 (82%) had searched for and used scholarly work available in OA

repositories and other publicly accessible web sites for research-related activities, followed by

teaching-related activities (89, 60%), and scholarly productivity-related activities (46, 31%).

Some respondents indicated they had used that scholarly work for other activities (10, 6.8%).

Among those 10 respondents, four (40%) did not provide any reasons for using the sites, while

the other six (60%) mentioned using sites to update information (*n* = 2), to use articles in OA

journals (*n* = 1), to prepare for a new project (*n* =1), to get information for a student seminar, and

to prepare for a conference presentation (*n* =1). One respondent mentioned using scholarly work

available in OA repositories since "I cannot find enough current information from scholarly

journals and online databases about my project" (ID). The other, who mentioned using articles in

OA journals, gave as a reason "to use pirated articles in open access journals" (ID040).

Table 5.47

Number of Participants Using Scholarly Work Available in OA Repositories and Other Public
Accessible Web Sites in Specific Activities (N = 148)

Activities	Responses (*N* = 148)	
	Frequency	Percentage
Research related activities	121	45.5
Teaching related activities	89	33.5
Other scholarly productivities	46	17.3
Other activities	10	3.8
Total	266	100.0

Note. The respondents were allowed to choose multiple activities.

The participants were then asked to specify their reasons for using the scholarly work

available in OA repositories and other publicly accessible web sites for specific activities.

Although the majority of respondents did not specify a reason for using it, some of them

provided explanations and reasons.

Table 5.48 presents reasons given by participants for using scholarly work available in

OA repositories and other publicly accessible web sites in research-related activities. Among the

121 respondents answering that they had searched for and used scholarly work available in OA

repositories and other public accessible web sites, half of them (61, 50.4%) did not provide

specific reasons. The top four most common reasons for using that scholarly work in research-

related activities were 1) to conduct a literature review (22, 18.2%); 2) to find information for

references (15, 12.4%); 3) to cite scholarly work available in OA repositories and other publicly accessible web sites (10, 8.3%); and 4) to develop and write a grant proposal or a research report (7, 5.8%).

Other reasons mentioned by no more than two respondents each included that open access repositories are easy to use ($n =2$), that they wanted to keep contact with other researchers and experts in their field ($n = 1$), that OA repositories and OA journals provided relevant information in their field ($n = 1$), that they wanted to use guidelines for writing a research paper for publication ($n = 1$), and that they wanted to use work available in OA repositories as guidelines to review other work ($n = 1$).

Table 5.48

Reasons for Using Scholarly Work Available in OA Repositories and Other Publicly Accessible Web Sites for Research-Related Activities (N = 121)

Reasons	Responses ($N = 121$)	
	Frequency	Percentage
To conduct a literature review	22	18.2
To find/search for information for references	15	12.4
To cite scholarly works	10	8.3
To develop and write a grant proposal or a research report	7	5.8
Other reasons	6	5.0
N/A	61	50.3

Table 5.49 shows the respondents' reasons for using scholarly work available in OA repositories and other publicly accessible web sites in teaching-related activities. Among the 37 respondents who provided reasons, the largest number (23, 25.8%) indicated that they used that scholarly work to prepare for teaching and to develop and update teaching/course materials. For instance, Respondent ID040 mentioned "finding some new materials for updating the reading list and course syllabus." Similarly, respondent ID133 stated as a reason "searching references, supplements, and documents to develop course materials and prepare for teaching." Other

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reasons were mentioned including to search for information and scholarly publications ($n = 5$), to

keep track of information and knowledge ($n = 4$), to find some material to be used in classes ($n = 3$), and to find effective teaching strategies and methods ($n = 2$).

Table 5.49

Reasons for Using Scholarly Work Available in OA Repositories and Other Publicly Accessible Web Sites for Teaching-Related Activities (N = 89)

Reasons	Responses ($N = 89$)	
	Frequency	Percentage
To prepare for teaching and develop/update teaching/course materials	23	25.8
To search for information and scholarly publications	5	5.6
To keep track of information and knowledge	4	4.5
To find some materials to be used in classes	3	3.4
To find effective teaching strategies and methods	2	2.2
N/A	52	58.4

As can be seen in Table 5.50, 15 respondents (out of 46) who used scholarly work

available in OA repositories and other publicly accessible web sites in other scholarly

productivity related activities indicated their reasons, including 1) to prepare a manuscript ($n = 5$), to search for information ($n = 4$), to conduct a literature review ($n = 3$), to stay current in

knowledge ($n = 2$), and to cite work available in OA repositories ($n = 1$). While four out of five

respondents who used work available in OA repositories and other venues to prepare for a

manuscript stated that they were preparing manuscripts for journal articles ($n = 2$) and textbook

manuscripts ($n = 2$), one respondent simply indicated "preparing manuscripts for publication"

(ID056).

Table 5.50

Reasons for Using Scholarly Work Available in OA Repositories and Other Publicly Accessible Web Sites for Other Scholarly Productivity-Related Activities (N = 46)

Reasons	Responses (*N* = 46)	
	Frequency	Percentage
To prepare a manuscript	5	10.9
To search for information	4	8.7
To conduct a literature review	3	6.5
To stay current in knowledge	2	4.3
To cite work available in OA repositories	1	2.2
N/A	31	67.4

Table 5.51 shows how frequently participants searched for and used scholarly work available in OA repositories and other venues; the largest number of respondents (34, 23%) indicated that they used them at least once a week, followed by 2-3 times a week (28, 18.9%) and 4-5 times a week (24, 16.2%). Altogether fewer than one-fourth of the respondents (31, 21%) used them every day or many times a day, and the same numbers of respondents (31, 21%) reported that they rarely used scholarly work available in OA repositories and other venues.

Table 5.51

The Frequency of Search and Use of OA Repositories and Other Venues among Respondents (N = 148)

Frequency	Responses (*N* = 148)	
	Frequency	Percentage
Many times a day	9	6.1
Everyday	22	14.9
4-5 times a week	24	16.2
2-3 times a week	28	18.9
Every week	34	23.0
Every month	18	12.2
Less than every month	13	8.8
Total	148	100.0

5.1.5.6 Participants' Willingness to Search and Use OA Repositories and Other Venues

Twenty-eight respondents who indicated that they had never searched for and used contents available in OA repositories and other publicly accessible web sites were asked if they intended to use them in the future. Overall, half of the respondents (14, 50%) said they would be willing to use OA repositories and other open access venues in the near future, while five respondents (18%) did not want to use them, and nine respondents (32%) had not made a decision about whether to use those sources. It is interesting that the number of respondents expressing their intention to search and use OA repositories in the near future was higher than the number of respondents who said that they did not want to use them.

Table 5.52 presents the willingness of the respondents to use OA repositories and other publicly accessible venues in the future broken down by discipline. A Fisher's exact test yielded $p = .598$. This means that there was no significant association between discipline and whether the respondents intended to use contents available in OA repositories and other public accessible venues in the future. According to the table, while a greater proportion of respondents from the humanities and social sciences (62.5%, n = 5) and other science and technology fields (50.0%, n = 5) reported they were willing to use content in OA repositories and other publicly accessible venues in the near future, a greater proportion of respondents from the medical and health sciences (50.0%, n = 5) felt uncertain and did not know whether they would use them in the future.

Table 5.52

Respondents' Willingness to Use OA Repositories and Other Venues by Discipline (N = 28)

Discipline	Willingness to Use *OA Repositories and Other Venues*					
	Yes N = 14		No N = 5		Uncertain N = 9	
	n	*%*	*n*	*%*	*n*	*%*
Medical & Health Sciences	4	40.0	1	10.0	5	50.0
Other Sci. & Technology	5	50.0	3	30.0	2	20.0
Humanities & Social Sci.	5	62.5	1	12.5	2	25.0
Total	14	50.0	5	18.0	9	32.0

Note. 7 cells (77.8%) have an expected count less than 5. Fisher's exact test was applied.

Table 5.53 presents data on participants' willingness to search and use OA repositories and other publicly accessible web sites broken down by academic position. Based on Fisher's exact test, $p = .904$, meaning that there was no significant relationship between academic positions and whether the respondents intended to use the contents available in OA repositories and other public accessible venues in the future. The greater proportion of respondents in all academic positions expressed their intentions to use contents available in these sources in the future. This group included 60.0% (n = 6) of associate professors, 50.0% (n = 3) of associate professors, and 42.0% (n = 4) of instructors and lecturers. Only a smaller proportion of respondents in all academic positions expressed no intention to use them. Among those who did not know whether they would use them, the greater proportion were 42.0% (n = 5) of instructors and lecturers, followed by 33.3% (n = 2) of associate professors, and 20.0% (n = 2) of assistant professors.

Table 5.53

Participants' Willingness to Search and Use OA Repositories and Other Venues by Academic Position (*N* = 28)

Academic Position	Willingness to Use *OA Repositories and Other Venues*					
	Yes *N* = 14		No *N* = 5		Uncertain *N* = 9	
	n	*%*	*n*	*%*	*n*	*%*
Associate Professor	3	50.0	1	16.6	2	33.3
Assistant professor	6	60.0	2	20.0	2	20.0
Instructor/Lecturer	5	42.0	2	16.0	5	42.0
Total	14	50.0	5	18.0	9	32.0

Note. 5 cells (41.7%) have an expected count less than 5. Fisher's exact test was applied.

For the purpose of understanding the reasons behind the respondents' decisions, respondents who answered "No" and "Uncertain" were asked to specify their reasons.

Among the five respondents indicating that they did not intend to use OA repositories in the near future, three respondents provided specific reasons to support their decisions. A faculty member from the field of Nanotechnology stated, "I don't understand the concept of open access and am concerned about the quality open access repositories" (ID037). A respondent from Electrical Engineering said, "I don't want to search and use OA repositories" (ID076). In addition, one respondent who was a faculty member from the library and information science field stated, "OA repositories are not information sources that I have ever consulted" (ID011).

Two out of the seven respondents who had not decided whether to search and use OA repositories and other venues provided specific reasons. While a faculty member in Biomedical Engineering said, "I don't trust OA repositories and their contents" (ID017), the other respondent, from the field of Environmental Science, stated, "I need more detailed information about open access repositories before making a decision to use them" (ID032). It is evident from the reasons provided not only by respondents who did not want to use OA repositories but also by those who did not know whether to use them that lack of information about OA and trust

toward OA repositories and the quality of contents were important reasons that hindered or delayed the respondents' willingness to use OA repositories in general. Similar reasons were also mentioned when the respondents were asked to identify their stance on the use of the university-based repositories in the previous sections.

5.1.6   Factors Affecting Faculty's Acceptance and Use of University-based IRs

This study utilized path analysis to further address the second research question as a way to identify the factors that contributed to faculty members' behavioral intention to use university-based IRs and their actual usage behavior. AMOS software was used to assess the overall model fitness. In this section, the results from factor analysis are presented, followed by an assessment of the structural model fit, hypotheses testing, and a proposal of the trimmed model.

5.1.6.1 Factor Analysis

Principle axis factoring (PAF) was performed using SPSS Version 23 to identify the latent constructs behind the observed variables. The correlation matrix was used as a matrix of association. The numbers of factors retained were based on theory. Each scale was believed to be one factor; hence, there were no rotations used, and the pattern coefficients (analogous to Beta weights) and the structure coefficients (the correlation between the individual item and the component) were one and the same (Stevens, 2007, p. 331). Since the pattern and structure coefficients are identical in cases where there is one factor, the coefficients are referred to as factor loadings. The percentage of the variance for each factor is the eigenvalue (trace) divided by number of items, times 100. Kieffer (1998) states that "trace" is the term for eigenvalues after rotation. Since there was no rotation, this study used the term "eigenvalue." The communality coefficient (h^2 = sum of squared factor loadings for the variable) is the proportion of each variable's variance that can be explained by the factors. "If a measured variable had a

communality coefficient close to 0%, this would mean that this variable is not being represented within the factors" (Thompson, 2004, p.20).

Results of the PAF factor extraction are presented in the following tables. The retained factor scores for each PAF were used as independent and dependent variables in a subsequent path analysis.

5.1.6.1.1   Attitude Toward IRs (ATT)

A principle axis factoring analysis, requesting one factor, was conducted and is reported in Table 5.54. In total, the four items explained about 73% of the variance. The factor loadings were all above .80 and had high communality extraction (h^2), above .70. Each of the four items had a large correlation with the factor. All items were retained. The internal reliability for the items in this factor was .89, indicating good internal reliability. The content of the four items was related to attitude toward IRs; thus, the factor was named attitude.

Table 5.54

The Attitude toward IRs Factor Loading and the Communality Coefficient

Variable	Final Scale	
	Factor	h^2
ATT1	*0.87*	0.76
ATT2	*0.86*	0.74
ATT3	*0.84*	0.70
ATT4	*0.85*	0.72
Eigenvalue		2.93
% of variance		73.19

Note. The Items with Coefficients greater than |.40| are italicized and were retained for the factor.

5.1.6.1.2   Performance Expectancy (PE)

Table 5.55 presents results of a principle axis factoring analysis of the performance expectancy scale. In total, the six items explained about 56% of the variance. The factor loadings

ranged from .44 to .87. The internal reliability coefficient for this factor was .84, indicating good internal reliability. All items were retained for performance expectancy.

Table 5.55

The Performance Expectancy Factor Loading and the Communality Coefficient

Variable	Final Scale	
	Factor	h^2
PE1	*0.79*	0.63
PE2	*0.87*	0.76
PE3	*0.84*	0.70
PE4	*0.76*	0.58
PE5	*0.69*	0.48
PE6	*0.44*	0.20
Eigenvalue		3.34
% of variance		55.68

Note. The Items with Coefficients greater than |.40| are italicized and were retained for the factor.

5.1.6.1.3   Effort Expectancy (EE)

A PAF, with one factor retained, was conducted for the EE scale. The six-item version of EE accounted for 38% of variance. Table 5.56 reports the factor loadings for the six items of EE. Item EE5r and EE6r (reverse coded) had low factor loadings (below .40), indicating they were not consistent with the factor. To further assess the relationship of EE5r and EE6r with the other four items, the internal reliability was examined. Both of them had a low correlation with the other items. The six-item version of EE, including EE5r and EE6r, had relatively low reliability, with Cronbach's α = .65. These two items were removed one at a time. After deletion, the overall reliability of the scale was improved, with Cronbach's α = .82, indicating good internal reliability. The four retained items of the EE construct were used in a subsequent PAF, and the results are reported in Table 5.56. In total, the four items explained about 56.61% of the variance. The factor loadings were all above |.40| and had communality extraction (h^2) above .40.

Table 5.56

The Effort Expectancy Factor Matrix and the Communality Coefficient

Variable	Initial Scale		Final Scale	
	Factor	h^2	Factor	h^2
EE1	0.69	0.47	*0.69*	0.47
EE2	0.77	0.59	*0.76*	0.57
EE3	0.80	0.64	*0.83*	0.68
EE4	0.73	0.54	*0.73*	0.53
EE5r	-0.17	0.03	-	-
EE6r	-0.11	0.01	-	-
Eigenvalue		2.285		2.264
% of variance		38.076		56.606

Note. The Items with Coefficients greater than |.40| are italicized and were retained for the factor. r = reverse coded.

5.1.6.1.4 Social Influence (SI)

A principle axis factoring analysis, with one factor retained, was conducted for the SI scale (Table 5.57). The six-item version of SI accounted for 64.56% of variance. The factor loadings were all above .60. Altogether, this factor had a relatively high internal reliability coefficient, with the Cronbach's α = .91, indicating the good internal reliability. All items were retained, and the factor scores were saved for the next inquiry.

Table 5.57

The Social Influence Factor Matrix and the Communality Coefficient

Variable	Final Scale	
	Factor	h^2
SI1	*0.63*	0.40
SI2	*0.66*	0.44
SI3	*0.82*	0.67
SI4	*0.92*	0.85
SI5	*0.87*	0.75
SI6	*0.87*	0.76
Eigenvalue		3.87
% of variance		64.56

Note. The Items with Coefficients greater than |.40| are italicized and were retained for the factor.

5.1.6.1.5   Resistance to Change (RTC)

Table 5.58 presents results from a principle axis factoring analysis, retaining one factor for RTC. The four-item version of RTC accounted for a small percentage of variance, 37.94%. Item RTC2r had a low factor loading (below .40) and had low communality coefficients ($h^2 = 0.07$); hence, it was not consistent with the factor. The internal reliability of this factor was examined, and it was found that RTC had relatively low reliability, with Cronbach's $\alpha = .49$. Item RTC2r was eliminated. Results showed that the overall reliability of the scale was improved, with Cronbach's $\alpha = .72$, indicating acceptable internal reliability. The PAF was rerun with the three remaining items, and the one-factor model was able to account for 47.38% of the variance. The factor loadings were all above the cutoff point |.40|. The factor scores for RTC were retained for use in the path analysis.

Table 5.58

The Resistance to Change Factor Matrix and the Communality Coefficient

Variable	Initial Scale		Final Scale	
	Factor	h^2	Factor	h^2
RTC1	.58	0.33	*0.60*	0.36
RTC2r	-.27	0.07	-	-
RTC3	.61	0.37	*0.63*	0.36
RTC4	.86	0.74	*0.82*	0.39
Eigenvalue		1.52		1.42
% of variance		37.94		47.38

Note. The Items with Coefficients greater than |.40| are italicized and were retained for the factor. r = reverse coded.

5.1.6.1.6   Altruism (ALT)

A principle axis factoring analysis, requesting one factor, was conducted for the ALT scale. The results are presented in Table 5.59. The three-items of ALT accounted for 67.48% of variance. The factor loadings were all above .70 and had a medium to high communality

extractions (h^2), ranged from .51 to .82. With all three items, this factor had a relatively high internal reliability coefficient, with Cronbach's α = .84, indicating good internal reliability. All items were retained, and the factor scores were saved for the path analysis.

Table 5.59

The Altruism Factor Matrix and the Communality Coefficient

Variable	Final Scale	
	Factor	h^2
ALT1	*0.71*	0.51
ALT2	*0.90*	0.82
ALT3	*0.84*	0.70
Eigenvalue		2.03
% of variance		67.48

Note. The Items with Coefficients greater than |.40| are italicized and were retained for the factor.

5.1.6.1.7 Copyright Concerns (CCs)

A principle axis factoring analysis, with one factor retained, was conducted for the CCs scale. Results are presented in Table 5.60. The four-items of CCs accounted for 53.05% of variance. The factor loadings were all greater than the cut-off point |.40|. All four items were consistent with one another, as indicated by a good internal reliability coefficient, with Cronbach's α = .80. The factor scores were retained for subsequent analyses.

Table 5.60

The Copyright Concern Factor Matrix and the Communality Coefficient

Variable	Final Scale	
	Factor	h^2
CCs1	0.83	0.69
CCs2	0.92	0.85
CCs3	0.60	0.36
CCs4	0.47	0.22
Eigenvalue		2.12
% of variance		53.05

Note. The Items with Coefficients greater than |.40| are italicized and were retained for the factor.

5.1.6.1.8   Trust toward IRs (TTIRs)

A principle axis factoring analysis, with one factor retained, was conducted for the TTIRs scale. As shown in Table 5.61, the four-item version of RTC accounted for a small percentage of variance, about 36%. Item TTIRs4 had a low factor loading (below .40) and had low communality coefficients ($h^2 = 0.01$), indicating that it was not consistent with the factor. The internal reliability of this factor was examined, and it was found that the overall TTIRs construct had low reliability, with Cronbach's $\alpha = .53$. Item RTC2r was dropped. Results showed that the overall reliability of the scale had improved, with Cronbach's $\alpha = .72$, indicating acceptable internal reliability. A PAF was rerun. The results show that the three retained items of the TTIRs construct accounted for 47.62% of the variance. The factor loadings were all above the cutoff point |.40|, and the factor scores were retained

Table 5.61

The Trust toward IRs Factor Matrix and the Communality Coefficient

Variable	Initial Scale		Final Scale	
	Factor	h^2	Factor	h^2
TTIRs1r	0.72	0.51	0.71	0.51
TTIRs2r	0.60	0.36	0.60	0.37
TTIRs3r	0.74	0.55	0.75	0.56
TTIRs4	-0.12	0.01	-	-
Eigenvalue		1.44		1.43
% of variance		36.07		47.62

Note. The Items with Coefficients greater than |.40| are italicized and were retained for the factor.

5.1.6.1.9   Facilitating Conditions (FC)

A PAF analysis, requesting one factor, was conducted for the FC scale. The results are presented in Table 5.62. The four items of FC accounted for 54.11% of variance. The factor loadings were all greater than the cut-off point |.40|. The internal consistency of this factor

indicated a good internal reliability coefficient, with Cronbach's α = .80. All four items were

retained, and the factor scores were saved for the next step

Table 5.62

The Facilitating Conditions Factor Matrix and the Communality Coefficient

Variable	Final Scale	
	Factor	h^2
FC1	*0.44*	0.20
FC2	*0.58*	0.33
FC3	*0.97*	0.94
FC4	*0.83*	0.70
Eigenvalue		2.16
% of variance		54.11

Note. The Items with Coefficients greater than |.40| are italicized and were retained for the factor.

5.1.6.1.10   Behavioral Intention (BI)

A PAF, requesting one factor for BI, was conducted and is reported in Table 5.63.

Altogether, the three items explained 76.54% of the variance. The factor loadings were all

above .80 and had a medium to high communality extraction (h^2), above .60. All four items had a

large correlation with the factor. All items were retained. The internal reliability of the overall

scales was excellent, and the Cronbach's α was .90. The contents of the three items were related

to faculty members' intention to use IRs; hence, the factor scores were saved and named

behavioral intention.

Table 5.63

The Behavioral Intention Factor Matrix and the Communality Coefficient

Variable	Final Scale	
	Factor	h^2
BI1	*0.89*	0.79
BI2	*0.91*	0.83
BI3	*0.82*	0.67
Eigenvalue		2.30
% of variance		76.54

Note. The Items with Coefficients greater than |.40| are italicized and were retained for the factor.

5.1.6.1.11 Usage Behavior (UB)

Table 5.64 presents a PAF analysis, requesting one factor for usage behavior. Altogether, the four items explained about 60% of the variance. The factor loadings were all above .70, and all had communality extraction (h^2) above .50. Each of these four items had a large correlation with the factor. All four items were retained. The Cronbach's α value was .85, indicating that the overall reliability of the scale was good. The contents of the four items were related to faculty members' actual usage of IRs; thus, the factor was named usage behavior.

Table 5.64

The Usage Behavior Factor Matrix and the Communality Coefficient

Variable	Final Scale	
	Factor	h^2
UB1	0.73	0.53
UB2	0.88	0.78
UB3	0.77	0.59
UB4	0.72	0.52
Eigenvalue		2.42
% of variance		60.15

Note. The Items with Coefficients greater than |.40| are italicized and were retained for the factor.

5.1.6.1.12 Assessing Model Fit

Prior to the testing of the research hypotheses, the model was examined for its goodness-of-fit. The Asymptotically Distribution Free (ADF) method was used as the estimation method since the factor scores in this study were continuous but not normal (Hox & Bechger, 1998). Additionally, there were Heywood cases (negative variance estimates or estimated absolute correlations greater than 1), and they were allowed into the model using an option in AMOS.

There are several fit indices to evaluate the model fit, such as model chi-square (χ^2), comparative fit index (CFI), root mean square error of approximations (RMSEA), and the goodness-of-fit statistic (GFI) (Kline, 2005; Hooper, Coughlan, & Mullen, 2008). For this study,

the model chi-square and GFI were employed, since CFI and RMSEA were not applicable due to the ADF estimation method. The model chi-square statistic was used to determine whether the model fit the observed data. According to Kline (2005), if the value of model chi-square is equal to zero, it indicates goodness of fit. The non-significant model chi-square ($p > .050$) indicates a good model fit, suggesting that the model does not differ significantly from the observed data (Park, Mills, & Edmondson, 2012). The χ^2/df (analogous to CMIN) should be less than 3.0, which indicates good fit. GFI evaluates the model fit by measuring the fit between an estimated model and the observed covariance matrix (Tabachnick & Fidell, 2007). A GFI greater than .90 indicates good fit (Kline, 2005). Based on the fit indices, the proposed path model indicated poor fit and showed that the path diagram of the proposed research model did not fit well with the observed data, $\chi^2 (9) = 35.65$, $p = .000$, CMIN = 3.96, GFI = .98. This meant the proposed research model could not be used to explain faculty members' behavioral intention and usage behavior with regard to university-based IRs.

After the structural model fit was assessed, resulting in an indication of poor fit, the study hypotheses were then tested prior to the removal of non-significant paths. The results must be interpreted with caution since there was poor model fit. Figure 5.4 shows the standardized path coefficient (β) weights (analogous to standardized beta weights), the coefficient of determination (R^2), and their significance for the hypothesized model. The beta weight indicates the strengths of the effects between the exogenous (independent) variables and endogenous (dependent) variables. The coefficient of determination (R^2), explained variance, demonstrates the proportion of variance in the endogenous variables that is explained by exogenous variables (predictors). Social influence (SI) and performance expectancy (PE) were found to have a significant direct effect on usage intention of university-based IRs ($\beta = 0.42$, $p < .001$ and $\beta = 0.31$, $p = .004$

respectively), while resistance to change (RTC) was found to have a negative direct effect on behavioral intention ($\beta = -0.15$, $p = .023$). Interestingly, both attitude (ATT) and effort expectancy (EE) were found not significant and did not have a direct effect on behavioral intention. Only behavioral intention (BI) and altruism (ALT) had a significant direct effect on faculty members' actual usage behavior regarding university-based IRs (UB) ($\beta = 0.57$ and 0.27, $p < .001$ respectively). The other factors, including copyright concerns (CCs), trust toward IRs (TTIRs), and facilitation condition (FC) were found to be not statistically significant. Altogether, the model explained 61% of variance ($R^2 = .61$) in both behavioral intention and usage behavior.
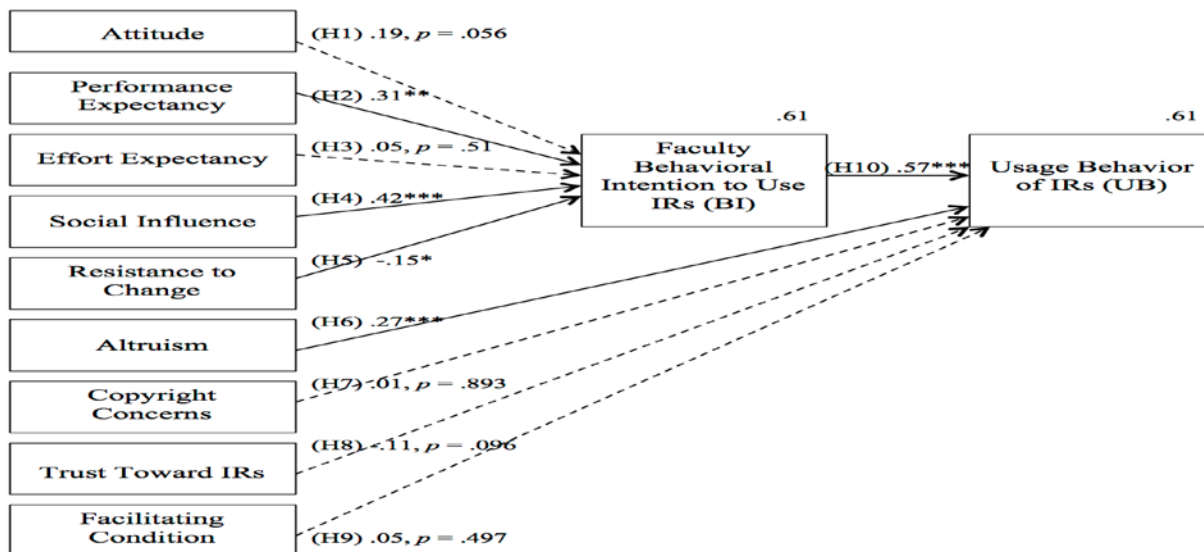
Note. *$p < .05$, **$p < .01$, ***$p < .001$
Figure 5.4. The hypotheses testing result of the proposed path model.

5.1.6.2 Hypotheses Testing

H1: Faculty members' attitudes toward IRs were expected to have a significant direct effect on behavioral intention. Hypothesis H1 was not supported, ($\beta = 0.19$, $p = .056$). As shown in Figure 5.4, the findings demonstrated that attitude toward IRs did not have a direct effect on behavioral intention to use university-based IRs on the part of faculty members in the research universities in Thailand. This indicates that attitude toward IRs did not directly enhance usage

intention. This finding is similar to what has been found in Venkatesh et al.'s study (2003), indicating that attitude does not have a direct influence on behavioral intention due to its interaction effects with performance expectancy (PE) and effort expectancy (EE).

H2: Performance expectancy was expected to have significant direct effect on behavioral intention. This hypothesis was supported. According to Figure 5.4, the findings indicated that performance expectancy had a positive direct effect on faculty members' behavioral intention to use university-based IRs, with a standardized path coefficient of 0.31 and a significant p-value less than .01. This indicates that performance expectancy enhanced usage intention and that faculty members would use university-based IRs if they found that IRs were useful for their work.

H3: Effort expectancy was expected to have a significant direct effect on behavioral intention. H3 was not supported ($\beta = 0.05$, $p = .510$). As can be seen in Figure 5.4, the findings showed that effort expectancy did not have a direct effect on behavioral intention to use university-based IRs on the part of faculty members in the research universities in Thailand. This indicates that effort expectancy did not directly enhance usage intention, and the faculty members' adoption of IRs would not depend on the level of ease of use of the system. This finding is inconsistent with findings in previous studies, particularly studies confirming the UTAUT model, which proposed that effort expectancy has direct effect on behavioral intention (Venkatesh et al., 2003). Additionally, in the area of self-archiving, Kim (2008, 2010) found that additional time and effort had negative direct effects on faculty self-archiving behavior.

H4: Social influence was expected to have a significant direct effect on behavioral intention. Hypothesis 4 was supported. The findings demonstrated that social influence had a positive direct effect on faculty members' behavioral intention to use university-based IRs, with

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the highest standardized path coefficient of 0.42 (moderate effect) and a significant *p*-value less than .001. This indicates that social influence enhanced usage intention, and faculty members' adoption of university-based IRs would increase if they recognized that other important people, such as colleagues, leading researchers in their field, their university, and funding agencies, believed that they should use IRs.

H5: Resistance to change was expected to have a significant direct effect on behavioral intention. Hypothesis 5 was supported. The findings showed that resistance to change had a negative direct effect on faculty members' behavioral intention to use university-based IRs, with a standardized path coefficient of -0.15 (a weak effect) and a significant *p*-value less than .05. This means that faculty members who exhibited higher level of resistance to change were less intent on trying to use university-based IRs. This finding is similar to that of Oreg (2003), who found that resistance to change can be used to predict the inclination to adopt new technology or product.

H6: Altruism was expected to have a significant direct effect on actual usage of IRs. This hypotheses was supported. As seen in Figure 5.4, altruism had a positive direct effect on faculty members' actual usage of university-based IRs, with a standardized path coefficient of 0.27 (a moderate effect) and a significant *p*-value less than .001. This indicates that altruism enhanced usage behavior. The faculty members' actual usage of IRs was expected to increase if they felt that posting work on university-based IRs could help other researchers to benefit from their work. This finding is in line with those of previous studies conducted in different contexts. Kim (2008, 2010) also found that altruism had positive direct effect on faculty self-archiving behavior.

H7: Copyright concerns were expected to have a significant direct effect on actual usage of IRs. Hypothesis 7 was not supported ($\beta = 0.01$, $p = .893$). Findings indicated that copyright concerns did not have a direct effect on faculty members' actual usage of university-based IRs. This finding presents a contradiction with the literature in which copyright concerns (CCs) are frequently cited as a major barrier to self-archiving and to IR contribution (Casey, 2012; Creaser et al., 2010; Kim, 2007, 2008, 2010, 2011; Singeh et al., 2013b; Swan & Brown, 2005; Xia et al., 2012).

H8: Faculty members' trust toward IRs was expected to have a significant direct effect on their actual usage of IRs. Hypothesis 8 was not supported ($\beta = -0.11$, $p = .096$). The findings showed that the faculty members' trust toward university-based IRs did not directly enhance their actual usage of university-based IRs. As trust in this study is related to issues such as fear of plagiarism and long-term preservation, it could be concluded that these issues did not directly contribute to faculty members' actual usage of university-based IRs.

H9: Facilitating conditions were expected to have a significant direct effect on actual usage of IRs. Hypothesis 9 was not supported ($\beta = 0.05$, $p = .497$). The findings demonstrated that facilitation conditions did not have direct effect on faculty members' actual usage of university-based IRs. This means that the faculty members' actual usage of university-based IRs did not depend on the availability of facilitating conditions such as the Internet or guidance. This finding stands in contrast to the UTAUT model (Venkatesh et al., 2003) and the findings of previous studies that indicate that technology and other issues related to technology are important factors contributing to IR and open access adoption (Ambruster, 2011; Dulle, 2010; Duranceau & Kriegsman, 2013).

H10: The faculty members' behavioral intention was expected to have a significant direct effect on actual usage of IRs. Hypothesis 10 was supported. As shown in Figure 5.4, faculty members' behavioral intention had a positive direct effect on the actual usage of university-based IRs, with a standardized path coefficient of 0.57 (a strong effect) and a significant p-value less than .001. This indicates that the faculty members' intention to use university-based IRs enhanced actual usage behavior, and the faculty members' adoption of university-based IRs would increase if their intention to use IRs increased. Similarly, the UTAUT model suggests that behavioral intention has a significant positive effect on an individual's usage of a particular technology (Venkatesh et al., 2003).

Table 5.65 presents a summary of findings and hypothesis testing for path analysis.

Table 5.65

Summary of Findings and Hypotheses Testing for Path Analysis

Path	Hypotheses	Estimate	p	Results
ATT → BI	H1	0.19	.056	Not supported
PE → BI	H2	0.31	**	Supported
EE → BI	H3	0.05	.507	Not supported
SI → BI	H4	0.42	***	Supported
RTC → BI	H5	-0.15	.023	Supported
ALT → UB	H6	0.27	***	Supported
CCS → UB	H7	0.01	.893	Not supported
TTIRS → UB	H8	-0.11	.096	Not supported
FC → UB	H9	0.05	.497	Not supported
BI → UB	H10	0.57	***	Supported

Note. $**p < .01$, $***p < .001$

Three of the five exogenous (predictor) variables were found to have a direct effect on the first endogenous (dependent) variable, faculty members' behavioral intention to use university-based IRs. Taken together, these three exogenous variables accounted for 61% of variance in behavioral intention ($R^2 = .61$). H2, H4, and H5 were supported, while H1 and H3 were found not significant and were rejected. Only behavioral intention and altruism were found to have a

direct effect on the actual usage of university-based IRs. These two exogenous variables explained 61% of variance ($R^2 = .61$) in usage behavior. H6 and H10 were supported. Based on the standardized beta (β) weight, social influence was the strongest predictor of behavioral intention ($\beta = 0.42$, $p < .001$), while behavioral intention was the strongest predictor of the actual usage of university-based IRs ($\beta = 0.57$, $p < .001$).

5.1.6.2.1   Model Trimming

According to Kline (2005), the path model can be trimmed based on either empirical or theoretical re-specifications. For this study, empirical re-specification was employed, meaning that paths were deleted according to statistical criteria. Briefly, if the path coefficients were not statistically significant, they were trimmed. This process is continued to identify the final model that fits the observed data (Kline, 2005, p. 146-147).

Since the proposed research model had poor fit ($\chi^2 (9) = 35.65$, $p = .000$, CMIN = 3.96, GFI = .98), non-significant paths were eliminated to trim the model. Those paths included 1) attitude toward IRs to behavioral intention (ATT→ BI), 2) effort expectancy to behavioral intention (EE → BI), 3) copyright concerns to usage behavior (CCS → UB), 4) trust toward IRs to usage behavior (TTIRS → UB), and facilitation condition to usage behavior (FC → UB). Once each path was trimmed, the trimmed model was retested. This process was continued until the final trimmed model was identified.

The final model, shown in Figure 5.5, exhibited a better fit to the observed data, $\chi^2 (31) = 49.52$, $p = .020$, CMIN = 1.60, GFI = 0.95, RMR = 0.12. Although the chi-square value of the final model had increased, the other fit indices had improved. The new model had a ratio of chi-square to the degree of freedom (χ^2/df or CMIN) of 1.60 and a goodness-of-fit index (GFI) of 0.95, suggesting that the model had good fit. Therefore, the final model fit the observed data

better than did the proposed research model. In addition, deleting non-significant paths also improved the strengths of the standardized path coefficient (β) weights between the exogenous (independent) variables and the endogenous (dependent) variables. Although the explained variance (R^2) had decreased throughout the process, altogether the final model explained 52% of variance ($R^2 = .52$) in behavioral intention and 50 % of variance ($R^2 = .50$) in actual usage behavior. Based on the final model, SI, PE and RTC were all significant predictors of BI ($\beta = 0.46$, $p < .001$, $\beta = 0.38$, $p < .001$, and $\beta = -0.18$, $p < .050$, respectively). Additionally, both BI and ALT were significant predictors of UB ($\beta = 0.50$ and 0.30, $p < .001$, respectively).
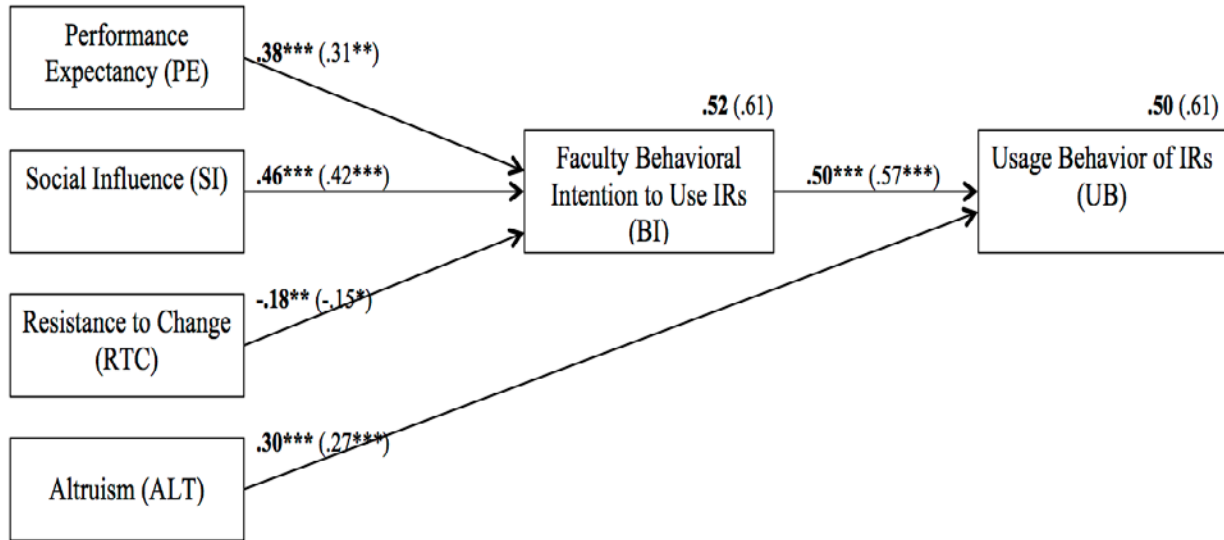
Note. *$p < .05$, **$p < .01$, ***$p < .001$
Figure 5.5. The final trimmed model. β weights and R^2 for the final model are in bold, those of the initial model in parentheses.

5.2   Qualitative Data Analysis

For the purpose of exploring subjects' self-archiving behaviors and the reasons behind their contributions or delay in contributing to university-based IRs in greater detailed, semi-structured interview using Skype and semi-structured email interviews were conducted. Among 176 respondents, 26 respondents indicated willingness to participate in follow-up semi-structured interviews. However, six respondents did not provide contact information. After the recruiting

emails were sent to twenty respondents, only five respondents from three universities agreed to participate in the follow-up interviews. Table 5.66 presents the distribution of interviewees based on self-archiving experience, whether or not they were IR contributors, academic position, and discipline.

Table 5.66

Distribution of Interviewees

Characteristics	Self-archiving Experience	
	Yes	No
IR Contributors		
Yes	3	1
No		1
Discipline		
Biochemistry	1	
Mathematics and computer science		1
Library and information science	2	1
Academic position		
Assistant Professor	1	1
Instructor/Lecturer	2	1

For the current study, faculty members whose materials were available or deposited in their university-based IRs were considered as IR contributors. Four interviewees considered themselves as IR contributors or IR supporters. Among these four interviewees, three of them had self-archiving experience, while the remaining one interviewee, who was an assistant professor in library and information science field, did not have self-archiving experience. However, this interviewee considered herself as an IR contributor, since her scholarly work had been deposited into the university-based IR by librarians. One interviewee, who was a lecturer in mathematics and computer science, identified himself as a non-contributor since he had never deposited any of his work to the Knowledge Bank (the university-based IR); however, he considered himself as a supporter of the Knowledge Bank and planned to deposit his work in the

near future. All three interviewees from the humanities and social sciences fields were from the field of library and information, including two assistant professors and one instructor. The other two interviewees were a lecturer in biochemistry and a lecturer in mathematics and computer science.

5.2.1   Attitudes Toward Open Access

In general, the interviewees had positive attitudes toward open access. However, their general comments regarding open access were slightly different in each topic. The following themes emerged from the conversation during the interviews.

5.2.1.1 Open Access Supporters

All five interviewees had heard about open access, supported the principle of open access, and believed that OA publishing benefited scholarly communication and enhanced the growth of scientific productivity. This alternative channel of scholarly communication helps scholars and researchers in different geographic areas to disseminate, access, use, and benefit from scholarly products freely available in both OA repositories and OA journals. An instructor from Library and Information Science directly stated, "open access publishing provides opportunities for scientists, researchers, and others in academia in different geographic locations to access, use, and benefit from scholarly works free of charge" (IV001). Also, an interviewee who was a lecturer in Mathematics and computer science supported the general assumption of open access and explained that:

> I support open access since the purpose of open access is for the development of education and research in the long run. As a scientist and a user of scientific productivity, I feel that open access repositories are important information sources that offer opportunities for researchers from around the world to access research papers that are freely available. In general, open access allows equality of learning and enhances a research cycle that will support growth in science, particularly in developing countries. (IV005)

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One assistant professor from the field of Library and Information Science saw the benefit of open access and believed that researchers and scholars should engage in open access. She commented, "there are more benefits to open access, and it is a new type of scholarly communication that academicians should be engaged in" (IV004).

This shows that the interviewees had positive attitude toward open access and open access publishing. In addition, all interviewees clearly stated that they were open access supporters. However, this finding contrasts with the findings of a previous study reporting a low rate of acceptance of OA publishing among Thai researchers (Klungthanaboon, 2015). This may be explained by noting that researchers and scholars may have changed their attitude toward open access publishing due to the global trend toward open access publishing.

5.2.1.2 OA as a Tool for Creating Collective Knowledge

An assistant professor from the LIS field expressed the belief that not only authors (contributors) but also users or readers benefited from the scholarly products shared through OA publishing. As a result of this, collective knowledge could be produced. He stated,

> I agree with the idea of open access, both green and gold OA. I believe that the more we share, the more benefits both others and me can gain. This idea also helps authors spread their work out. The users accessing our work sometimes give us useful comments or feedback. We can do further research and grow the study areas we are interested in together. I mean that we can build 'collective knowledge' at last. (IW003)

Based on the assumption that knowledge building is regarded as interplay between the cognitive system and the social system, if a knowledge community uses information and communication technologies for that purpose, collective knowledge can appear and exist not only as the fragile product of communication activities within a community but also in a variety of digital artifacts, including chat log files, wiki articles, and weblog entries (Kimmerle, Cress, &

Held, 2010). This assumption about collective knowledge may be used to explain why the interviewee felt that open access could help to create collective knowledge.

5.2.1.3 OA Publishing as Important Tool for Reducing Information Inequality

Access to quality scholarly productivities such as research reports and peer-reviewed articles and quality educational materials is essential for the health of education and the growth of science. However, information inequality exists as a major issue in education, particularly in developing countries. The emergence of open access in the last decades, the adoption of both green and gold open access, and the idea of open education have helped to narrow down this gap between rich and poor countries as well as rich and poor universities. A lecturer from mathematics and computer science stated,

> Posting work in knowledge banks or OA journals allows equality of learning and enhances the research cycle. This will support the growth in science in general. Also, this can help other researchers, particulary in poor and developing countries, who may have a problem with a paywall and have limited access to high quality scholarly articles, to build upon the existing research freely available in institutional repositories (knowledge banks), subject repositories, and OA journals. (IV005)

Another lecturer in Biochemistry also stated that free access to scholarly works could help to narrow the information gap between scientists and researchers working in rich institutions with the ability to invest in research resources and those working in poor institutions with a limited budget. The interviewee compared his past experience working in two different research environments, one in the UK, where he had graduated, and the other in a research university in Thailand where he was working. He stated,

> When I was working as a researcher in a university in the UK, access to high quality scholarly information was not an issue. But I realize that this issue is becoming more relevant in the Thai context. I hope that OA can help to narrow this gap. I absolutely agree with the principle of OA and open access publishing, but I think the implications and implementation of both open access journals and open access repositories in Thailand are not there yet. (IV002)

It is clear that the interviewees believed that the full implementation of open access repositories may help to narrow the information gap and solve the issue of information inequality.

5.2.1.4 Acceptance of Open Access Journals

Although all interviewees expressed overall positive attitudes toward OA publishing, they had slightly different opinions on open access journals. Both of the interviewees from Science and Technology fields, including Biochemistry and Mathematics and computer science, indicated a familiarity with open access journals and expressed an acceptance of this alternative channel of scholarly communication. The Biochemistry faculty member stated:

> When I was studying my PhD in the UK, I worked with the Medical Research Council, UK. It is compulsory for researchers to make their research available by publishing in open access journals or depositing their work to open access repositories. Publishing in open access journals is more common in the UK. Although I prefer to publish in more prestige journals in my field, publishing in some peer-reviewed and accurate OA journals such as *PLOS Biology* and *PLOS Medicine* is a good idea. (IV002)

In addition, this interviewee had published several papers in open access journals; including *PLOS Biology*, *PLOS Medicine*, *Nucleic Acids Research*, *Biotechnology for Biofuels*, *Molecular & Cellular Proteomics*, *Genome Biology* by the BMC, and *eLife*. He also mentioned:

> Publishing in the top open access journals in life science and biomedicine, like *PLOS Biology*, is very competitive, since the rejection rates are high. Only outstanding research papers will get accepted. However, you need to be careful and should not publish in any open access journals listed in Bell's list of predatory publishers 2016. (IV002)

A lecturer from Mathematics and computer science expressed similar opinions on open access journals and predator publishers. Additionally, this interviewee showed a more positive opinion toward open access journals than traditional journals by stating:

> When comparing the two types of scholarly journals, I like open access journals more than traditional subscription-based journals, since I support the idea of open access. The term open access journals in this sense refers to only high quality peer-reviewed open access journals. I know that there are many predatory publishers out there that authors or

researchers should be aware of before submitting their work. Personally, I prefer only high quality OA journals. (IV005)

When comparing open access journals versus institutional repositories, both interviewees expressed similar opinions, showing that they were more familiar with open access journals than open access institutional repositories, particularly their university-based IRs. The biochemistry faculty member stated, "I'm more familiar with the University of Cambridge's repository. Honestly, I just became aware of MUIR when I was completing your survey" (IV002). The other lecturer from mathematics and computer science said:

> There are many misunderstandings among faculty members and researchers. I'm one who does not clearly understand OA publishing. I know that publishing in the Knowledge Bank and OA journals is different, but have limited understanding of the benefit of publishing in university-based IRs or the Knowledge Bank in my case. (IV005)

It can be seen clearly from the faculty members' standpoint that they understand open access and show a positive attitude toward OA journals. Publishing in high quality open access journals is acceptable to them. In addition, they are also aware of the negative side of OA publishing, as both of them mentioned avoiding publishing in journals published by predatory publishers listed in Bell's List of Predatory Publishers 2016. However, they expressed misunderstanding of institutional repositories, particularly their university-based IRs. This misunderstanding and ambiguity might lead them to delay their adoption. This can be seen from the statement of a lecturer in mathematics and computer science:

> There are some confusion and myths about open access and knowledge banks among us (faculty members in my faculty). If the faculty members don't clearly understand what the PSU Knowledge Bank is and what the benefit of publishing through the knowledge bank is, they won't be willing to do so. (IV005)

This finding is consistent with those of the previous study indicating that researchers in different disciplines have different attitudes toward open access publishing. It appears that none of the interviewees from the field of library and information sciences mentioned open access

journals and had experience publishing in open access journals, although, this group of respondents represented more knowledge and understanding of open access publishing and its principles. By contrast, two interviewees who were from biochemistry and mathematics and computer science were more familiar with open access journal and expressed positive attitude toward them. Previous study also found that researchers in science and technology fields were more familiar with open access publishing as compared with those in social sciences and humanities (Klungthanaboon, 2015).

5.2.2   Self-Archiving Experience

The qualitative data show that among the four interviewees who identified themselves as IR contributors or IR supporters, only three of them had self-archiving experience. However, the interviewees expressed both similar and different opinions and concerns on this topic. The following themes regarding mandated self-archiving, self-archiving culture, venues for self-archiving, and content types emerged from the discussion with the interviewees.

5.2.2.1 Mandated Self-Archiving vs. Voluntary Self-Archiving

Two different assumptions on mandated self-archiving are found in the literature. While some researchers believe that self-archiving mandate helps to increase faculty participation and populate content in institutional repositories, others think that mandatory policy is not the answer. Since currently, self-archiving in Thailand is completely voluntary, questions regarding interviewees' opinions on this topic were posted during the interview to determine whether the interviewees agreed on this topic. Interestingly, the interviewees expressed different opinions on this topic. Both a junior lecturer from the LIS field and a lecturer in Mathematics and computer science supported the mandatory policy and called for a self-archiving mandate. They also believed that a clear university policy on mandated self-archiving and a reward system could

help to increase faculty participation. The former stated several times during the interview that "I would be willing to deposit my work if the university launched a clear mandate policy asking faculty members to deposit work in the CUIR and had clear incentives in place" (IV001). A similar opinion was also expressed by the latter interviewee: "The university should acknowledge faculty members who deposit work into the knowledge bank and have a clear open access mandate policy or reward system for those who do so" (IV005).

However, a Biochemistry lecturer showed his disagreement on this issue, stating, "Libraries/librarians and IR developers should act as facilitators to facilitate communication between the library and faculty members. Depositing work into the MUIR should not be compulsory. The library should play a supportive role, not a policy role" (IV002). The same interviewee also stated that a mandatory policy should be applied to students' work such as theses, dissertations, and conference presentations, but a similar procedure might not work for faculty members. For this interviewee, MUIR was more appropriate as a students' showcase. It should be noted that the MUIR is different from other university-based IRs in the current study, since it houses only faculty work; any theses and dissertations are excluded from the collection.

It is clear that faculty members expressed different views toward mandatory self-archiving vs. voluntary self-archiving, indicating that both librarians and IR managers/developers should consider carefully before making any decision on whether to make self-archiving mandatory.

5.2.2.2 Self-Archiving Culture: Non-common Behavior in Thai Research University Context

Two contrasting opinions were expressed by interviewees in response to the question of whether making a work publicly available through university-based IRs and other open access forums is a common behavior. One assistant professor from the field of Library and Information

Science opined that this is quite common behavior. She stated, "Making academic works

publicly available through university-based IRs and other open access venues is quite common

behavior in my field" (IV004). On the other hand, four interviewees expressed the idea that self-

archiving work through university-based IRs was not a common behavior. A junior lecturer in

LIS field said:

> Depositing work or making work publicly available in both the CUIR and other open
> access forums is not a common behavior. Some scholars may view university-based IRs
> such as CUIR as an information resource that collects intellectual works of the scholars
> within the CU community; however, the majority of them do not consider it as a channel
> for scholarly communication. That is a reason why many of them do not deposit and
> distribute their work. (IV001)

The other interviewees from Biochemistry and Mathematics and computer science also

mentioned that self-archiving research work to university-based IRs was not a common behavior.

When comparing this behavior with publishing work in OA journals, these two interviewees

agreed that publishing in OA journals was more common in their field and department. The

former (IV002) stated, "Depositing work to the MUIR is not a common behavior. I know some

faculty members publish their paper in OA journals, but I have not heard any faculty in my

department mention MUIR." Similarly, the latter interviewee mentioned,

> I have never known any colleagues that publish their work in the knowledge bank or
> other open access venues. This is not a common behavior in my field, I mean in my
> faculty and department. Some people mentioned the PSU Knowledge Bank, but they did
> not deposit their work in the knowledge bank. I have heard that some people have
> published in open access journals. (IV005)

Based on the interviewees' responses, it is clear that self-archiving work in university-

based IRs is not a common behavior in the Thai research university context. However,

publishing work in OA journals, which are Gold Open Access is more common, especially for

faculty members from the science and technology fields. Both interviewees from the science and

technology fields stated that this behavior was more common in their field and also showed positive attitudes toward OA journals.

5.2.2.3 Venues for Self-Archiving

5.2.2.3.1   University-based IRs

The major focus of this study was to investigate whether the faculty members in Thai research universities had deposited their work in university-based IRs. Findings from the quantitative data analysis (Table 5.11) show that only a small proportion of the respondents (44 out of 176, 25%) had deposited their work through university-based IRs. Findings from the qualitative part also show similar pattern. It is interesting to note that although all interviewees had positive attitudes toward open access and considered themselves as IR contributors (n = 4), none of them had experienced posting their works to institutional repositories established by their respective universities. Two faculty members, one from LIS and the other from the field of biochemistry, mentioned that they had experienced depositing their dissertations to into the IRs of the universities where they graduated. For these two interviewees, depositing their dissertations into the university-based IR was a university requirement. A lecturer from biochemistry stated, "I have experienced posting my dissertation to Apollo, previously known as DSpace@Cambridge. There is a university policy requiring all PhD students to deposit their work into the repositories" (IV002). Although these two interviewees did not have experience self-archiving their work into university-based IRs, they expressed their interest in university-based IRs and mentioned that they might consider depositing their work in the near future under some conditions and factors regarding benefit, ease of use, and copyright. In addition, the other interviewee from mathematics and computer science identified himself as non-contributor but stated that he supported the development of the PSU Knowledge Bank, the university-based IR

developed by Prince of Songkla University, and was considering depositing his work in the near future. It is clear that university-based IRs have not been widely accepted and used for self-archiving by scholars in Thai research universities. However, the interviewees also mentioned other venues in which they have self-archived their works or in which they planned to self-archive in the future, including social networking sites and disciplinary repositories.

5.2.2.3.2   Social Networking Sites

Recently, there have been growing numbers of social networking sites available for scholars and researchers to disseminate their work and communicate with other researchers. Two popular sites are Academia.edu and ResearchGate.net. Findings from the quantitative part of the current study (Figure 5.2) show that respondents cited a number of social networking sites as venues for self-archiving, including ResearchGate.net, Facebook, Academia.edu, and Google Scholar. Among these social networking sites, ResearchGate.net seems to be the most popular site, mentioned by seven respondents in the survey. This social networking site was also the only social networking site mentioned by three interviewees. Those interviewees were: a junior lecturer in biochemistry who mentioned that he had self-archived his current research on this site (IV002); a junior lecturer in LIS who was a member of ResearchGate but had never published any work (IV001); and an assistant professor in the LIS field who was actively engaged in this social networking site and currently self-archived his work, which was a conference paper to ResearchGate.net (IV003).

While the first two interviewees did not mention anything in particular about this social networking site, the latter interviewee (IV003) provided a more detailed explanation regarding how he started participating in this site and the reasons behind his decision. The interviewee mentioned that participating in ResearchGate.net allowed him to communicate with other

scholars and researchers in LIS and other related fields, and this site also allowed him to track

the latest work of those researchers, their publications, and the sources that they had cited. This

interviewee said,

> A number of academics, researchers, and colleagues of mine, who were already
> ResearchGate.net members, are the reason for my choice of ResearchGate.net. I found
> that this site suits my primary purpose in terms of regularly connecting to the scholarly
> community in the field of information studies. (IV003)

Based on this quote, it appears that the popularity of the site among researchers in the IS

field and peer-influence are the primary reasons why this interviewee preferred using a social

networking site such as ResearchGate.net over CUIR (a university-based IR developed by his

university). Another reason was Web 2.0 user interface features that allowed him to easily

upload and disseminate his works through the site. However, there were some negative sides of

social networking sites mentioned by interviewees, including issues relating to long-term

preservation and access (IV003) and to such sites' ability to increase communication with peers

or other researchers (IV001). The latter issue was mentioned by a junior lecturer in the LIS since

she didn't believe that actively engaging in social networking sites could help to increase

communication with peers.

5.2.2.3.3   Disciplinary Repositories-bioRxiv

For some disciplines such as physics and mathematics, self-archiving preprint research

articles is a disciplinary norm. Findings from the quantitative part of this study (Figure 5.2) show

that among 61 faculty members who had made their work publicly available on the Internet, six

mentioned depositing work into subject-based or disciplinary repositories, including Pubmed,

BiomedCentral, London School of Economics, and Political Science. None of them mentioned

arXiv and bioRxiv. However, the interview data show that a faculty member from biochemistry

showed his interest in disciplinary repositories, particularly bioRxiv (http://biorxiv.org/), a

preprint server in life sciences and other related fields. He also mentioned that different from

physicists and mathematicians, life scientists and biologists did not have a preprint culture.

However, in the past few years, the depositing of unpublished preprints in bioRxiv has become a

norm in biology and life sciences. He also expressed his interest in depositing his work in

bioRxiv in the future, since depositing work in bioRxiv provides a chance for researchers to

distribute their research findings immediately to the scientific community. The interviewee

mentioned:

> Some disciplines, such as Physics, have arXiv.org for archiving and disseminating research papers before they are published in peer-review journals. Recently, we have bioRxiv (http://biorxiv.org/), which is the preprint server for biology, where authors can post unpublished preprints in life sciences to make their findings immediately available and get feedback from the community before submitting their final versions to journals. (IV002)

Clearly the interviewee valued the benefits that he could gain from depositing work into

disciplinary repositories and getting feedback from scholars in the same fields, who had similar

research interests. He also had favorable opinion toward disciplinary repositories regarding

plagiarism issues, as he indicated by stating:

> I think there is no need to worry about plagiarism. If you post your work to bioRxiv or other discipline-based repositories such as arXiv, you will have your name and date of publication on your published work. Therefore, other researchers know that you are the first author working on this research area. (IV002)

Similar findings were made in Kim's (2008) study. According to Kim (2008), two

professors in her study were not worried about plagiarism, since when they posted or deposited

their work to arXiv, the date and time would appear in their pre-printed articles. As a result,

plagiarism was not an issue for self-archiving pre-printed research findings in disciplinary-based

IRs.

BioRxiv was launched in 2013 and has been embraced by some pioneers in life sciences. Recently, its collection has expanded to cover all aspect of research in life sciences, and about 3,100 preprints have been deposited since it was launched (Callaway & Powell, 2016). The increased interest of biologists toward publishing preprints in disciplinary repositories such as bioRxiv may be explained by the success of the preprint culture of the pioneers in physics and mathematics. In addition, during the past few years, many major scientific journal publishers in biology have begun to allow researchers to preprint their manuscripts. Those publishers include Nature, Science, PLOS, Elsevier, and Springer. Additionally, some open access journals have launched their own preprint server. *PeerJ* has launched its own preprint server, called '*PeerJ* Preprint' (https://peerj.com/preprints). To date, the total number of submissions has reached 2,314 preprint manuscripts. All of these contribute to the increasing interest in self-archiving on the part of researchers, particularly in the science and technology disciplines.

5.2.2.3.4   Content Types

Although four out of five interviewees identified themselves as IR contributors, as some of their works had been made available through university-based IRs, none of them had had experience in self-archiving their works in university-based IRs. However, this group of interviewees and the other interviewee who considered himself as a non-contributor expressed different opinions and concerns regarding content types that they considered depositing in IRs in the near future, including peer reviewed articles, teaching materials, conference papers, presentations, posters, and data sets.

5.2.2.3.4.1 Peer Reviewed Articles

At the time of the study, none of interviewees had self-archived peer reviewed articles in their university-based IRs. However, all of them stated that they would prefer to deposit only

quality work such as peer reviewed articles and research reports, particularly the final versions, in the future. A lecturer from library and information sciences stated, "I would deposit only quality work such as peer reviewed articles and research reports, since these two types of work have already been peer-reviewed. The quality of work is the most important factor affecting my decision to deposit my work" (IV001). Similarly, a lecturer from biochemistry said, "For MUIR, I agree to deposit the final version of my paper (a published version), if it is allowed by publishers" (IV002). This interviewee also mentioned that he had published many articles in peer reviewed open access journals and knew that some journals, such as *PLoS One*, *Nucleic Acids Research*, and *Biotechnology for Biofuels,* supported open access and allowed authors to self-archive their work in other open access repositories, including university-based IRs. However, he had not self-archived his peer-reviewed articles in MUIR at the time. Although his two final versions of peer-reviewed articles were made available in MUIR, he stated that he had not self-archived them. That work had been done by the MU librarian. The interviewee also stated that he would be willing to contribute if he were contacted by a librarian and if the deposition process did not require more time and effort. Based on the interviewee opinion, personal contact with faculty is a good strategy for the promotion of IRs, as one interviewee stated that he would be willing to contribute if he were contacted by a librarian.

A lecturer in mathematics and computer science also mentioned that he would be willing to deposit his final work (a publisher's version/PDF) into the PSU Knowledge Bank in the near future if he were published in *BMJ,* which allows authors to publish under a non-exclusive license. Therefore, authors can use articles for non-commercial purposes without seeking permission from the publisher.

It appears that all interviewees intended to deposit only final versions of their work into university-based IRs. However, some of them also expressed concerns and uncertainty concerning whether it was legal to post a final version of their work (publisher's versions/PDFs) into university-based IRs. As a result, some faculty members, such as a lecturer from biochemistry and a lecturer from mathematics and computer science, indicated that they would be willing to deposit work published in open access journals that supported self-archiving, so they would not have to deal with the legal issue.

5.2.2.3.4.2 Teaching Materials

The survey data show that a small number of respondents had made course materials/lecture notes and course syllabi publicly available on university-based IRs (Figure 5.1) and other venues (Figure 5.3). A similar pattern was found in the analysis of the interview data. None of interviewees had made their course-related material available in such a venue. Particularly, two interviewees, one a lecturer in library and information science and the other a lecturer in biochemistry, stated that they would not agree to post course-related or teaching materials in university-based IRs or other publicly accessible web sites. These two interviewees provided different reasons. The faculty member from the LIS field stated, "I don't want to deposit teaching material such as Power Point Presentations or other course materials into the CUIR, since the materials are dynamic and constantly changing over time" (IV001). This interviewee also expressed concerns regarding the third-party copyright materials that she had utilized in her teaching materials.

Rather than the dynamic nature of teaching materials and copyright concerns, the biochemistry lecturer discussed an interesting case concerning students' use of teaching

materials available online. Actually, he had been afraid that if students could get access and download course materials more easily they might avoid coming to class. He stated:

> I would not agree to publish teaching materials or course-related materials, since students can get them more easily. If they can access and download course materials or examples of previous exams from MUIR, they might not come to class. There was an example for this issue. Recently, some Pre-med students decided not to come to class since they could download lectures, recorded from the previous year, from the e-learning system. I don't want to deal with this issue in my classes. (IV002)

The interviewee was extremely concerned about this issue and thought that it could provoke conflicts between teachers and students. To resolve this issue, the interviewee thought that "MUIR should not allow the faculty members to post any course-related materials" (IV002).

It is clear that copyright concerns, the dynamic nature of teaching materials, and issues related to how students make use of teaching materials are three major factors that make faculty members reluctant to post teaching materials. Two faculty members preferred to keep teaching materials private rather than make them publicly available on university-based IRs or any other open access repositories, although these faculty members identified themselves as contributors and supported the development of university-based IRs and the principle of open access.

5.2.2.3.4.3 Conference Papers

While the survey data analysis showed that only one respondent, who was an IR contributor, had self-archived a conference paper to a university-based IR, three interviewees mentioned conference papers as another type of research-related content for self-archiving. Interestingly, none of the interviewees had self-archived conference papers in IRs hosted by their respective universities, while some of them self-archive conference paper in other venues. Particularly, an assistant professor in the LIS field had posted his recent conference paper to ResearchGate.net. The other lecturer in a similar discipline mentioned that a conference paper of which she was a co-author was available in Purdue e-Pubs (http://docs.lib.purdue.edu/), an open

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access repository held by Purdue University Libraries. She noted that this conference paper was self-archived by her co-authors.

While a lecturer in biochemistry indicated that he had never self-archived his own conference papers to university-based IRs or other open access venues, he agreed that self-archiving conference papers and posters in university-based IRs might be an alternative way for a research showcase. This interviewee said:

> In my opinion, an institutional repository, particularly MUIR, is appropriate for archiving ongoing research work, including other research-related work such as conference presentations or posters of faculty. Students' work such as dissertations and theses, conference papers/posters, and other kinds of work should be accepted. (IV002)

This interviewee also showed willingness to share his conferences papers and presentations and stated that if his university-based IR accepted this type of research-related work. He also stated that he would like to encourage his students to share their papers and posters. It should be noted that currently neither faculty members' conference presentations/posters nor students' research-related work were allowed for self-archiving in MUIR.

The interviewees cited a number of reasons including perceived benefits of self-archiving conference papers as a research showcase for a work in progress (IV002) and the perceived absence of any negative impact from self-archiving conference papers, particularly copyright issues (IV003), as reasons why they had self-archived or were willing to self-archive this type of research-related work in such a venue.

5.2.2.3.4.4 Data Sets

Although there is a growing interest in research data sharing at a global level and self-archiving research data has become a common behavior and norm in particular disciplines such as ecology and molecular biology, findings from the quantitative part of this study show that

depositing data sets in not only university-based IRs but also other open venues was not a common practice in the Thai research university context. None of the IR contributors had made data sets available in university-based IRs (Figure 5.1), and only one respondent from the computer science field had made a data set available through any other public accessible venue (Figure 5.3). Similarly, the interview data show that only an interviewee in biochemistry expressed his intention to engage in self-archiving of research data, since his research involved creating a huge data set. Additionally, the interviewee cited the increasing concerns related to research data sharing within the scientific community as another reason why he was considering depositing and sharing his research data. The interviewee indicated by stating:

> To date, some scientific journals, as *Nature*, have declared their stand toward data sharing. Open access journals, such as *ScientificData*, have started accepting and publishing data sets. Also, there is a trend in scientific data sharing. Scientists in many fields have begun sharing data, including in biology and biomedical science. It would be great if we could put our data in a safe place. (IV002)

Although this interviewee declared his intention to deposit a data set into the university-based IR developed by his respective university in the near future, he expressed concern regarding the quality of university-based IR and doubts about whether he could trust the system. Additionally, the interviewee also mentioned issues related to human subjects and clinical data, which are very sensitive data. He mentioned, "If the university-based IR will allow faculty members to self-archive this type of data in the future, it is essential that they make clear policy regarding this issue and make sure that librarians can deal with it" (IV002).

Other interviewees, including three interviewees (two assistant professors and one lecturer) in the LIS field and another lecturer in mathematics and computer science, had never self-archived data sets and did not have any plan regarding this issue. All of them stated that their

research did not involve creating huge data sets as was the case for other faculty and researchers in other science fields.

5.2.3   Factors Hindering or Motivating Self-Archiving

Each of the interviewees showed both similar and different opinions concerning university-based IRs and factors hindering or motivating them to deposit their work, opinions which are examined and discussed in the following section.

5.2.3.1 Trustworthiness

For the current study, trust toward IRs was proposed as an important factor affecting faculty members' decisions to deposit work in university-based IRs. However, this factor was found not significant (β = -0.11, p = .096). Contrast with the quantitative findings, most interviewees mentioned trustworthiness as an important factor in decisions regarding contribution to university-based IRs. A senior lecturer in the LIS field mentioned trustworthiness as a reason behind her decision to contribute. She stated, "CUIR is trustworthy, and the system is reliable" (IV004). Similarly, the junior lecturer in LIS emphasized trustworthiness and ranked trust toward IRs as the first important factor that would affect her decision to contribute to the CUIR and other open access repositories in the near future. This interviewee stated, "the accuracy and trustworthiness of an IR can affect my decision whether to deposit my work in a particular venue such as the CUIR or other open access repositories" (IV001). This also can be interpreted to mean that failing to establish trust among faculty members toward IRs may delay their participation in them. A junior lecturer in biochemistry whose research involved creating a huge data set expressed concern about this issue and compared two university-based IRs, one developed by the university where he graduated and the other operated by his respective

university, while he was talking about archiving scholarly work and research data in university-based IRs:

> An archiving system such as MUIR can be a good archiving system for scholarly work, like the one in Cambridge. However, the University of Cambridge's repository has been established for a long time and the system is stable and can guarantee long-term accessibility and preservation. If MUIR or other open access repositories in Thailand had equal quality, I would be the first one to contribute and publish my work, I mean work that has never been published anywhere else, including research data. … It would be great if we could put our data in a safe place. I don't know if I can archive my research data in MUIR, and also I wonder whether I can trust the system. (IV002)

It is clear that scholars in the Thai research university context also emphasized trustworthiness of IRs and viewed it as an essential factor that might affect their decision whether to contribute or deposit their work in an IR. This finding is in line with that of other previous studies conducted in different contexts. Kim (2008) also found that some interviewees in her study expressed concern about the issue of trust, and the low level of trust made them hesitate to self-archive in IRs.

5.2.3.2 Ease of Use and Additional Time and Effort

For the current study, ease of use was regarded as one factor that might affect faculty members' decisions to deposit their work into university-based IRs; however, results from the quantitative analysis failed to identify this factor as important factor affecting faculty acceptance and use of university-based IRs. In the discussion with the interviewees, two faculty members who had self-archiving experience expected the content deposition process to be easy. A lecturer from the LIS field noted that she had had a difficult time understanding guidance for depositing work. The interviewee recalled her experience when she self-archived her dissertation in the IR of the university where she graduated: "I think the content deposition is a somewhat complicated process. I have had a difficult time understanding the guidance, since it was written in English. I expected the deposition process to be easy" (IV001). The other lecturer from biochemistry noted,

"The depositing process of the institutional repository where I graduated is very easy, simple, and straight-forward. I did it myself. I uploaded the PDF file of my dissertation and typed in some metadata fields. That's all." The interviewee continued:

> I spent no more than ten minutes depositing my dissertation to the University of Cambridge Repository. If an author would like to deposit something, it should be easy. Personally, if the depositing process of the MUIR takes more than ten minutes, I'll probably ask my student assistant to do it for me. (IV002)

It is clear that this interviewee was concerned with not only ease of use but also additional time and effort that he would spend in the content deposition process. The other assistant professor in LIS field, who self-archived his work in ResearchGate.net, said, "The ReseachGate.net provides me with an easily understandable interface like other social networking sites I meet in everyday life. There is no need to read any instructions before use. I can upload my work effortlessly" (IV003). He also clearly stated that he would be willing to deposit his work if the repository of his respective university were developed based on Web 2.0 technology and was easy to use. The interviewee stated, "It would be preferable to its rivals if the university-based IR (CUIR) was developed in Web 2.0 form like ResearchGate.net" (IV003). It is clear that the interviewee valued ResearchGate.net due to its ease of use. This interviewee also mentioned that he would continue self-archiving his work in that social networking site so that he could stay connected with his colleagues in the LIS field.

Like the IR contributors, a non-contributor from mathematics and computer science with no self-archiving experience also agreed that an easy content depositing process could help in recruiting and encouraging some faculty members to become engaged in depositing work.

Thus, not only interviewees with previous self-archiving experience but also an interviewee without self-archiving experience expected the content deposition process of university-based IRs to be easy and to require little additional time and effort. Additionally, a

Web 2.0-like user interface was suggested as an approach for designing and improving the user interface of university-based IRs.

Regarding the interviewees' past experience with self-archiving, it is clear that all contributors expected the content depositing process to be easy. It may be assumed that ease of use in the content depositing system may help to motivate faculty members to deposit their work. In other words, additional time and effort required to deposit work can be considered as a major barrier to self-archiving, and this barrier may delay faculty members' decisions to contribute to university-based IRs. One interviewee clearly explained his concerns regarding this issue. A similar pattern was also found in previous studies. For instance, Kim (2008) identified extra time and effort as a barrier to participants' self-archiving practices, and this issue tended to be mentioned in connection with the technical skills necessary for self-archiving. However, extra time and effort in Kim's (2008) study were mentioned by interviewees who had no self-archiving experience. In the current study, conducted in a different context, additional time and effort in content deposition were mentioned by faculty members having previous experience depositing their works in both university-based IRs and social networking sites like ResearchGate.net. It is clear that based on their past experience, this group of faculty members still preferred an uncomplicated submission process that did not require additional time and effort. This finding is also similar to that of a previous study conducted in the same context. In the study of stakeholders' perspectives on institutional repositories in the National Research University in Thailand, Klungthanaboon (2015) identified the complicated submission process and additional time and workload as barriers to self-archiving and participation in university-based IRs. In addition, technical skills seem not to be an issue since none of the interviewees in the current

study mentioned this issue. This might be due to the fact that most interviewees in the current study were junior faculty members and had the skills necessary to deal with content deposition.

5.2.3.3 Global Visibility and Popularity of IRs

One major objective for developing and implementing institutional repositories is to create global visibility for the host institutions and research by their faculty. One assistant professor in the LIS field who considered herself as an IR contributor mentioned global visibility as one important factor that affected her decision to make her work available through a university-based IR, the CUIR. This interviewee mentioned, "I decided to make my academic work available in CUIR, since it can be globally and publicly accessible" (IV004). Additionally, global visibility was mentioned along with the popularity of IRs or other venues by a lecturer (IV001) and by another assistant professor (IV003) in the LIS field. The former mentioned that she considered the popularity of IRs or other venues as an important factor affecting her decision on whether to contribute, since it will help to increase the visibility of work after it is deposited (IV001). The assistant professor (IV003) also mentioned the popularity of the source and global visibility of work after it had been deposited as a factor in his decision to actively engage in ResearchGate.net. He stated, "I have deposited my work in ResearcGate.net because it makes my papers known in the global online community of the IS field" IV003. It can be concluded from the conversation with these two interviewees that both of them were concerned that the IR developed by their respective university lacked this advantage, since it was not fully open access as were other university-based IRs. This may be interpreted to mean that, if a university-based IR is not popular and does not have the potential to increase the visibility of its institution or the institution's faculty's research, it is less likely to gain any attention from its community, particularly from faculty members.

5.2.3.4 Benefit: Academic Reward

All interviewees mentioned that posting or self-archiving their scholarly work, such as journal articles, research reports, and teaching-related materials, was not a priority task for them and that they did not see any benefit of posting or self-archiving their work. For all of them, depositing work to university-based IRs was absolutely voluntary; therefore, they did not want to put in effort without seeing any benefit, particularly clear academic rewards. A junior lecturer in LIS stated, "I don't see any benefit of depositing work in the CUIR. Doing so also requires more work and effort, so many faculty members do not want to get involved" (IV001). The interviewee continued, "Many faculty members in the CU community do not perceive any benefits and do not consider it as important or as a high priority task. That is one reason why many of them do not deposit and distribute their work" (IV001).

The benefit of self-archiving in a university-based IR was also mentioned by a biochemistry lecturer. The interviewee expressed the idea that merely promoting the positive impact of self-archiving in terms of increased citation rates might not be enough: "the library should clearly state how we as faculty members can benefit from depositing our work, in terms of academic rewards" (IV002).

Additionally, another interviewee, who was a lecturer in mathematics and computer science without any self-archiving experience, also expressed a similar opinion regarding this issue, saying, "If the faculty members don't clearly understand what the knowledge bank is and what the benefit of publishing through the knowledge bank is, they won't be willing to do so" (IV005).

It is likely that a clear mandatory policy that addressed clear academic rewards could help to deal with this issue. A junior lecturer from the LIS field stated:

In my opinion, the university mandatory policy on open access and self-archiving has a direct effect on faculty members' decisions about whether to deposit their work. As I've said, a clear reward system can motivate faculty members to deposit their work. The reward system may include but not be limited to giving credits for self-archiving, using self-archiving as one indicator for evaluation, or recognizing and acknowledging those who contribute to the CUIR. (IV001)

A similar opinion on rewarding systems was also expressed by a lecture in mathematics and computer sciences, who stated, "The University should acknowledge faculty members who deposit work into the knowledge bank and have a clear policy or reward system for those who do so" (IV005).

Based on the interviewees' opinions, it is concluded that faculty members value benefits, especially in the form of an academic reward system. The academic reward systems proposed by interviewees include giving credit or acknowledging those who self-archive and using self-archiving as an indicator for evaluation. The appropriate reward system could not only help to increase the uptake of IRs but also help to populate their content.

5.2.3.5 Altruism

In this study, altruism refers to faculty members' altruistic motivation to self-archive. This factor was measured based on the extent to which faculty members reported having a clear perception of the principle of open access and having notions about helping others to access and build on research work, particularly those who had difficulties in accessing scholarly work. Three interviewees mentioned that open access and self-archiving scholarly work in OA repositories allowed other researchers to benefit from that work. A junior lecturer in LIS stated, "Open access publishing provides opportunities for scientists, researchers, and others in academia in different geographic locations to access, use, and benefit from scholarly work free of charge" (IV001). The other assistant professor in the same field, who supported open access and had benefited from using work shared by other scholars, strongly believed that the more they

shared the more they gained. This interviewee thought that "we can do research further and grow the study areas we are interested in together" (IV003).

In addition, a lecturer from mathematics and computer sciences pointed out that as both teacher and scientist, he had benefited from unrestricted access to research work and teaching materials. The interviewee said:

> As I am a teacher and researcher, unrestricted access to research work and teaching material*s* allows me to access and benefit from using those materials not only in classes but also in my research without worrying about the paywall system. As a scientist and a user of scientific productivity, I feel that open access repositories are important information sources that offer oppotunities for researchers from around the world to access research papers that are freely available. In general, OA allows equality of learning and enhances a research cycle that will support growth in science, particularly in developing countries. (IV005)

This interviewee concluded that the principle of open access was essential and said that his belief that local researchers should benefit from his public funded research motivated him to share his works with other researchers, not only in the university community but also at the local and the global level. This was the reason that he planned to self-archive his work in a university-based IR if he could publish in an OA journal. The interviewee stated:

> I agree that making my work publicly accessible on the web or any other open access venues can help other researchers to build on my research, particularly researchers in Thailand and other developing countries in Asia and Africa and other areas around the world. (IV005)

Similar to the previous study by Kim (2008), the current study also found that faculty members were encouraged by reciprocal altruism more than by true altruism. Reciprocal altruism happens when "scholars or researchers want to reciprocate after receiving benefits from using OA content by giving back to other researchers through self-archiving their research" (Kim, 2008, p. 192).

5.2.3.6 Copyright Concerns

For the survey part of this study, the respondents' copyright concerns were measured by a set of questions regarding whether the respondents agreed that 1) they needed to ask permission from publishers to post their work on university-based IRs, 2) they might infringe on copyright if they posted their work on university-based IRs without permission, 3) they needed to ask for permission from co-authors or collaborators to post their work on university-based IRs, and 4) they could not publish their works if they posted them on university-based IRs before publication. Results indicated that copyright concerns did not have a significant direct effect on faculty members' actual usage of university-based IRs ($\beta = 0.01$, $p = .893$).

In the qualitative part of this study, all of the interviewees expressed concerns and uncertainty regarding copyright issue. One interviewee, a lecturer in LIS, cited copyright issues as the most important factor for her to consider before posting or depositing her work. She stated "I am concerned about the copyright issue. If I would like to deposit my work, I would probably consider the publisher's policies on open access. This is the most important factor that affects my decision as an author whether to deposit a piece of work" (IV001).

Specifically, one lecturer from the LIS field expressed concern regarding 3rd party copyright materials and whether it was legal to post dissertations or other research-related materials with 3rd party copyright materials, such as images and diagrams. She stated, "I've done the depositing work by myself. However, I had an issue about the 3rd party copyright materials, particularly images and diagrams, to be included in my dissertation" (IV001).

Some of interviewees also felt uncertainty regarding whether it was legal to post the final versions of their work (publisher's versions/PDFs) to university-based IRs (IV002 and IV005). A lecturer from biochemistry explained:

My concern is about the copyright issue. I wonder if I could post the final PDF versions of my work on MUIR. I just know that if my papers were published in OA journals, I could get them linked to my profile in social media sites such as ResearchGates right away. (IV002)

Since these two interviewees did not want violate the copyright issue, they indicated that they would be willing to deposit work published in open access journals that supported self-archiving, so they did not have to deal with the legal issue. For instance, a lecturer from biochemistry mentioned that if he were contacted by the librarian, he would be willing to post published versions of his articles published in open access journals to MUIR. A mathematics and computer science lecturer also stated that he planned to deposit a final version of his article to the PSU Knowledge Bank, if he were to be published in *BMJ (British Medical Journal)*, which allows authors to publish under a non-exclusive license.

The interviewees were asked whether they had been aware of the existence of SHERPA/RoMEO (http://www.sherpa.ac.uk/romeo/index.php), where they can check publisher copyright and self-archiving policies by themselves. All interviewees who were faculty members in the LIS field had been aware of that site, while faculty members from both biochemistry and mathematics and computer science had not heard about it. A junior lecturer from the LIS field pointed out:

Some faculty may have concerns about some issues such as copyright, publisher policy, and funding agency policy, but they may not have time to learn more about these issues since depositing work in CUIR is not a high-priority task. If the library/librarians want to populate IR collections, they should work actively to help faculty members to resolve these issues.

A faculty member from biochemistry also mentioned that it would be beneficial if the library could help faculty members to check with publisher policies on self-archiving. Findings from the follow-up interview indicate that the copyright issue seems to be the most important issue that concerns all interviewees. Both IR contributors and non-contributors were uncertain

whether they were allowed to make published materials accessible on university-based IRs. It also appears that tools like SHERPA/RoMEO that can help authors to check publisher information were not widely known, particularly among faculty members in other disciplines. It is essential that libraries promote this tool or take responsibility to learn about publisher policy on open access and self-archiving on the behalf of faculty members.

5.2.3.7 Long-Term Preservation and Access

One objective that drives an institution to develop institutional repository is to provide long-term preservation and access for the digital assets of its community. However, findings from the qualitative data analysis in this study showed that interviewees had different opinions regarding long-term preservation. Three interviewees agreed that in general depositing work to university-based IRs or other open access forums provided safety (long-term preservation) and long-term accessibility for scholarly work. While an assistant professor in LIS mentioned that long-term preservation depended on the data curation plan and policy of each university, a junior lecturer in the same field expressed the view that the institutional repository developed by her respective university failed to address issues related to long-term preservation. She said:

> The CUIR neither provided any information regarding this issue nor mentioned any plan for long-term preservation. Therefore, I'm not sure whether they have any plan for long-term preservation. (IV001)

By contrast, a lecturer in mathematics and computer science strongly believed that the university-based IR was a source for long-term preservation for both the journal articles and the research papers of its community. The interviewee gave an example:

> In some cases when you publish your work with some publishers, if those publishers stop publishing journals that they have published or if the library discontinues subscription to online databases or journals due to financial constraints, users will no longer to be able to access their work.

The interviewee then concluded that this issue could be solved by the depositing of work in university-based IRs. It is interesting that although this interviewee did not have self-archiving experience, he had positive opinions about self-archiving in university-based IRs.

Alongside the interviewees' opinions on long-term preservation by means of university-based IRs, an assistant professor in LIS who had self-archived his work on a social networking site addressed the issue of long-term preservation of work on social networking sites. He stated, "Honestly, I used to worry about this issue. Because of the popularity of ResearchGate.net, I hope it will last long enough. All my work is regularly uploaded on GoogleDrive as a back-up" (IV003).

It is clear that interviewees expressed concerns regarding long-term preservation in both university-based IRs and social networking sites. Despite the fact that university-based IRs in this study have been operated for a long period of time, some of them still did not have a long term preservation plan in place. If one of the major aims of university-based IRs is for long-term preservation and access for the digital assets of its community, an absence of a clear preservation plan may create confusion. Yakel et al. (2013) noted that the guarantees of preservation and sustainability are important factors to all IRs stakeholders, particularly for faculty members. The current study confirmed that long-term preservation should not be ignored. It should be considered as a motivating factor for IRs contribution. It is essential for academic libraries and other IRs developers to explicitly state the strategy for long-term preservation and sustainability of the IRs to the users or designated communities, which can help to establish trust in IRs. This in turn will lead to more deposition and use. On the other hand, uncertainty regarding the long-term preservation and sustainability of scholarly content and IRs themselves might make some authors reluctant to deposit their work into IRs.

5.2.3.8 Social Influence

Results from the quantitative part of this study revealed that social influence is an important factor that affected faculty members' behavioral intention to use university-based IRs ($\beta = 0.46$, $p < .001$). Findings from the interviews supported the quantitative part. Some interviewees' intention to participate in social networking sites was influenced by their peers and funding agencies. For instance, an assistant professor in LIS field mentioned that he was encouraged by his supervisor to participate in social networking sites. This interviewee stated "my ex-PhD supervisor invited me online to join ResearchGate.net" (IV003). Additionally, peer pressure appears to be an important reason that made this interviewee continue to actively engage in this social networking site. He mentioned, "a number of academics, researchers, and colleagues of mine, who have already been ResearchGate.net members, are a reason for my choice of ResearchGate.net" (IV003).

A lecturer in biochemistry explained that his decision to publish in open access sources when he was studying in the UK was a result primarily of peer pressure. He stated:

> The university policy, faculty members (particularly my supervisor), and colleagues' thoughts about open access influenced me to publish in open access resources. (IV002)

By contrast, this interviewee mentioned that peer pressure did not currently affect him since "in Thailand publishing in either open access journals or repositories is not a common behavior" (IV002).

The context of self-archiving also appears to be an important factor relating to peer pressure. The interviewees were also asked whether their funding agencies affected their decision to self-archive. Only a lecturer from biochemistry responded to this question, stating:

> I worked with the Medical Research Council, UK, while I was studying for my PhD. It is compulsory for researchers to make their research available by publishing in open access journals or depositing that work to open access repositories. The funding agency also

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provides support for all publication cost (the author-pay model). Different from the UK, in Thailand the funding agencies do not provide support for publication, particularly for open access journals, and do not ask researchers to self-archive their works in open access. I'm not aware of any funding agency policy that supports open access or open access publishing in Thailand (IV002).

However, two interviewees, an assistant professor and a junior lecturer in LIS field from the same university, perceived no influence from either peers and faculty or the department regarding self-archiving. Both of them considered themselves as contributors. Their work was deposited to university-based IR by librarians. An assistant professor stated:

> Other people's opinions do not affect my decision to deposit my works to CUIR, since I already know the advantage of using the institutional repository. The opinions of other people such as university, faculty, and department do not affect my decision to make my works available. (IV004).

Similarly, a junior lecturer stated "In the case of CUIR, depositing work into CUIR is absolutely voluntary. Other people's opinions do not affect my decision" (IV001).

Findings from the qualitative part showed that social influence affected only some interviewees and can be used to explain their intention to self-archive or share their work through other open access venues in some cases. Since self-archiving or posting scholarly work in university-based IRs is completely voluntary in the Thai research university context, this finding can be taken to confirm that the social influence factor may be useful to explain the acceptance of technology in both mandatory and voluntary contexts.

5.2.3.9 Facilitating Conditions

For the current study, facilitating conditions refers to the degree to which faculty members believe that there are guidance, people, and technical infrastructure available to support their use of university-based IRs. It appears from the survey of the websites of all participating institutions that only some participating libraries are already provided online guidelines. Those who relied solely on DSpace software simply used a link to DSpace Help; however, specific

guidelines tailored to fit their institutional context were not provided. Therefore, interviewees asked for more personalized guidelines and expressed preferences and suggestions.

5.2.3.9.1   Online Guidance

Three interviewees indicated that online guidance should be made available. More specifically, a lecturer in biochemistry preferred short and easily understood guidelines. He said, "Guidance, such as online pamphlets, should be short and clear. A short and easy depositing process would be helpful" (IV002). The guidelines should cover important topics such as the benefits of the university-based IR (IV001), author-self archiving guidelines and requirements (IV002), and open access publishing guidelines (IV005). A lecturer from mathematics and computer science also mentioned that the library might create separate guidelines for each topic, since nobody would want to read long guidelines.

5.2.3.9.2   Personal Consulting Services

A junior lecturer in LIS field suggested that library should provide personal consulting services to help faculty members who might have a problem with content deposition process. This faculty member recalled her experience while she was depositing her dissertation into university-based IR where she graduated. She mentioned that although the deposition process was not difficult since there were guidelines and online tools available, she still needed to consult with a librarian personally, particularly on some issues related to copyright. However, only online consultant via email was provided at that time. This suggestion should be considered by librarians and IR developers if they want to improve or launch new IR-related services that are more closely tailored to their community members' needs.

5.2.3.9.3   Meetings and Workshops

It is interesting to note that training and workshops in in some specific topics were

thought to be needed. In fact, three out of five interviewees mentioned this. The topic of

meetings and workshops may cover but not be limited to:

1) Benefits of university-based IR. A lecturer in the LIS field stated:

there should be a continuing meeting/workshop that establishes a discussion on the CUIR within the community. It is essential that the library make the faculty members (authors and contributors) understand the real benefits of CUIR, which in turn will lead to more contribution and use.

2) Training and workshops on the content deposition process, a topic which was

mentioned by a lecturer in biochemistry and a lecturer in mathematics and computer science. The

former interviewee stated, "A short training session on content deposition (no more than 3 hours)

would probably be okay. If the training session is more than 2 such days of training, no one will

participate" (IV002). Similarly, the latter interviewee stated:

Libraries can provide support by organizing workshops on the content deposition process and on how to access and use the PSU Knowledge Bank. Even though depositing work to the knowledge bank is easy and may not require more work, learning by doing during the workshop will provide good experience for the users and may make them more comfortable and willing to deposit more work. (IV005)

This interviewee also suggested that libraries should promote the use of university-based

IRs, particularly the PSU Knowledge Bank, both on and off campus. Then local researchers

around the university community could benefit from these resources. He explained:

The promotion of IRs, particularly the PSU knowledge bank, should be done both on and off campus so local researchers around the univesity community could benefit from freely available public funded research. Some local researchers cannot reach international open access repositories and journals due to language barriers and technological barriers. It would be good if the library could help them to reach invaluable resources in the knowledge bank. (IV005)

The interview data analysis shows that faculty members in the current study expressed

their need for particular guidelines and services that are tailored to meet their preferences.

Relying on only the existing guidance and limited services may not help to improve faculty

participation and expand IR collections. Librarians and IR developers need to go beyond user expectations and work more actively if they want to succeed in this effort. Additional guidelines and services may need to be implemented.

5.3   Summary

This chapter reports the findings of the study. The descriptive statistic section reports the frequency and percentage of demographic data, the usage of university-based IRs, and respondents' opinions on the usage of content available in IRs. The path analysis section is provided to test the hypotheses of the study. Of the ten hypotheses, only five of them were supported. The trimmed path model was also proposed as the final model that is best fit for the observed data concerning factors affecting faculty acceptance and use of university-based IRs in Thai research university context. Chapter 6 summarized the findings of the study and presents conclusions and implication.

CHAPTER 6

DISCUSSION AND CONCLUSION

The primary purpose of this study was to identify factors affecting faculty acceptance and use of university-based IRs in the Thai research university context. This study explored the relationship and relative importance of factors that influenced users' intentions and behavior regarding the use of IRs. This chapter discusses the results of hypothesis testing and the answers to the research questions. The results are summarized in the summary of findings section. Additionally, opportunities for future research and the limitations of this research are presented. Finally, practical recommendations concerning factors affecting faculty member acceptance and use of university-based IRs in the Thai research university context are also provided.

6.1   Summary of Findings

This section presents the major research findings, hypothesis testing, and answers to the research questions. The proposed research model was tested in the context of the adoption of university-based IRs by faculty members in Thai research universities. This study tried to answer three major research questions. The first question concerned faculty members' acceptance and usage of university-based IRs. The second question concerned factors affecting their decision to use university-based IRs. Finally, the third question addressed how those factors affected faculty members' acceptance and use of university-based IRs in the current situation.

6.1.1   Faculty' Acceptance and Usage of University-based IRs

The first research question—*to what extent do faculty members in Thai research universities accept and use university-based IRs?*—focused on whether faculty members accepted and made use of university-based IRs. Based on technology acceptance theories, user acceptance is "the demonstrable willingness within a user group to employ information

technology for the tasks it is designed to support" (Dillon and Morris, 1996, para. 4). More importantly, the absence of user acceptance is a significant impediment to the success of new information systems. For this study, faculty members' acceptance of IRs was determined based on their awareness and usage of university-based IRs, as well as their intention to use this alternative channel of scholarly communication in the future. The following sections provide answers to the first research question by briefly providing information on the respondents' backgrounds and then addressing faculty members' IR awareness, status as IR contributors or non-contributors, IR usage, and current self-archiving practice in other venues.

The total number of respondents in this study was 176 faculty members from four research universities in Thailand. There were 99 female participants (56.2%) and 77 male participants (43.8%). The ages of the respondents ranged from 25 to 66 years. The largest number of the respondents were aged 25-39 years (84, 47.7%). Most of the respondents were from science disciplines, including 71 (40.3%) respondents from other sciences and technology disciplines and 49 (27.8%) respondents from the medical and health sciences, as compared to 50 (28.40%) respondents from the humanities and social sciences. In terms of academic positions, slightly more than half of the respondents were instructors and lecturers (101, 57.4%), followed by assistant professors (48, 27.3%), associate professors (21, 11.9%), full professors (3, 1.7%), and researchers (3, 1.7%). Most of the respondents held Ph.D. degrees (138, 80%). It was evident that the respondents had been actively engaged in scholarly communication prior to the study. More than three-fourths of the respondents (136, 77.3%) had published at least 1-2 articles per year, and some of them had engaged in several scholarly activities, as shown in Table 5.3. This fact may be explained by the promotion criteria currently in place, which required an individual to publish several articles in recognized publications (both national and international journals) in

order to move from the rank of a lecture/instructor to the upper levels (assistant professor, associate professors, and full professor). In terms of Internet usage skills, overall, faculty members were confident that their Internet usage skills were sufficient for accessing and disseminating scholarly information. However, their level of confidence in their ability to search for and access scholarly information on the Internet varied by age. Faculty members aged 50 years and over indicated that they had significantly lower confidence in their ability to search for and access scholarly information on the Internet than those who were 25-39 years ($U = 711.50$, $p = .013$, $r = - 0.23$) and 40-49 years ($U = 476.00$, $p = .012$, $r = - 0.27$). The lack of confidence in their ability to search for and access scholarly information on the Internet might have prevented them from gaining access and from benefiting from the use of university-based IRs and other open access forums. Kim (2008) identified age as the second most significant barrier to self-archiving. Kim found that younger faculty members tend to self-archive a greater percentage of their work than do older faculty, since they are more familiar with publishing and disseminating their work on the Internet. Inadequate Internet search skills and technical skills were identified as one factor that constrained self-archiving and the use of this type of scholarly communication (Ivwighreghweta & Onoriode, 2012; Kim, 2008; Okoye & Ejikeme, 2011).

6.1.1.1 IR Awareness and Acceptance

The 176 faculty members, the majority ($N = 129$, 73%) had been aware of university-based IRs. The faculty members' awareness of IRs did not differ significantly by discipline or academic position. The larger proportion of faculty members in all disciplines and academic positions, except full professors, had been aware of the development of university-based IRs prior to this study. The high proportion of faculty members who had been aware of IRs may be explained by the current stage of IR development. All of the university-based IRs in this study

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had been operated for more than five years. One of them was the first university-based IR developed in Thailand and had operated since 2006.

When the faculty members were asked whether the development of university-based IRs was important, the majority of them (153, 87%) thought the development of IRs for archiving and disseminating scholarly work and teaching materials was important, while only a small proportion of them (23, 13%) thought that it was not important. Faculty members who had been aware of university-based IRs were more likely to agree that the development of IRs was important, as compared to those who had not been aware of IRs, χ^2 (1, N = 176) = 8.77, p = .003 (Table 5.18). Additionally, their opinions on the importance of the development of IRs varied significantly by academic position. In fact, the majority of faculty in all academic positions agreed with the importance of IR development, with the exception of all of the full professors, who thought that it was not important.

Many researchers have found that the success of IRs depends mainly on faculty participation and the numbers of items contained in the IRs (Markey et al., 2007, Shearer, 2003; Tribodeau, 2007; Yakel et al. 2009; Xia & Sun, 2007). This study found that the high rates of faculty awareness of IRs and their agreement with the importance of IRs did not reflect the success of university-based IRs in terms of faculty participation. Although nearly three-fourths of the respondents (129 out of 176, 73%) had been aware of IRs, only one-fourth of the respondents (44 out of 176, 25%) had participated and deposited their work into IRs. However, there was a statistically significant relationship between the respondents' awareness of IRs and whether they contributed to the university-based IRs, χ^2 (1, N = 176) = 5.12, p = .024, ϕ = .17). This suggests that faculty members who had been aware of IRs were more likely to contribute and deposit their work. In fact, most of the contributors (38 out of 44, 86.4%) were faculty

members who had been aware of IRs, as compared to six (13.6%) respondents who had not been aware of IRs but who considered themselves as contributors.

Interestingly, the numbers of faculty members who had been aware of IRs but had never deposited any work seems very high (91 out of 129) (Table 5.9). It is essential that IR developers pay attention to this group of faculty members who may be aware of IRs but have not yet contributed any work to them. It may be necessary to carry out an in-depth user study to understand this group of faculty members, to identify their specific needs, and to discover the reasons for their reluctance to contribute. The results could indicate a better strategy to persuade them to contribute to the university-based IRs, which in turn could lead to a growth in the number of collections, thus attracting a greater number of users.

Despite the fact that the majority of respondents across academic positions had agreed that the development of university-based IRs was important, some of them were still not willing to deposit their work, and a number of them were uncertain whether or not to participate. Clearly, the high proportion of non-contribution to IRs is in contrast with the participants' opinions about the importance of the development of university-based IRs. There were 132 non-contributors. Among the 132 non-contributors, 56 (42.4%) indicated that they would be willing to deposit their work in university-based IRs in the near future, while 23 (17.4%) said they would not be willing to deposit their work. It should be noted that more than one third (53, 40.2%) remained uncertain about whether to contribute to university-based IRs. The number of non-contributors who remained uncertain about whether to contribute was nearly equal to the number of those who indicated that they would be willing to contribute. It is essential that IR developers and staff pay more attention to this group of faculty members.

Two major reasons cited by both faculty members who had not made a decision about whether to contribute and those who were not be willing to deposit were a) absence of submission guidelines and lack of knowledge/information about IRs, as well as b) the perception that there were no benefits of using IRs. This may suggest that although many faculty members stated that they were aware of IRs, they did not really understand what IRs were or what their real benefits might be. Similar issues were identified in a previous study conducted in a similarly context and showing that a low rate of awareness and misconception of IRs were the major issues related to IR development and implementation in Thailand (Klungthanaboon, 2013). If libraries can paint a clearer picture of the university-based IRs and their benefits and provide user manuals or depositing guidelines, more faculty members might change their mind and want to participate and deposit their work into university-based IRs. If IR developers or IR staff were able persuade these groups of non-contributors to become contributors and deposit their work, the result would be growth of university-based IRs in terms of contents and participation.

Contrary to the findings of Kim (2008), where most of the full professors were IR contributors, among the participants in this study, none of the full professors were IR contributors. Additionally, none of them agreed that the development of IRs was important; thus, they would not be willing to contribute their work to university-based IRs. Although there were only three full professors participating in this study, their opinions on IRs may well be important. If the junior faculty members look to them for guidance and leadership, they might also decide not to deposit their work into university-based IRs. Indeed, the findings in this study showed that social influence had a positive direct effect on faculty members' behavioral intention to use university-based IRs ($\beta = 0.42$, $p < .001$).

6.1.1.2 Content and Review of Repository Content

Not surprisingly, about a half of IR contributors had deposited theses and/or dissertations, (21, 47.7%), followed by journal articles (17, 38.6% (mostly pre-refereed articles) and research reports and technical reports (15, 34.1%). Other materials that the contributors had made available through university-based IRs were course-materials and lecture notes, books and book chapters, and course syllabi. *OpenDOAR* also lists journal articles, theses and dissertations, unpublished reports and working papers, and conference papers as major content types deposited in open access repositories in Thailand. In contrast with the *OpenDOAR* list, only one contributor in this study had made a conference paper available on a university-based IR. This may be explained by the fact that none of the participants' universities explicitly stated that they allowed faculty to deposit conference papers. Only one university mentioned on a policy webpage that faculty members were allowed to deposit research-related work. In general, conference papers and presentations may be counted as part of research-related work. Some faculty members ($n = 6$) mentioned that they had self-archived conference papers, posters, and presentations in other open access venues (Figure 5.3). Additionally, three interviewees mentioned conference papers as another type of research-related content for self-archiving. However, none of them had self-archived conference papers in IRs hosted by their respective universities. One interviewee, who was an assistant professor in the LIS field, mentioned that he had self-archived a conference paper in ResearchGate.net. The other interviewee, who was a junior lecturer in LIS, mentioned that a conference paper of which she was a co-author had been self-archived by her co-author in Purdue e-Pubs (http://docs.lib.purdue.edu), an open access repository held by Purdue University Libraries. This may imply that the faculty members might not have known that they could self-archive their conference papers in university-based IRs. One of the interviewees, who was an IR

contributor, suggested self-archiving conference papers and posters in university-based IRs might be an alternative way to create a research showcase. This interviewee also showed willingness to share his conferences papers and presentations and stated that if his university-based IR accepted this type of research-related work, he would like to encourage his students to share their papers and posters. The interviewees cited a number of reasons, including perceived benefits of self-archiving conference papers as a research showcase for a work in progress (IV002) and the perceived absence of any negative impact from self-archiving conference papers, particularly copyright issues (IV003), as reasons why they had self-archived or were willing to self-archive this type of research-related work in such venues. Based on these findings, this study suggests that academic libraries in Thailand should make a clear policy regarding content types that will be allowed in university-based IRs and take the faculty members' suggestion into consideration by considering graduate students' conference papers as another type of research-related content that could be self-archived in university-based IRs.

Despite the growing concerns around research data management and the fact that many institutional repositories have accepted data sets as a part of their content, none of the contributors in this study reported depositing a data set to a university-based IR. Findings from the quantitative part of this study indicate that only one respondent, from the computer science field, had made a data set available through another publicly accessible venue. Self-archiving data sets was not a common practice in the Thai research university context. Additionally, at the time of this study none of the participating universities had allowed faculty to deposit data sets into its IR. However, one interviewee, who was a junior lecturer in biochemistry, showed his intention to deposit research data into the IR developed by his university. This interviewee said, "If the university-based IR will allow faculty members to self-archive this type of data in the

future, it is essential that they make clear policy regarding this issue and make sure that librarians can deal with it" (IV002). This study highlights the notion that if the libraries plan to launch any services for self-archiving research data in the future, they should have a clear policy in place and work more collaboratively with faculty who are both data providers and data users. Researchers and scholars in different disciplines have different needs and work with different types of data. Starting with those who have experience self-archiving research data or those who are interested in this issue would be beneficial. Newton, Miller, and Bracke (2011) suggested that librarians should work closely with faculty and researchers at the first stage in collecting data sets, since data sets must be identified, evaluated, and prepared before they are deposited into data repositories. Then they must be made discoverable and retrievable though the repositories. Importantly, such a decision should be made jointly by both parties in a collaborative environment.

Regarding the review of content, two-thirds of faculty members (118, 67%) agreed that all work should be peer reviewed before being submitted to university-based IRs, while only a small proportion of faculty members (58, 33%) disagreed with this idea. Faculty members who had been aware of IRs (69%, n = 89) were more likely to agree that any work should undergo peer-review before being deposited into university-based IRs, as compared to only 31% (n = 40) of such faculty members who reported that they did not agree with this idea. Among those who had agreed, the largest group felt faculty research committee should take responsibility for the review process (52, 44%), followed by a university research committee (26, 22%) and a departmental research committee (19, 16%). This may be explained by the fact that the faculty in each of the research universities in Thailand already had its own research committee, which had been working closely with faculty members to develop and promote research. This may imply

that the faculty members in the current study had already established trust in their faculty

research committee. If library or IR managers can work closely with those committees and

engage them in the university-based IR projects, they may help to encourage or recruit more

faculty members to participate in IRs.

6.1.1.3 Usage of University-based IRs

Since the current study views faculty members as both authors and users of university-

based IRs, it is of interest to know whether the faculty members make use of the university-based

IRs. Slightly more than half of the respondents (97, 55%) indicated that they had used and

searched a university-based IR, while the remaining 79 (45%) faculty members had never used

one. Results from a chi-square test confirmed that faculty members who had been aware of IRs

were more likely to use them (χ^2 (1, N = 176) = 16.626, p = .000, ϕ = .307). Faculty members

had used university-based IRs for three major activities, including research-related activities (79,

81%), teaching-related activities (56, 57%), and other scholarly productivity-related activities

(29, 30%) such as preparing for a manuscript. Clearly, the development of university-based IRs

had helped to support faculty teaching and research activities, which was one of its purposes.

However, the majority of faculty members reported using them infrequently (Table 5.33). It

would be of interest for IR developers to study the reasons why those who made use of IRs used

them infrequently. One interviewee who was a contributor mentioned that he had tried to use the

university-based IR but found that it had a poor user-interface, particularly the search feature. A

similar reason was mentioned by some faculty members who had never used a university-based

IR.

The open-ended questions provided the opportunity for this study to capture reasons

behind the faculty members' decisions. Based on the participants' reasons and comments, some

suggestions and solutions for the development and improvement of IRs appear reasonable. For instance, system design is an essential issue, mentioned by not only respondents who stated that they did not plan to use university-based IRs but also some who were still unsure whether they would use IRs in the near future. This finding is consistent with the finding in Davis and Connolly's (2007) study. A perceived lack of software functionality was one of the important reasons mentioned for non-use of Cornell's DSpace (Davis & Connolly, 2007). It should be noted that most of the university-based IRs in the current study used DSpace as a platform. Therefore, redesigning the existing user interface and search systems may help to draw the attention of more users and increase the usage rates of university-based IRs. Improved search interface and user interface design may also be of value. For those who reported having a lack of information or having misunderstandings about the purpose of IRs or reservations about the quality of their contents, effective promotion of IRs within the university community may help to eliminate misconceptions. At the same time, such promotion may help to establish greater understanding among faculty members (as authors and users) and IR developers (libraries). This may help to improve the uptake of the university-based IRs in the long run. One participant stated that his decision to use or not to use the university-based IR depended solely on "how the library promotes the IR, it's content, and ease of use" (ID041).

Faculty members' opinions on the usage of contents available in the university-based IRs differed by age for the first statement, "All users should be allowed to make any comments on work available in the university-based IRs", $H(2) = 8.73$, $p = .013$. Results from the post hoc test showed that those aged 25-39 years had significantly different opinions on this statement as compared to faculty members aged 40-49 years. Additionally, faculty members' opinions on the usage of contents in the university-based IRs varied significantly by academic position for all

statements, including "all users should be allowed to make any comments on work available in the university-based IRs," ($H(4) = 16.66$, $p = .002$); "any use of a work deposited in the university-based IRs is acceptable as long as it is acknowledged and cited" ($H(4) = 14.90$, $p = .005$); and "individual users should register before using the university-based IRs, so that the usage statistics can be collected," ($H(4) = 9.96$, $p = .041$). Although the faculty members' opinions differed significantly by age and academic position, they were more likely to agree that users should be allowed to use the content as long as it was acknowledged and cited and to agree that individual users should register before using university-based IRs so that the usage statistics could be collected. One interviewee (IV001) stated that she had received email from Purdue e-Pubs about the usage statistics of her conference paper occasionally and that it was very nice to know that her paper had been downloaded. However, she stated that she had never received any information regarding her work deposited in the university-based IR developed by her university. Based on faculty members' opinions, it can be inferred that the faculty members valued the usage statistics and wanted to know if their work was used and properly cited. Additionally, they may have wished to know the usage statistics of an individual piece of work hosted by the university-based IRs. It should be noted that one university-based IR had already made a clear policy about the usage of content available in the IR by requiring all users to register on the IR website before accessing and using the full text in the IR. However, based on the survey of university-based IR websites participating in this study, only one of them provided usage statistics at the individual item level, such as when was the article was last used and downloaded, total visits per month, top country views, and top city views. The usage statistics may be used to provide feedback to the faculty members and help them see how the university-based IRs work, as well as to see some of the benefits of contribution. This may help to encourage them to

contribute more work to the university-based IRs in the future. This study suggests that both libraries as IR developers and faculty members as contributors would benefit from using this statistical data.

6.1.1.4 Current Self-Archiving Practice in Other Open Access Venues

The present study also explored the current self-archiving practices and experience of the participants and their intention to self-archive in the near future. At the time of this study, self-archiving was not a common behavior in the Thai research university context; evidence from both the quantitative and the qualitative parts of this study lead to this conclusion. A smaller proportion of faculty members (61, 34.70%) had made their scholarly work and/or teaching materials available in other open access repositories and/or other publicly accessible web sites, as compared to a larger proportion of faculty members (115, 65.3%) who had not made their work available in such venues. Among the 61 respondents, only 40 (65.60%) had become involved in self-archiving, while the others had not done so. However, the work of those involved in self-archiving had been made available on publicly accessible sites on their behalf.

Although a chi-square test showed that there was no statistically significant association between discipline and whether faculty members had made their work publicly available in OA repositories and other venues, $\chi^2 (2, N = 170) = 1.25$, $p = .490$, a larger proportion of faculty members in all disciplines had not made their work publicly available through such venues. Furthermore, a Fisher's exact test yielded $p = .054$, confirming that their decision to self-archive differed significantly by academic position. In fact, all researchers had made their work publicly available in OA repositories and other venues, while the greater proportion of faculty in all academic positions had never done so. Interestingly, slightly more than three-fourths (72 out of 101) of instructors and lecturers had never made their work publicly available on the Internet.

Only one of the three professors had made his work available on other OA repositories or publicly accessible sites on the Internet.

Journal articles, theses and dissertations, and research reports and technical reports were cited as the top three main content types that faculty members had made available on the Internet. Similar to previous studies conducted in the U.S. (Kim, 2008) and Tanzania (Dulle, 2010) contexts, this study found that departmental and faculty web sites were the most commonly used venues for publishing work for public access. More interesting, a new publishing trend had emerged. Social networking sites appeared to be drawing more attention from faculty members, as a number of them (n = 10) mentioned that they had posted and shared their work through social media sites such as ResearchGate, Facebook, Academia.edu, and Google Scholar. Among these social networking sites, ResearchGate.net appeared to be the most popular site, mentioned by both respondents to the survey and interviewees during semi-structured interview. Particularly, one interviewee who was an assistant professor in the LIS field had been actively engaged in a social networking site and valued it as it had allowed him to communicate with other scholars and researchers in LIS and other related fields. Three national open access repositories—eLibrary-the Thailand Research Fund, Thai Digital Collection-ThaiLIS, and the Thailand National Research repositories—were also mentioned along with discipline repositories, including PubMed Central, BioMed Central, and LSE Theses. Additionally, in the interview, a faculty member from biochemistry showed his interest in disciplinary repositories, particularly bioRxiv (http://biorxiv.org), a preprint server in life sciences and other related fields. Despite the fact that bioRxiv was newly launched in 2013, it has been embraced by some pioneers in life sciences, and its collection has expanded to cover all

aspect of research in life sciences; about 3,100 preprints have been deposited since it was launched (Callaway & Powell, 2016).

While self-archiving in university-based IRs did not appear to receive much attention from faculty members, publishing in Open Access journal was cited as more common behavior by faculty members from the science and technology fields. Evidence of this can be seen in the findings from both the quantitative and qualitative parts of the study. The two interviewees from biochemistry and mathematics and computer sciences agreed with this idea. Additionally, about one-third of respondents (20 out of 61) had already published their work through open access journals, both international open access journals and open access journals published by professional organizations in Thailand. Most of the journals mentioned in the current study were journals in the medical and biomedical fields; the exceptions were the *Journal of the Association for Information Research,* which is a journal in the field of information systems and information technology, and *PLOS One,* a multidisciplinary open access journal.

6.1.1.5 Planning for Self-Archiving and Use of OA Repositories in the Future

The number of faculty members who did not have any experience in self-arching or in posting work to other publicly accessible venues was considerably high (115 out of 176). Slightly more than one-third of the respondents (46, 40%) indicated they would be willing to publish their work through other publicly accessible web sites, while 27 (23.5%) respondents said they would not be willing to do so. Interestingly, another slightly more than one third (42, 36.5%) did not indicate whether they planned to publish through these alternative channels. While a Chi-square test indicated that there was no statistically significant association between discipline and whether the respondent planned to publish in OA repositories or other publicly accessible venues on the Internet, the data showed that respondents in the humanities and social

sciences were more likely to publish their work in the near future, as compared to those in the medical and health sciences and other science and technology fields. When academic position was considered, the proportion of respondents who were willing to publish in OA repositories or other publicly accessible venues varied by academic position. Instructors and lecturers (38, 33%) were more willing to self-archive their works in the near future, as compared to respondents in other positions.

In contrast with the previous study which found that faculty members who did not currently self-archive were less likely to do so or were unsure whether to self-archive in the near future (Kim, 2008), the current study found that many respondents who had never self-archived their work in either university-based IRs or other open access venues stated that they would be willing to do so in the near future. Although the numbers of respondents who were uncertain whether to self-archive in the near future were high, they did not exceed the numbers of those who wanted to contribute. The top reasons cited as major factors hindering their contribution were not having any work, low levels of trust toward OA repositories and quality of content, and lack of information about OA publications.

The findings showed that faculty members participating in the current study used other work more frequently than they published their own work. The majority of respondents (148, 84%) had already searched for and used scholarly work available in OA repositories and other publicly accessible web sites, while only 28 (16%) indicated that they had never searched for or used scholarly works from these sources. The major purposes for using scholarly work available in OA repositories and other publicly accessible web sites were for research related activities, teaching related activities, and other scholarly activities such as to prepare for a manuscript, to search for information, to conduct a literature review, and to stay current in the field. These

findings show that while many respondents in the current study understood the concept of institutional repository as well as that of open access in general, there was still a lack of information about OA and misunderstandings among some scholars. This finding is related to the findings of a previous study conducted in the Thai higher education context. The study found that 47% of LIS faculty in Thai government universities knew about open access resources only moderately or hardly knew about them at all (Thaotip, 2011). Despite the fact that the greater proportion of faculty members participated in the current study reported that they had been aware of IRs, a number of them reported a lack of information. These facts indicate that education in and promotion of open access and institutional repositories can play an important role in the adoption of IRs in this context. IR developers should pay particular attention to these aspects and work hard to increase understanding among faculty members in the community.

6.1.2   Factors Affecting Faculty Members' Acceptance and Use of University-Based IRs

The primary purpose of this study was to determine the factors affecting faculty acceptance and use of university-based IRs in the Thai research university context. This section discusses answers to the second and the third research questions: *what are the factors that affect faculty members' acceptance and use of institutional repositories in the Thai research university context*? *To what extent do those factors affect faculty members' acceptance and use of institutional repositories (IRs) in the Thai research university context?* Discussion on each factor is also presented.

The proposed research model was developed based on two major models, the UTAUT model (Venkatesh et al., 2003) and the model of factors affecting faculty self-archiving (Kim, 2008). Additionally, more factors identified in the literature regarding open access and institutional repositories were included in the proposed model. In total, the proposed model

consisted of nine exogenous variables (ATT, PE, EE, SI, RTC, ALT, CCs, TTIRs, and FC) in

relation to two endogenous variables (BI and UB). A path analysis was used to evaluate the

contribution of the combination of each path to the overall fit of the structural model. Results

showed that the proposed path model indicated poor fit and showed that the path diagram of the

proposed research model did not fit well with the observed data, $\chi^2 (9) = 35.65$, $p = .000$, CMIN

$= 3.96$, GFI $= .98$ (Figure 5.4). The proposed research model did not fit the data based on the

significant chi-square test. Of the ten hypotheses, only five were supported. The model was

trimmed, and a final model with a better fit to the observed data was proposed, $\chi^2 (31) = 49.52$, p

$= .020$, CMIN $= 1.60$, GFI $= 0.95$ (Figure 5.5). Although the chi-square value was still

significant, it was better than the value for the proposed research model. Furthermore, the final

model could be used to explain faculty members' behavioral intention and actual usage behavior

toward the university-based IRs in the Thai research university context. Table 6.1 summarizes

the findings and hypothesis testing of the study.

Table 6.1

Summary of Findings and Hypothesis Testing for Path Analysis

Path	Hypotheses	Initial Model		Final Model		Results
		Estimate	*p*	Estimate	*p*	
ATT→ BI	H1	.19	.056	-	-	Not supported
PE → BI	H2	.31	**	0.38	***	Supported
EE → BI	H3	.05	.507	-	-	Not supported
SI → BI	H4	0.42	***	0.46	***	Supported
RTC → BI	H5	-0.15	.023	-0.18	**	Supported
ALT → UB	H6	0.27	***	0.30	***	Supported
CCS → UB	H7	0.01	.893	-	-	Not supported
TTIRS → UB	H8	-0.11	.096	-	-	Not supported
FC → UB	H9	0.05	.497	-	-	Not supported
BI → UB	H10	0.57	***	0.50	***	Supported

Note. **$p < .01$, ***$p < .001$

6.1.2.1 Attitude toward IRs.

Faculty members' attitudes toward IRs were found to not have a direct effect on behavioral intention to use university-based IRs. Hypothesis 1 was not supported (Table 6.1, $\beta =$ 0.19, $p = .056$). The question of attitude presented an interesting case in the literature regarding technology acceptance. It was found to be significant across other technology acceptance models (TRA, TPB/DTPB, and MM), while this construct was not significant in the UTAUT model (Venkatesh et al., 2003). The results in this study confirmed those reported in the UTAUT model, which indicated that attitude does not have a direct influence on behavioral intention due to the fact that the variance of BI is already accounted for by performance expectancy (PE) and effort expectancy (EE) (Venkatesh et al., 2003). However, the results of this study are contrary to those of studies employing the UTAUT in the open access context (Mann et al., 2009; Dulle, 2010). In a large-scale study of 1,443 scientists across 49 countries, Mann et al. (2009) found that attitude was one of the factors affecting the scientists' behavioral intention to use open access publishing. However, Mann et al. (2009) noted that their study was conducted at the early stage of open access publishing; thus, at that time scientists might have had a more positive attitude toward open access. Similarly, in a study of researchers' open access adoption within public universities in Tanzania, Dulle (2010) found that attitude had a direct effect on researcher intention; however, it did not have a direct effect on actual usage. Different from Mann et al.'s (2009) and Dulle's (2010) studies, the current study was conducted after university-based IRs in Thailand had been in operation for many years, and for that reason faculty members' attitudes toward IRs might have changed as explained by Mann et al. (2009). The current study also sought to fill a gap by investigating whether attitude had a significant effect on behavioral intention to adopt new technology, particularly in the area of the acceptance and use of IRs. The

findings in this study may contribute to a better understanding of behavioral intention by confirming that attitude did not have a significant direct effect on faculty members' behavioral intention to use IRs. Although attitude could not be counted as a factor affecting faculty members' behavioral intention to use IRs in this study context, it should not be disregarded from the perspective of the promotion and the implementation of IRs since many studies have confirmed that it was one of the factors contributing the success of open access and institutional repositories (Dulle, 2010; Mann et al., 2009).

6.1.2.2 Performance Expectancy

Performance expectancy had a positive direct effect on faculty members' behavioral intention to use university-based IRs. Hypothesis 2 was supported (Table 6.1, $\beta = 0.38$, $p < .001$). This means that for each standard deviation increase in performance expectancy, behavioral intention increased by 0.38 standard deviation. Therefore, this study confirms that performance expectancy enhanced usage intention and that faculty members would intend to use university-based IRs if they found that IRs were useful for their work, for instance, if using IRs helped them to publish their teaching and scholarly work more quickly, increased their teaching and scholarly productivity, increased their chance to communicate with peers, helped them to enable researchers from other countries to access their work, and increased their chance of promotion or getting more credit. It may be concluded that the future adoption of IRs is highly dependent on the expected benefits of such adoption. By confirming that PE is a strong predictor of behavioral intention, these findings also support those of other studies utilizing the UTAUT model (Dulle, 2010; Dulle, Minishi-Majanja, & Cloete, 2010; Mann et al., 2009; Van Schaik, 2009; Venkatesh et al., 2003; Wang, Wu, & Wang, 2009).

One emerging theme from the qualitative data also points in the same direction. Clearly, faculty members valued the performance of IRs and expected that depositing work in university-based IRs would help to increase the visibility of their work at the global level. A senior lecturer in LIS field said, "I decided to make my academic work available in CUIR, since it can be globally and publicly accessible" (IV004), and a junior lecturer in the same field stated, "I considered the popularity of IRs or other venues as an important factor affecting my decision on whether to contribute, since it will help to increase the visibility of work after it is deposited" (IV001). This may be interpreted to mean that if a university-based IR has the potential to broaden the visibility of its institution, faculty, and research, it is more likely to gain attention of its community, particularly of faculty members.

6.1.2.3 Effort Expectancy

Effort expectancy did not have a significant direct effect on behavioral intention. Hypothesis 3 was not supported (Table 6.1, $\beta = 0.05$, $p = .507$). While the UTAUT model suggests that adoption of technology (in this case university-based IRs) by individuals will depend on the level of ease of use of the technology, and this factor was confirmed to be significant in the context of open access and IRs adoption (Abizah, Hilmi, & Kassim, 2015; Dulle, 2010; Singeh et al., 2013a), the current study found that this factor did not directly enhance usage intention. The faculty members' adoption of IRs did not depend on the level of ease of use of the system. One possible reason for the statistical insignificance of the effort expectancy variable is that the ease of use or difficulty associated with the use of such a technology is more likely to be relevant during the early stages following its introduction but will become non-significant over a period of time (Venkatesh et al., 2003). In light of this, it is relevant that the current study was conducted many years after IRs had first been operated.

Although results from the quantitative part of this study show that this factor was not significant and did not have a direct effect on faculty member intention to use university-based IRs, ease of use and additional time and effort were mentioned as one factor hindering faculty decision to deposit work into IRs. In fact, this factor was mentioned by both contributors and one non-contributor, with and without self-archiving experience. Clearly, all contributors expected the content depositing process to be easy. This suggests ease of use in the content deposition process may help to motivate faculty members to deposit their work. In other words, additional time and effort required to deposit work can be considered as a major barrier to self-archiving, and this barrier may delay faculty members' decisions to contribute to university-based IRs. A similar pattern was discovered by Kim (2008, 2010), who found that additional time and effort had negative direct effects on faculty self-archiving behavior. Additionally, Klungthanaboon (2015) confirmed in a qualitative study of IR stakeholders in Thailand that a complicated submission process and additional time and workload are barriers to self-archiving and participation in university-based IRs. Therefore, this study suggests that this factor should not be disregarded. IR developers should consider revising the IR system. Consideration should be given to both the depositing process and the user interface system, since both quantitative and qualitative data from this study point in these directions.

6.1.2.4 Social Influence

Social influence had a positive direct effect on faculty members' behavioral intention to use university-based IRs with the highest standardized path coefficient (Table 6.1, $\beta = 0.46$, $p < .001$). This means that for each standard deviation increase in social influence, there was a 0.46 standard deviation increase in behavioral intention. This study confirmed that faculty members would intend to use university-based IRs if they recognized that important individuals, such as

peers, the faculty member's organization, and funding agencies, believed that they should use IRs. Based on the UTAUT model, this factor is significant in mandatory environments, but it is not significant in voluntary environments (Venkatesh et al., 2003). The current study suggests that this factor can be used to explain behavioral intention to use IRs in the Thai higher education context, in which such use is completely voluntary. Thus, this study sheds light on this issue. Additionally, social influence has characteristics similar to those of "peer pressure" in the self-archiving context (Kim, 2008, 2010). However, Kim (2008) found that quantitative data indicated that peer pressure did not have a direct relationship with faculty decisions to self-archive. This factor, however, was discovered through the reviewing of results from qualitative data in her study and added to the model of factors affecting faculty self-archiving. Results from the current study can be used to support the conclusion that social influence has a significant direct effect on faculty members' intention to used IRs, even though it was conducted in a different context.

Results from qualitative data analysis also support these findings. Some interviewees mentioned that they intended to participate in social networking sites due to the influence of peers and funding agencies. An assistant professor in the LIS field mentioned that he had been encouraged by his supervisor to participate in social networking sites. He stated, "my ex-PhD supervisor invited me online to join ResearchGate.net" (IV003). Additionally, peer pressure appears to be an important reason that made this interviewee continue to actively engage in this social networking site. Also, a lecturer in biochemistry mentioned that his decision to publish in open access sources had a result primarily of peer pressure such as supervisors and colleagues and the influence of the university policy (where he had graduated).

As both quantitative data and qualitative data in this study indicate the relative importance of social influence on faculty members' behavioral intention to use IRs in a voluntary context, it is essential that IR developers work closely with individuals who might influence and encourage faculty members to engage in university-based IRs, for instance, senior faculty or faculty research committee members who may have worked closely with the faculty members in promoting their research, as mentioned by participants in this study. In the case of senior faculty, this study discovered that none of the full professors were IR contributors. Additionally, none of them agreed that the development of IRs was important; as a result, they indicated they would not be willing to contribute work to university-based IRs. Although there were only three full professors participating in this study, their opinion on IRs might be considered important as it could influence other junior faculty members. If the junior faculty members look to them for guidance and leadership, they might decide not to deposit their work into university-based IRs. Therefore, this study suggests that if the IR developers could establish trust with this group of faculty members and persuade them to change their mind about the importance of IRs, there would be beneficial results.

6.1.2.5 Resistance to Change

The findings showed that resistance to change had a negative direct effect on faculty members' behavioral intention to use university-based IRs (Table 6.1, $\beta = -0.18$, $p < .01$).). Hypothesis 5 was supported. This means that faculty members who exhibited a higher level of resistance to change were less intent on trying to use university-based IRs, since for each standard deviation increase in resistance to change, the was a 0.18 standard deviation decrease in behavioral intention. This factor was incorporated into the proposed research model since there has been a debate on whether to confirm or to disregard RTC as a determinant of behavioral

intention. In the context of open access, resistance to change has also been mentioned in some studies conducted at the early stage of OA and IR development. For instance, Chan (2004) found that many faculty members cited cultural inertia, which is a resistance to change or reluctance to adopt new culture or technology, as a reason for the slow adoption of self-archiving (Chan, 2004; Kim, 2008). In the digital library adoption context, Nov and Ye (2008, 2009) confirmed that users with higher RTC had higher effort expectancy toward new technology. No studies in the areas of OA and IRs have been conducted to determine whether resistance to change has an effect on OA or IR adoption. This study confirmed that resistance to change is one of the important factors hindering faculty members' intention to adopt and use university-based IRs. This factor can be used to predict the inclination to adopt new technology or products as reported in Oreg's (2003) study. The findings of this study can help to fill the gap in the literature in the area of technology adoption, particularly in the institutional repository adoption context.

6.1.2.6 Altruism

The notion of altruism in this study refers to faculty members' altruistic motivation to self-archive their work in university-based IRs. The current study found that altruism had a positive direct effect on faculty members' actual usage of university-based IRs. Hypothesis 6 was supported (Table 6.1, $\beta = 0.30$, $p < .001$). This means faculty members' usage of IRs increased by 0.30 standard deviation for every one standard deviation increase in altruism. In Kim's studies (2008, 2010), altruism was identified as one factors influencing faculty members' tendency to contribute their work to their university IRs in the U.S. context. The current study confirms that this factor can be used to explain the actual behavior of faculty members in a different context, specifically, in the Thai research university context. Findings from the qualitative part of this study show that faculty members, both contributors and non-contributors,

had a clear perception of the principle of open access and had ideas about helping other researchers to access and build on their research. The non-contributor, who intended to deposit his work in the near future, concluded that the principle of open access was essential, and he reported his belief that local researchers should benefit from his public funded research motivated him to share his work with other researchers, not only in the university community but also at the local and the global level. Clearly, findings from the qualitative part of this study can be used to explain in greater detail how altruism behavior affects faculty members. Similar to Kim's (2008) study, the current study also found that faculty members were encouraged by reciprocal altruism more than by true altruism: "scholars or researchers want to reciprocate after receiving benefits from using OA content by giving back to other researchers through self-archiving their research" (Kim, 2008, p. 192). In support of this, four out of five interviewees in this study mentioned that they benefited from the principle of open access by using other scholars' work freely available on other open access venues, including open access journals; thus, they would be in turn giving back to the community by sharing their work. An assistant professor in the LIS field notably stated, "the more we shared the more we gained, in that we can do research further and grow the study areas we are interested in together" (IV003).

6.1.2.7 Copyright Concerns

Interestingly, copyright concerns were found to not be significant and did not have a direct effect on usage of IRs. Hypothesis 7 was not supported (Table 6.1, $\beta = 0.01$, $p = .893$). This finding presents a contradiction to findings in the literature in which copyright concerns (CCs) along with fear of plagiarism are frequently cited as a major barrier to self-archiving and to IR contribution (Abrizan et al., 2015; Casey, 2012; Creaser et al., 2010; Kim, 2007, 2008, 2010, 2011; Singeh et al., 2013b; Swan & Brown, 2005; Xia et al., 2012). While the quantitative

part of this study did not shed light on this issue, copyright concerns and uncertainty regarding the issue of copyright were captured in the qualitative part. In fact, all of the interviewees expressed concerns regarding this issue. Specifically, a lecturer from the LIS field stated that copyright was the most important factor affecting her decision on whether to deposit work. This interviewee mentioned third-party copyright materials and brought up the question of whether it was legal to post dissertations or other research-related materials with third-party copyright materials, such as images and diagrams. The other two interviewees from scientific fields felt uncertainty regarding whether it was legal to post the final versions of their work (publisher's versions/PDFs) to university-based IRs. Hence, they stated that if they would deposit any work in the future, they would deposit work published in open access journals that supported self-archiving, so they would not have to deal with the legal issue. Studies conducted in similar contexts have also found the issue of copyright and its legal aspects to be a major issue and one considered to be a major barrier pertaining to the success of the development of open access and IRs in Thailand (Klungthanaboon, 2013, 2015; Wipawin & Wanna, 2014). Findings from a mixed-method in the current study suggest that the copyright issue should not be neglected in the adoption and the implementation of university-based IRs. Unexpectedly, tools like SHERPA/RoMEO were not widely known to this study's participants, particularly in the case of faculty members in other disciplines outside the LIS field. It is essential that libraries promote the use of such tools or take responsibility to learn about publisher policy on open access and self-archiving on behalf of faculty members and work closely with them to make sure that they are available for help and support.

6.1.2.8 Trust toward IRs

Faculty members' trust toward university-based IRs was found not to be significant and did not directly enhance their actual usage of university-based IRs. Hypothesis 8 was not supported (Table 6.1, β = -0.11, p = .096). The notion of trust in this study is related to issues such as fear of plagiarism, long-term preservation, and quality of the IR itself. While results from the quantitative part of the study suggest that issues relating to trust did not directly contribute to faculty members' actual usage of university-based IRs, the qualitative findings show that trustworthiness was cited an important factor in decisions regarding contribution to university-based IRs. Most contributors in the qualitative study emphasized trustworthiness. A previous study also found that faculty members in the U.S. research universities expressed concern about the issue of trust, indicating that a low level of trust made them hesitate to self-archive in university IRs (Kim, 2008, 2010). A faculty member from the biochemistry field who was interested in depositing research data in a university-based IR said, "if university-based IR or other open access repositories in Thailand had equal quality as one developed by the university where I graduated, I would be the first one to contribute. It would be great if we could put our data in a safe place. I don't know if I can archive my research data in MUIR, and also I wonder whether I can trust the system" (IV002). Clearly, failing to establish trust among faculty members toward IRs may delay their participation in them. In other words, if the faculty members could trust the system, they would be more likely to use IRs.

One important factor emerged from the qualitative part is that interviewees expressed concerns regarding long-term preservation in both university-based IRs and social networking sites. This finding is similar to that in the study of repositories in the U.S. context, that "repositories are not yet providing key preservation services, such as guaranteeing the integrity

of file formats for future use" (Markey et al., 2007, pp. ix). However, the study in the U.S.

context was carried out at the early stage of IR development and implementation, while the

current study was conducted many years after university-based IRs had been operated in the Thai

research university context. Evidently, this issue has been ignored for a very long period of time.

Librarians and IR developers in Thailand should take responsibility by developing and

implementing preservation plan as part of the university-based IR services. It also seems clear

that some degree of uncertainty existed and led one of the interviewees to seek an alternative

means of personal archiving, by uploading works to GoogleDrive. There has been an increasing

concern regarding personal digital archiving and preservation. If libraries can offer this service

along with IRs, it would be of great benefit for faculty members.

6.1.2.9 Facilitating Conditions

The findings in the current study demonstrated that facilitating conditions did not have a

direct effect on faculty members' actual usage of university-based IRs. Hypothesis 9 was not

supported (Table 6.1, $\beta = 0.05$, $p = .497$). This means that the faculty members' actual usage of

university-based IRs did not depend on the availability of facilitating conditions such as the

Internet or guidance in using the technology. Although the UTAUT model suggests that

technology and other issues related to technology are important factors contributing to

technology acceptance and use (Venkatesh et al., 2003), there is no evidence in the present

sample that facilitating conditions can predict actual usage of university-based IRs. In the open

access context, Dulle (2010) and Dulle and Minishi-Majanja (2011) reported that facilitating

conditions were found to significantly affect researchers' actual usage of open access in

Tanzania. In the Thai higher education context, Boonsong (2014) found that facilitating

conditions had the strongest positive direct effect on instructors' usage behavior in the use of

web-based learning. Although this factor was found not significant and could not predict the actual usage of IRs, both contributors and a non-contributor in the qualitative part of the current study indicated that they valued facilitating conditions. The conversation with interviewees allowed this study to identify some services requested by faculty members, such as online guidance, personal consulting services, and meetings and workshops on suggested topics such as the benefits of university-based IRs and the content depositing process. A faculty member suggested that libraries and librarians should promote the use of university-based IRs both on and off campus. Therefore, local researchers around the university community could benefit from these invaluable resources. This study recommends that IR developers take facilitating conditions into account and provide necessary resources and services that may help to facilitate faculty members' use of IRs, as suggested by faculty members who participated in this study.

6.1.2.10   Behavioral Intention

Consistent with results in several studies (Boonsong, 2014; Dulle, 2010; Dulle & Minishi-Majanja, 2011; Venkatesh et al., 2003), usage intention was found to have a significant direct effect on actual usage. Hypothesis 10 was supported (Table 6.1, $\beta = 0.50$, $p < .001$). The standard path coefficient of 0.50 shows a strong effect, making behavioral intention an important and indeed the strongest predictor of faculty members' actual usage of university-based IRs. This means that usage increased by 0.50 standard deviations for every one standard deviation increase in intention. Clearly, faculty members who intended to use IRs were more likely to engage in and use them and increase their use of them in the future. Along with those of other studies, results from this study confirm that behavioral intention is a consistent predictor of actual usage of technology as proposed in the UTAUT model (Venkatesh et al., 2003). The significance of this factor implies that IR developers should pay attention to encouraging the faculty members'

intention to use university-based IRs, for instance, by enhancing their awareness of IRs and providing information on the real benefits of IRs. Additionally, the qualitative findings of this study suggest that faculty members value benefits, especially a direct academic reward system such as giving credit or acknowledging those who self-archive and using self-archiving as an indicator for evaluation. This study proposes that an appropriate reward system could not only help to improve faculty intention to use IRs but also help to increase the uptake of IRs in the long run.

The findings of this study reveal that both the UTAUT model and the model of factors affecting faculty self-archiving can help to explain the adoption and use of university-based IRs in the Thai research university context. This study confirms that performance expectancy, social influence, and resistant to chance are significant predictors of behavioral intention, while behavioral intention and altruism are significant predictors of actual usage. It may be inferred from the findings that improving factors that affect faculty members' intentions such as performance expectancy, social influence, and reduced resistance to change, will also increase the adoption of IRs. Altogether these three factors accounted for 52% of variance ($R^2 = .52$) in behavioral intention. Furthermore, behavioral intention and altruism were found to be significant predictors of usage behavior; these two predictors accounted for 50% of variance ($R^2 = .50$) in actual usage behavior. The final model was found to fit the observed data better than the proposed research model. Although some factors such as attitude, effort expectancy, copyright concerns, trust toward IRs, and facilitating conditions were found not to be significant, none of them should be disregarded in the development of IRs. More emphasis may be put on the major significant factors, while other factors also need to be taken into account in order to ensure the success of IRs in the long term.

6.2   Limitations of the Study

This study has some limitations due to the sample size, response rates, and data gathering methods. Theoretically, structural equation modeling (SEM) is a large sample technique (Kline, 2005). This study adopted a path analysis, a variant of SEM, for assessing the model fit and for hypothesis testing. According to Kline (2005), a small sample size may result in an unstable model estimate. After the data screening, there were 173 cases left for path analysis. This number is considered a small sample size for SEM. Additionally, a complex model such as the one proposed by this study requires a large sample for stable estimates. The ratio of case can be as low as five cases per variable (5:1), by which indicator an appropriate sample for this study should be 240 cases. Also, if latent variables have multiple indicators, 100 cases per group is recommended for multi-group modeling (Kline, 2005). Theoretically, it is not optimal to carry out analysis for multi-group modeling with the sample size of the current study.

The participants in this study were limited to faculty members who volunteered to participate and to fill out the survey. Even though this study employed both traditional mail and online questionnaire using Qualtrics, the response rates were still low, which might create a risk of bias (Bryman, 2008). Additionally, about half of participants in this study were faculty members aged 25-39 years (84, 47.7%), and slightly more than half of them were instructors and lecturers (101, 57.4%). They might not have been a good representation of all faculty members in Thai research universities. Therefore, the results may not be generalizable to the entire population, the faculty members in all Thai research universities. In addition, the data in this study were also limited by the possibility of various biases due to the use of a self-reporting questionnaire.

Another limitation was that the participating institutions in this study were only four research universities. Therefore, this study lacked information about other university-based IRs operated by other research universities. Currently, some other research universities have also implemented university-based IRs, for instance, Chiang Mai University Intellectual Repositories (http://cmuir.cmu.ac.th), which was launched in 2014, and Kasetsart University Knowledge Repository (http://kukr.lib.ku.ac.th/db/kukr/multi_menu/index/8), which has been operated since 2015. Since this study did not cover these newly operated IRs, space for future research on this topic is available.

6.3   Future Research

This study was the first study to address factors affecting faculty members' acceptance and use of university-based IRs in the Thai research university context. It uncovered factors underlying user acceptance and use of university-based IRs. Additionally, using a mixed methods approach allowed the researcher to discover and explain faculty acceptance and usage of university-based IRs and the factors affecting their decision in greater detail. Although the limitations of the study might have an effect on the interpretation of a final path model, all factors identified in this study may well be useful to librarians and IR developers who currently operate IRs and who plan to implement IRs in the near future.

The results of this study were based on the study of faculty members in only four research universities in Thailand that have implemented and operated university-based IRs. Therefore, this study reflected the views of only faculty members in these institutions. There are other IR stakeholders, including researchers and graduate students, who also play an important role as both contributors and users of IRs. Further studies should include more institutions and

address all stakeholders in order to obtain a fuller view of the development and implementation of IRs in Thailand.

Finally, another important finding of this study was the confirmation that there is a disciplinary difference among the science and technology fields versus the humanities and social sciences in the use of IRs and attitudes toward open access publishing, as suggested by many studies (Abrizah et al., 2015; Akers & Doty, 2013; Dubinsky, 2014; Dulle, 2010; Kim, 2008; Tenopir et al., 2015). Findings from both the quantitative and the qualitative parts of this study revealed this pattern. The majority of respondents were faculty members from the science disciplines (71 from other science and technology fields and 49 from medical and health sciences), as compared to 50 from the humanities and social sciences. The quantitative findings indicated that when IR contributors from other science and technology disciplines and those from the medical and health sciences were combined, this group made up the overwhelming majority of IR contributors (30 out of 44, 68%), compared with faculty members from the humanities and social sciences (14 out of 44, 32%). Interestingly, faculty from the humanities and social sciences said they were more likely to publish their work in the near future, as compared to those in the medical and health sciences and other science and technology fields. Findings from the interviews showed that two interviewees from scientific fields (biochemistry and mathematics and computer science) were more familiar with open access journals and expressed more positive attitudes toward them, as compared with those from the library and information sciences. None of the interviewees from the field of library and information sciences mentioned open access journals or had experience publishing in open access journals although this group of respondents had more knowledge and understanding of open access publishing and its principles. In a similar context, a study concerning stakeholders' perspectives on IRs also

found that researchers in the science and technology fields were more familiar with open access publishing as compared with those in the social sciences and humanities (Klungthanaboon, 2015). Clearly, such disciplinary differences are key for IR development, particularly in the Thai higher education context. Future studies should be done examining each discipline in a greater detail or comparing scholars from these two camps in terms of IR usage, preferences, and factors that may motivate their acceptance and use.

6.4   Recommendations and Suggestions

Based on the findings, some recommendations for libraries, librarians, IR managers and developers who are currently involved in IR projects and those who plan to implement IR projects in the future are presented.

First, university-based IRs should be built based on a bottom-up approach with complementary formal policies regarding benefits. It was found that a lack of faculty participation was the major problem hindering IR development and implementation in the Thai research university context. Despite the fact that university-based IRs in the current study have been operated for more than ten years, they have not been successful in terms of faculty participation and the quantity of content. Faculty members in this study expressed different opinions on mandated self-archiving versus voluntary self-archiving. On one hand, faculty members believed that a clear university policy on mandated self-archiving and a reward system could help to increase faculty participation. Others believed that libraries/librarians and IR developers should act as facilitators to facilitate communication between the library and faculty members and create a more collaborative environment to encourage faculty members to engage in IRs. The results from this study suggest that libraries should adopt a bottom-up approach to engage faculty members in the development of IRs and build collections. Any new services

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should be designed based on the needs of faculty members as a major concern. Working closely with those who were the pioneers (early adopters) may be beneficial for reaching the late majority and the laggards, who may follow the example of the pioneers, as explained by the technology adoption curve (Rogers, 2003). However, clear policies on benefits should be enacted because the findings show that if faculty members think that they can gain benefits through depositing their work into IRs, they will be willing to do so.

Second, clear policy regarding open access and self-archiving is important as evidenced by the fact that it was mentioned by faculty members in the interview part. The absence of open access and self-archiving policies may contribute to faculty members' lower motivation to contribute to university-based IRs or make their work publicly available in other venues. Different opinions have also been posted regarding mandated versus voluntary self-archiving. This study proposes that libraries have a clear policy regarding open access and self-archiving in place and adopt the policy of voluntary self-archiving. However, incentives and benefits, such as academic rewards, for those who self-archive and commit to contributing to university-based IRs should also be provided and made clear in the policies. Based on the qualitative data analysis of this study, benefits and academic rewards may include but not be limited to giving credit or acknowledging those who self-archive and using self-archiving as an indicator for evaluation and promotion.

Third, need assessment and usability testing at an institutional level are needed. The current study was conducted in four research universities in Thailand. Although the major focus of the study was not to address faculty members' needs regarding university-based IRs, results from the mixed method approaches provide some insight into faculty members' need for specific services related to university-based IRs. The faculty's needs may vary depending on the

characteristics of the IRs developed by their respective universities. It was also found that although university-based IRs in Thailand have been operated for a long of time, in some cases for more than five years, not all of them has been evaluated. In order to understand faculty members in each community more clearly, needs assessment and usability testing at an institutional level should be conducted. Kim and Kim (2008) suggest that a usability evaluation for digital institutional repositories may cover user satisfaction, system supportiveness, usefulness, and effectiveness. Since many researchers suggest that the evaluation of an IR should cover both the self-archiving process and the searching system (Qing & Ruhua, 2008; Zhang, Maron, & Charles, 2013; Betz & Hall, 2015), this study suggests that librarians and IR developers should apply an evaluation framework to assess issues regarding content and the content deposition process (self-archiving process), and IR functionalities (the browse system and the user-interface design) identified in the current study. Both large-scale and small-scale user studies may be needed. While a large-scale user study can provide the general feedback about an IR, a small-scale usability study, using both on-site (laboratory testing) and remote usability tests, may provide more inside into IR functionality (search system and interface design). Results could provide invaluable information that may be useful for not only improving the existing services but also launching new IR-related services tailored based on the users' needs.

Fourth, the findings show that there has been a lack of communication and collaboration between libraries and librarians, who have been responsible for developing and implementing university-based IRs, and faculty members, who are one of the major stakeholders of IRs, being both contributors and users. Results from both the survey data and the interviews indicate that many of the faculty members in this study had not been aware of university-based IRs. Of those

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who indicated that they had been aware of university-based IRs, only a small proportion (25%) had contributed. The interview data analysis shows that some faculty members still did not understand the real benefits of university-based IRs and asked for more clarification from libraries and librarians. Therefore, it is important for librarians to work closely and collaborate with faculty members in order to promote the benefits of IRs and establish trust among faculty members and other stakeholders in the community. By working closely and collaboratively with faculty members, librarians may gain more trust and support from them, which in turn may result in their being more willing to contribute. It also appears that younger or junior lecturers were more likely to participate in and contribute to university-based IRs. Therefore, this study suggests that librarians should work collaboratively with this group of faculty members.

Fifth, researchers also suggest that the success of a library-operated institutional repository may be based upon a new role of librarians in developing and implementing the IR (Palmer, Teffeau, & Newton, 2008; Foster & Gibbons 2005). Although the findings in this study indicate some success on the part of librarians in the promotion of knowledge about the existence of university-based IRs, the participation rate of the faculty members was still low. This study suggests that libraries/librarians should play a more active role in encouraging faculty members to use university-based IRs as a new channel for scholarly communications. The new role may include offering new services related to research data management. An interviewee from biochemistry field showed his interest in depositing a data set into the university-based IRs developed by his university. However, the interviewee expressed concern about whether the university-based IR was a safe place for his data set and whether the librarians were capable of dealing with sensitive data such as human subjects and clinical data. The interviewee said, "If the university-based IR will allow faculty members to self-archive this type of data in the future, it is

essential that they make clear policy regarding this issue and make sure that librarians can deal with it" (IV002). Therefore, this study suggests university libraries and librarians should make a clear policy regarding research data services and work closely with faculty members to support them.

Sixth, it may be beneficial to use a combination of methods to promote IRs. The results of this study show that IR staff members and librarians, library/university websites, and colleagues were found to be the major sources through which the faculty members were informed about university-based IRs. This evidence shows that IR staff members and librarians played a significant role in promoting of university-based IRs, as also shown by many other studies (Foster & Gibbons, 2005; Kim, 2008). Several other ways in which the faculty members had learned about university-based IRs included personal contact with other important persons, such as deans/directors of the libraries, deans of colleges, and presidents/vice presidents of the universities; events such as university and faculty meetings and international and national conferences; and by other ways such personal contact via electronic mail and Google searches. The results of this study suggest that using a combination of methods in promoting university-based IRs can be beneficial for reaching a larger number of potential users and may help to recruit more participants.

Seventh, IR user-interface design and search interface systems should be improved to fit the users' needs. At the time of the study, all university-based IRs in the current study had adopted DSpace and relied on its user-interface design. In both the survey and the interviews, a number faculty members complained about the user-interface and search-interface of IRs developed by their respective universities. Some faculty members also cited this issue as a reason for not using the IR. At present, in the digital environment, user-interface design is becoming

more important since users rely solely on user-interface to reach and explore digital collections as well as IR collections. If the user-interface fails to capture user attention, it is less likely that they will use those collections or return to use them again in the future. The results of this study suggest using a Web 2.0 approach for designing and improving the user-interfaces of university-based IRs. This finding is in line with those of a previous study which confirm that Web 2.0 design patterns and approaches have potential for enhancing community participation in institutional repositories, particularly in the case of PocketKnowledge at the Teachers College, Columbia University (Cocciolo, 2010). The traditional browsing system which allows users to browse by communities, subjects, authors, and titles, may need to be redesigned through the addition of more browse functions.

Finally, at this time the majority of content in university-based IRs is research papers, thesis and dissertations (graduate students are required to deposit their work in university-based IRs except for MUIR). Other resources, such as grey literature, are less likely to be deposited. The recommendation of this study is that university-based IRs should be expanded to accept a greater variety of works. Supplementary materials related to research such as conference papers, presentations, and posters of not only faculty members but also other stakeholders such as researchers, staff, and students should be allowed for self-archiving. Additionally, a faculty member in biochemistry suggested that even unpublished papers or negative research results should be allowed to be posted in university-based IRs, since these resources can benefit other researchers by allowing them to build upon them (IV002). Depositing such work into university-based IRs would provide a better chance for visibility and accessibility of the work.

Although the survey data show that none of the faculty respondents had deposited a data set in a university-based IR, a faculty member in biochemistry expressed his interest toward data

sharing. He was also interested in depositing a data set into the university-based IR developed by his university. However, the faculty member indicated that he was not sure if he could trust either librarians or the system. Libraries and IR developers may consider collecting and preserving data sets in IRs and preparing for this new service. In order to guarantee long-term preservation and accessibility of research data, collaborative work between librarians as metadata specialists and faculty members, who are data originators, may be needed.

6.5   Conclusions

This study provides a holistic picture of university-based IRs from the faculty members' perspective. The core purposes of university-based IRs are to store and to make accessible digital materials created by their communities. Dorner and Revell (2012) proposed a simple equation by which IRs can become a successful innovation: "Input of documents + Access/Use of documents = Success of the IR" (p. 262). Evidence found in this study confirms that awareness of IRs is key for both sides of the equation. For the input (deposit) side, it was found that those who had been aware of university-based IRs were more likely to agree that the development of IRs was important. The greater proportions of them were contributors and were more likely to become involved and deposit their work in the future. On the access and usage side, it is clear that faculty members who had been aware of IRs were more likely to use them. This study suggests that the inclusion of awareness of IRs in Dorner and Revell's equation may help to increase the uptake of IRs and help them to become a successful innovation: "Awareness of IRs (Input of documents + Access/Use of documents) = Success of the IR."

However, in view of the findings of this study, the numbers of those who had been aware of IRs but did not contribute and did not know whether to contribute seems to be high, and these numbers should not be ignored. Education in and promotion of open access and institutional

repositories can play an important role in the adoption of IRs in this context. Proper guidance is also essential and must be made available in a variety forms. This study confirms that the success of university-based IRs does not depend on a single factor; rather, every factor must be taken into account. The usefulness of university-based IRs (performance expectancy), social influence, and resistance to change are significant predictors that can enhance a faculty member's intention. Additionally, faculty members' usage of university-based IRs can be predicted by their intention and their altruistic motivation. Other factors can also contribute to the success of IRs. Therefore, all of these factors can be used to assist IR managers and developers to implement strategies, derived from the users' perspectives, to increase faculty participation and involvement, which will help to improve the uptake of university-based IRs in Thailand. Besides, the collaborative efforts among faculty members (as contributors and users), libraries/librarians (as IR developers), and other stakeholders within communities are necessary and essential for the sustainability of university-based IRs.

APPENDIX A

IRB APPROVAL AND INFORMED CONSENT FORM

UNT®

November 12, 2015

Supervising Investigator: Dr. Jeonghyun Kim
Student Investigator: Sujira Ammarukleart
Department of Library and Information Sciences
University of North Texas

Re: Human Subjects Application No. 15461

Dear Dr. Kim:

As permitted by federal law and regulations governing the use of human subjects in research projects (45 CFR 46), the UNT Institutional Review Board has reviewed your proposed project titled "Factors Affecting Faculty Acceptance and Use of Institutional Repositories in Thailand." The risks inherent in this research are minimal, and the potential benefits to the subject outweigh those risks. The submitted protocol is hereby approved for the use of human subjects in this study. **Federal Policy 45 CFR 46.109(e) stipulates that IRB approval is for one year only, November 12, 2015 to November 11, 2016.**

When building your online informed consent notice, please copy the text exactly as it appears on the version approved by the IRB.

It is your responsibility according to U.S. Department of Health and Human Services regulations to submit annual and terminal progress reports to the IRB for this project. The IRB must also review this project prior to any modifications. **If continuing review is not granted before November 11, 2016, IRB approval of this research expires on that date.**

Please contact Shelia Bourns, Research Compliance Analyst, at extension 4643, if you wish to make changes or need additional information.

Sincerely,

Chad Trulson, Ph.D.
Professor
Department of Criminal Justice
Chair, Institutional Review Board

CT:sb

University of North Texas Institutional Review Board

Informed Consent Notice

Before agreeing to participate in this research study, it is important that you read and understand the following explanation of the purpose, benefits and risks of the study and how it will be conducted.

Title of Study: Factors Affecting Faculty Acceptance and Use of Institutional Repositories in Thailand

Student Investigator: Sujira Ammarukleart, University of North Texas (UNT) Department of Library and Information Sciences. **Supervising Investigator:** Dr. Jeonghyun Kim.

Purpose of the Study: You are being asked to participate in a research study which seeks to determine the factors affecting faculty acceptance and use of university-based institutional repositories in the Thai research university context. This study will explore the relationship and relative importance of factors that influence a user's behavioral intention and usage behavior regarding the use of institutional repositories.

Study Procedures: You will be asked to complete the online survey that will identify your acceptance and use of institutional repositories (IR). The estimated time duration for completion of the survey is no more than 45 minutes.

Foreseeable Risks: Your participation in this online survey involves risks to confidentiality similar to a person's everyday use of the Internet.

Benefits to the Subjects or Others: This study is not expected to be of any direct benefit to you, but we expect to understand the factors influencing individuals' intention to utilize IRs. This understanding may assist IR developers to implement strategies, derived from the users' perspectives, to increase and improve the uptake of IRs, particularly for universities in Thailand.

Compensation for Participants: There is no compensation for respondents. Your participation is completely voluntary and you may withdraw your participation at any time without penalty.

Procedures for Maintaining Confidentiality of Research Records: Confidentiality will be maintained to the degree possible given the technology and practices used by the online survey company. However, all data will be kept and stored in a password protected electronic format to minimize the risks to confidentiality. The confidentiality of your individual information will be maintained in any publications or presentations regarding this study.

Questions about the Study: If you have any questions about the study, you may contact *Sujira Ammarukleart* at SujiraAmmarukleart@my.unt.edu or *Dr. Jeonghyun Kim* at Jeonghyun.Kim@unt.edu .

APPROVED BY THE UNT IRB
FROM 11/12/15 TO 11/11/16

Review for the Protection of Participants: This research study has been reviewed and approved by the UNT Institutional Review Board (IRB). The UNT IRB can be contacted at (940) 565-4643 with any questions regarding the rights of research subjects.

Research Participants' Rights: Your participation in the survey confirms that you have read all of the above and that you agree to all of the following:

- *Sujira Ammarukleart* has explained the study to you and you have had an opportunity to contact him/her with any questions about the study. You have been informed of the possible benefits and the potential risks of the study.
- You understand that you do not have to take part in this study, and your refusal to participate or your decision to withdraw will involve no penalty or loss of rights or benefits. The study personnel may choose to stop your participation at any time.
- You understand why the study is being conducted and how it will be performed.
- You understand your rights as a research participant and you voluntarily consent to participate in this study.
- You understand you may print a copy of this form for your records.

APPROVED BY THE UNT IRB
FROM __11/12/15__ TO __11/11/16__

APPENDIX B

QUESTIONNAIRE (ENGLISH VERSION)

	FACTORS AFFECTING FACULTY ACCEPTANCE AND USE OF INSTITUTIONAL REPOSITORIES IN THAILAND			
	Section 1: This section is designed to gather information regarding your awareness and usage of IRs as well as self-archiving experience.			
	Direction: Please complete the following questions.			
1.	Have you ever heard about Institutional Repositories before this study?	☐Yes	☐No	
2.	Are you aware of the Institutional Repository (IR) in your university?	☐Yes	☐No	
3.	How did you learn about the Institutional Repository in your university? (Select all that apply) ☐IR staff/Library staff contacted me. ☐The Dean of my faculty told faculty members about the IR. ☐Another university authority told me about the IR. ☐Faculty colleagues told me about the IR. ☐I found publicity about the IR on university/library web sites. ☐Other (please specify)…………………………………………………………			
4.	Have you ever deposited your scholarly work and teaching materials or any other of your work into your university-based IR? (If the answer is "No", skip to question No. 8)	☐Yes	☐No	
5.	In the past two years, what are the types of scholarly works and teaching materials that you have deposited into the university-based institutional repository? ☐ Journal article ☐ Data set ☐ Pre-refereed draft ☐ Dissertation/thesis ☐ Publishers' PDF file of pre-refereed article ☐ Conference presentations ☐Final version of refereed articles ☐ Course syllabi ☐ Research reports/technical reports ☐ Lecture notes, handouts, and assignments ☐ Book chapters ☐ Other (please specify)……………………………..			
6.	Who was involved in depositing your work in the university-based institutional repository? ☐Self (Self-archiving) ☐Assistants/Student Assistants ☐Department staff ☐Library staff ☐Colleagues ☐Other (please specify)………………………………			
7.	When was the last time that you deposit your work to the university-based IR. ☐1-6 months ago ☐More than 3 years ago ☐7-12 months ago ☐Other (please specify)……………………………... ☐1-2 years ago			
8	Have you ever plan to deposit your work to the university-based IR in the near future? ☐Yes ☐No (please provide any reason behind your decision)……………………………….......................... ☐Uncertain (please provide any reason behind your decision)……………………………..................			
9	How do you rate the importance of the development of an institutional repository for archiving and disseminating scholarly work and teaching materials at your University? (Select the one that applies to you) ☐Important ☐Not important			

	Section 1: This section is designed to gather information regarding your awareness and usage of IRs as well as your self-archiving experience. (Cont.)
	Direction: Please complete the following questions.
10.	Do you agree or disagree that any works should undergo peer-review process before depositing in university-based IRs? ☐Agree ☐Disagree
11.	If your answer in Question No. 10 is AGREE, who should conduct the review process? *(Select ONLY ONE you think MOST appropriate.)* ☐Department Research Committee ☐Library Director and IR staffs/librarian ☐Faculty Research Committee ☐Do Not Know ☐University Research Committee ☐Other (Please specify)………………………………… ……………………………………………………..
12.	Have you ever searched and used any works available in your university-based IR? ☐Yes ☐No (If the answer is "No", skip to question No. 15)
13.	Have you used material available in your university IR for the following activities? ☐Research related activities ☐Teaching related activities ☐Other scholarly productivity related activities ☐Other activities (Please specify)……………………………………………………………………… …………………………………………………………………………………………….
14.	How many times have you ever search and used any works available in your university-based IR? ☐Many times a day ☐Every day ☐4-5 times a week ☐2-3 times a week ☐Every week ☐Every month ☐Less often than every month
15.	Have you ever planned to search and use your university-based IR in the near future? ☐Yes ☐No (please provide any reason behind your decision)……………………………................... ☐Uncertain (please provide any reason behind your decision)……………………………...................

Section 1: This section is designed to gather information regarding your awareness and usage of IRs as well as your self-archiving experience. (Cont.)						
Direction: Please complete the following questions.						

	Do you agree or disagree with the followings statements regarding the usage of contents available in the university-based IRs.					
	Statement	Strongly Agree	Agree	NAND	Strongly Disagree	Strongly Disagree
16.	All users should be allowed to make any comments on work available in the university-based IRs.					
	Any use of a work deposited in the university-based IRs is acceptable as long as it is acknowledged and cited.					
	Individual users should register before using the university-based IRs, so that the usage statistics can be collected.					

17.	In the past three years, have you ever made your scholarly work and teaching materials available on other publicly accessible sites on the Internet? ☐Personal web pages ☐Research group/lab/center web sites ☐Department/Faculty web sites ☐Subject-based open access repositories ☐Open access journals ☐The Thai National Research Repository (http://www.tnrr.in.th/2558/) ☐ThaiLIS (http://tdc.thailis.or.th/tdc/) ☐TRF eLibrary (http://elibrary.trf.or.th/) ☐Other (please specify)…………………………………………………………………...

18.	In the past three years, what are the types of scholarly work and teaching materials that you have made available through the publicly accessible sites on the Internet
	☐ Journal article ☐ Data set
	  ☐Pre-refereed draft ☐ Dissertation/thesis
	  ☐Publishers' PDF file of pre-refereed article ☐ Conference presentations
	  ☐Final version of refereed articles ☐ Course syllabi
	  ☐ Research reports/technical reports ☐ Lecture notes, handouts, and assignments
	  ☐ Book chapters ☐ Other (please specify)……………………………..

19.	Who was involved in making your work available through publicly accessible sites on the Internet? ☐Myself (Self-archiving) ☐Assistants/Student Assistants ☐Department staff ☐Library staff ☐Colleagues ☐Other (please specify)…………………
20.	Have you used material available through publicly accessible sites on the Internet for the following activities? ☐Research related activities ☐Teaching related activities ☐Other scholarly productivity related activities ☐Other activities (Please specify)…………………………………………………………………………………… ……….
	End of Section 1 (Please continue to Section 2)

Section 2: This questionnaire is designed to gain a better understand of factors that influence faculty members to accept and use of Institutional Repositories (IRs). Your answers are confidential.					
Directions: Please indicate your opinion about each of the questions below by making one of the six responses in the column on the right side. You may choose any of the five possible responses, ranging from (1) "Strongly Disagree", (2) "Disagree", (3) "Neither Agree nor Disagree", (4) "Agree", (5) "Strongly Agree" as each represents a level of agreement to indicate how you feel about the statement.					

Attitude Toward IRs (ATT)		1	2	3	4	5
1	Publishing in IRs is a good idea.					
2	Publishing in IRs would make my work more interesting and accessible.					
3	Accessing and use of work in IRs is a good idea.					
4	Content in IRs is beneficial to scholarly communication.					
Performance Expectancy (PE)		1	2	3	4	5
5	I would find IRs useful in my job.					
6	IRs enable me to publish my teaching and scholarly work more quickly.					
7	Using IRs increases my teaching and scholarly productivity*.					
8	Posting my teaching and scholarly work on the university IRs will increase the chance to communicate my work to peers.					
9	IRs enable researchers from other countries to access my work more easily.					
10	My university will accept work on IRs as an alternative to publication for promotion.					
Effort Expectancy (EE)		1	2	3	4	5
11	I expect interaction with IRs to be clear and understandable.					
12	I would find IRs easy to use.					
13	Learning to use IRs is easy for me.					
14	It is easy to access work published in IRs from the Internet.					
15	Posting my materials on IRs takes time away from my work.					
16	Additional time and effort is required to make my materials available through IRs.					
Social Influence (SI)		1	2	3	4	5
17	People who influence my behavior think that I should use IRs.					
18	My colleagues think that I should use and publish in IRs.					
19	My funding agency requires me to use and publish in IRs.					
20	My institution requires me to use and publish in IRs.					
21	The administration of this university has been supportive of the use of IRs.					
22	In general, the university has supported the use of IRs.					
Resistance to Change (RTC)		1	2	3	4	5
23	I generally prefer to use other traditional scholarly communication media with which I am familiar over starting to use IRs.					
24	I find it's exciting to try out and use IRs.					
25	I often feel a bit uncomfortable about trying out/using IRs, even though doing so may be beneficial to me.					
26	If I were to be informed that there is going to be a significant change regarding the way things are done at work, I would probably feel stress.					
Altruism (ALT)		1	2	3	4	5
27	I will continue posting my work on IRs even if others in my field do not.					
28	Posting my materials on IRs will help other researchers build on my research findings.					
29	Posting my materials on IRs allows other scholars to access items that they could not otherwise use.					

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* Faculty members' scholarly productivity can be categorized into five areas: books, journal articles, citations, grants, and honors/awards

Section 2: This questionnaire is designed to gain a better understand of factors that influence faculty members to accept and use of Institutional Repositories (IRs). Your answers are confidential. (Cont.)					
Directions: Please indicate your opinion about each of the questions below by making one of the six responses in the column on the right side. You may choose any of the five possible responses, ranging from (1) "Strongly Disagree", (2) "Disagree", (3) "Neither Agree nor Disagree", (4) "Agree", (5) "Strongly Agree" as each represents a level of agreement to indicate how you feel about the statement.					

Copyright Concerns (CCs)	1	2	3	4	5
30 I need to ask permission from publishers to post my work on IRs.					
31 If I post my work on IRs without permission, I may infringe on copyright.					
32 I need permission from co-authors or collaborators to post my work on IRs.					
33 I cannot publish my work if I post it on IRs before publication.					

Trust Toward IRs (TTIRs)	1	2	3	4	5
34 If I post my materials on IRs, readers may plagiarize or fail to cite my work.					
35 If I post my materials on IRs, the integrity of my work will be compromised.					
36 Materials on IRs are not maintained securely.					
37 I trust the quality of the repository process (documentation, data cleaning, and quality checking).					

Facilitating Conditions (FCs)	1	2	3	4	5
38 I have the knowledge necessary to use IRs.					
39 I have the resources (e.g. Internet access) necessary to use IRs.					
40 A specific person (or group) is available to give me guidance to publish in IRs.					
41 A specific person (or group) and guidance is available for me to access IRs.					

Behavioral Intention (BI)	1	2	3	4	5
42 I intend to use IRs.					
43 I intend to increase my use of IRs in the future.					
44 I plan to use IRs in the next few months.					

Usage Behavior (UB)	1	2	3	4	5
45 I use IRs to communicate with other researchers.					
46 I use IRs to distribute/disseminate scholarly work.					
47 I use IRs to distribute/disseminate teaching-related materials.					
48 I use IRs to access scholarly literature and other teaching-related materials.					

End of Section 2 (Please continue to Section 3)					

Section 3: This section is designed to gather demographic information. Your answers are confidential.			
Direction: Please complete the following demographic information.			
1.	Gender	☐Male	☐Female
2.	Age	……………………………………………	
3.	What is your highest academic qualification? ☐PhD ☐Bachelors Degree ☐Master Degree ☐Other (please specify)………………………………			
4.	What is your discipline? (i.e. Engineering, Economics, Humanities and Languages): ………………………………………………………………………………………………………..			
5.	What is the Institutional Repository developed by your university? ☐CUIR (http://cuir.car.chula.ac.th/sidebar/report.jsp) ☐MUIR (http://intranet.li.mahidol/muir/) ☐PSU Knowledge Bank (http://kb.psu.ac.th/psukb/) ☐SUTIR (http://sutir.sut.ac.th:8080/sutir/)			
6.	Which of the following best describes your current academic position? ☐Professor ☐Associate Professor ☐Assistant Professor ☐Lecturer/Instructor ☐Other (please specify)………………………………			
7.	Which of the following roles have you performed in the past year? (Select all that apply) ☐Author of journal article ☐Referee/reviewer of a journal ☐Editorial board member of a professional association ☐Editorial board member of a journal ☐Editor of a journal ☐Other (please specify)………………………………			
8.	Approximately, how many articles do you publish each year? ☐0 ☐3-4 ☐1-2 ☐More than 5			

9	Please indicate the extent to which you agree or disagree with each of the following statements regarding Internet usage skills. (Select the appropriate number that applies to you. (1) "Strongly Disagree", (2) "Disagree", (3) "Fair", (4) "Agree", (5) "Strongly Agree"	1	2	3	4	5
	I feel confident in searching for and accessing scholarly information on the Internet.					
	I feel confident in publishing and disseminating my scholarly information on the Internet.					
	I feel confident in creating/editing my personal website					
	I feel confident publishing on the Internet whether or not there is no one around to show me how to do it.					

10	Would you like to participate in the follow-up semi-structured interview? ☐Yes- Please provide your email address or other contact information..………………………………. ……. ☐No
THANK YOU FOR YOUR PARTICIPATION	

APPENDIX C

INTERVIEW PROTOCOL (ENGLISH VERSION)

Factors Affecting Faculty Acceptance and Use Of Institutional Repositories In Thailand
Interview Protocol

1. Would you please provide information about yourself with respect to your use of your university-based IR?

2. Do you consider yourself as an IR contributor or Non-contributor?

Interview Protocol: IR Contributor

1. Please tell me about your last experience posting your work to your university-based IR or other publicly accessible sites such as open access repositories, discipline-based repositories, and open access journals.

2. Are there any other people who help you to deposit your work? Who is actually involved in this process? If you do it by yourself (self-archive), do you think this process requires additional time and effort? Do you have any issues or concerns regarding this process? If the answer is yes, could you please identify your issues or concerns?

3. Please tell me about your decision to make available or deposit your work to your university-based IR or other publicly accessible sites.

     3.1 Why do you decide to make a certain works publicly accessible (particularly in relation to scholarly works or teaching materials)?

     3.2 How do you decide where to post or deposit a particular piece of work and make it available for public access? What are the important factors that contribute to your decision?

     3.3 Are there any other people such as your grant-awarding bodies, peers, or other important individuals that influence your decision to deposit your work into your university-based IR or other publicly accessible sites? How much do those individual opinions affect your decision to deposit or self-archive your work? Please give an example.

     3.4 How much does your university/faculty/department affect your decision to self-archive?

4. Is your university-based IR open access?

5. Have you ever heard about open access before this survey? If you have heard about open access, please tell me about your opinion of open access. Do you agree or disagree with the idea of open access? Please explain in more detail.

6. What are your thoughts about posting or depositing your work to your university-based IR and other open access forums, regarding the following issues?

     6.1 What do you think about copyright issues? Are you aware of publisher policies relating to posting your work on your university-based IR and other open access forums?

     6.2 There is a belief that depositing work to university-based IR or other open access forums provides safety (long-term preservation) and long-term accessibility for scholarly work. Do you agree or disagree with this idea? What do you think about this?

     6.3 Have you considered the possibility that making your work publicly accessible on the web helps other researchers build on that research, or allows others to access your work that they could not otherwise access?

     6.4 How common is this behavior (the behavior of making your work publicly available through your university-based IR and other open access forums) in your field (or university or department)?

     6.5 Do you have any concerns regarding other readers using your work stored in your university-based IR and other open access forums? Please explain your concerns in detail.

7. Do you think there are any benefits of posting your work on your university-based IR and other open access forums?

7.1 Have you experienced increased communication with peers, as a result of depositing your work to your university-based IR or other open access forums?

7.2 Have you ever checked the usage rates and citation rates of your work that is publicly accessible on the Internet? If so, what is your opinion regarding this point?

7.3 What do you think about the impact or recognition of your work that is publicly accessible on the Internet?

8. Have you ever accessed and used any work published in your university-based IR and other open access forums (open access repositories and open access journals) for your research-related activities and teaching-related activities? What reasons contribute to your decision to access and use or not to access and use any of that work?

9. Do you have any concerns or obstacles regarding the depositing of scholarly work and teaching materials in your university-based IR?

10. Do you have any suggestions that can help to improve your university-based IR?

Interview Protocol: IR Non-Contributor

1. Is your university-based IR open access?

2. Have you ever heard about open access before this survey? If you have heard about open access, please tell me about your opinion about open access. Do you agree or disagree with the idea of open access?

3. What are your thoughts about depositing and making your scholarly work and teaching materials available on your university-based IR and other open access forums (open access repositories and open access journals)?

3.1 What do you think about copyright issues? Are you aware of publisher policies relating to posting your work on your university-based IR and other open access forums?

3.2 There is a belief that depositing work into university-based IR or other open access forums provides safety (long-term preservation) and long-term accessibility for scholarly work. Do you agree or disagree with this idea? What do you think about this?

3.3 Have you considered the possibility that making your work publicly accessible on the web helps other researchers build on that research, or allows others to access your work that they could not otherwise access?

3.4 How common is this behavior (the behavior of making your work publicly available through your university-based IRs and other open access forums) in your field (or university or department)?

3.5 Do you have any concerns regarding other readers using your work that is stored in your university-based IR and other open access forums?

4. Do you plan or are you willing to deposit your work in your university-based IR and other open access forums (open access repositories and open access journals) in the near future?

4.1 If yes, what types of materials are you going to deposit into your university-based IR and other open access forums? What motivates you to deposit your work?

4.2 If no, what would motivate you to deposit your work?

5. If you would not be willing to deposit your work into the university-based IR in the near future, what makes you reluctant to deposit your work?

6. If you would not be willing to deposit your work into any open-access forums, what makes you reluctant to deposit your work?

7. Do you see some benefits of posting your work to your university-based IR and other open access forums (open access repositories and open access journals)? Please explain why and provide detailed information.

8. How much do other important individuals such as grant-awarding bodies and peers affect your decision not to deposit your work into your university-based IR and other open access forums?

9. Have you ever accessed and used any work published in your university-based IR and other open access forums (open access repositories and open access journals) for your research-related activities and teaching-related activities? What reasons contribute to your decision to access or not to access and use any of that work?

10. Do you have any concerns/suggestions that can help to improve your university-based IR?

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