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SUCCESS FACTORS OF INSTITUTIONAL REPOSITORIES (IR) PERFORMANCE IN MALAYSIAN ACADEMIC LIBRARIES

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CONFIRMATION BY PANEL OF EXAMINERS

I certify that a Panel of Examiners has met on 12 May 2022 to conduct the final examination of Mohd Helmi bin Masor @ Mansor on his **Doctor of Philosophy** thesis entitled "Success Factors of Institutional Repositories (IR) Performance in Malaysian Academic Libraries." in accordance with Universiti Teknologi MARA Act 1976 (Akta 173). The Panel of Examiner recommends that the student be awarded the relevant degree. The Panel of Examiners was as follows:

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I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

The purpose of this study is to examine the success factors of institutional repositories and its institutional repositories performance in Malaysian academic libraries. The Institutional Repositories (IR) is a new scholarly communications platform in providing and disseminating digital contents of a university and academic institution. The objectives of the study are: (1) to identify the perception of academicians on the success factors of institutional repositories and its IR performance in Malaysian academic libraries, (2) to compare the success factors of institutional repositories in terms of genders, grade position, education level, years of work experience and work department, (3) to examine the relationship between the success factors of institutional repositories and its IR performance and (4) to measure the effect of success factors on IR performance. This study is a quantitative study using the survey method. The questionnaire was distributed to 357 academicians in five research universities in Malaysia. The research universities are Universiti Malaya (UM), Universiti Teknologi Malaysia (UTM), Universiti Sains Malaysia (USM), Universiti kebangsaan Malaysia (UKM) and Universiti Putra Malaysia (UPM). Respondents are academicians from various faculties and fields starting from grade DS 45 until VK (Professor). From the total respondents of 357, only 257 (71.9%) of the questionnaires were returned and useable for further analysis by Statistical Package for the Social Sciences (SPSS). Descriptive statistics of perceptions scores such as demographic details of respondents, means and standard deviations for each dimension were tabulated. Analytical methods for inferential statistics such as correlation analysis, statistical test of significant differences and multiple regression analysis were conducted. This study measures the perceptions on six success factors of institutional repositories (IR) that consists of knowledge sharing, self-archiving, IR usage, IR policy, IR procedure and copyright awareness toward IR performance among academicians in a Malaysian university and to seek the relationship between success factors of IR and IR performance. The result indicated that knowledge sharing was the most preferred response as perceived by the respondents (mean = 0.648) followed by IR usage (mean = 0.547). It also showed that, knowledge sharing and IR usage were moderately correlated with institutional repositories performance. Through ANOVA test, the results showed that there were significant differences on *knowledge sharing, IR usage, copyright awareness* among age group of respondents. In terms of grade group, *knowledge sharing and copyright awareness factors* were significantly different. For multiple regression analysis, the dimensions of *Knowledge Sharing, Self-Archiving, IR usage, IR Policy, IR procedure* and *Copyright Awareness* explained 55.1% of the variance in *Institutional Repositories Performance*. There is adequate evidence to conclude that the success factors of institutional repositories; *Knowledge Sharing, IR Usage, IR Policy and Copyright Awareness* are significant predictors in measuring IR performance. This research contributes to the development of an empirical framework for assessing IR performance, managerial skills in IR, the literature and knowledge in IR services and the development of a questionnaire. The outcome is important for academic libraries, particularly in terms of improving institutional repository services and measuring the performance of the university's research activities.

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Abbreviations

IR	Institutional Repositories
KMO	Kaiser-Meyer-Olkin
PCA	Principle Component Analysis
UM	Universiti Malaya
USM	Universiti Sains Malaysia
UTM	Universiti Teknologi Malaysia
UKM	Universiti Kebangsaan Malaysia
UPM	Universiti Putra Malaysia
SPSS	Statistical Package for Social Science
OpenDOAR	Global Directory of Open Access Repositories
OA	Open Access
CSF	Critical Success Factor

CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

Various types of information, documents, videos, audios and multimedia can be accessed and retrieved on the fingertips via using the World Wide Web (WWW) browsers. These are common platform for Internet applications. The rapid development of technology, which is the WWW is giving challenges to academic libraries in providing high quality information sources and services to their users. In the fast development of Information Communication and Technology (ICT), it will give impact and opportunities to universities, colleges and educational institutions, which may create alternative ways or solutions in order to publish, disseminate and acquire scholarly information. Besides, with the advent of the ICT, academic libraries are facing the new revolution in the ways of collecting, providing, preserving and disseminating of information in the digital era. With the changing trends, the library users have moved to the new platform in searching the information (Masor & Kassim, 2020).

Academic libraries were traditionally acknowledged as the main reference source for researchers to get scientific information through printed journal collection service. Besides that, academic libraries were also considered as the main custodian of scientific information, especially in higher education institutions (Fox & Hanlon, 2015). However, due to the limitation of budget and increasing cost of acquisition of scholarly journals from year to year, it has caused constraints and barriers to library management in providing the library users' need. This scenario and limitation of sources to knowledge is counter productive and against the library goals of information services.

Open access concept for scholarly articles means free online access for readers or library users to the digital content provided. An open access approach means a strategy used by authors and publishers to eliminate all financial, technical and legal issues related to the access problems, limiting and hindering the access to the research articles. The costs related to open access were funded by the author to ensure that his/her articles were freely accessible through the Internet (Suber, 2002). The Association of Research Libraries (2004) defined open access strategy as a cost-effective approach in the knowledge sharing and dissemination of information world-wide. This is an

alternative way to replace the traditional subscription-based publishing model made possible by new digital technologies and network communications. Through the open access model, it will increase the access and usage of scholarly literature through modern communication technologies. Zhang (2007) found that the open access model has become a trendy topic and has been debated and discussed among previous researchers over the past few years.

The Budapest Open Access Initiatives (2002) categorised open access into two domains, open access journals and open access repositories. Open access journals were known as Golden Road, while open access repositories were known as Green Road. There were diverse open access repositories (OARs) that have grown over the time and technologies. Pinfield (2009) defined repository as a group of systems and services that provided features for collection management, information retrieval process, storage and preservation of scholarly outputs, display the search results and reuse of digital objects. Repositories platforms can be implemented by the institutions, subject experts, research communities, research funders and other groups for the purpose of one stop centre and dissemination of research articles. The repositories provide access to the varieties of digital contents, including journal articles, peer-reviewed articles, chapters in book, theses, research data sets, teaching and learning materials that supported the global research information environment (Pinfield, Salter, Bath, Hubbard, Millington, Anders & Hussain, 2014).

Open Access (OA) to literature is believed to be the alternative solution for economic barriers indicated by the high cost of journals' acquisition and journal subscriptions for libraries with restricted budgets (Suber, 2004). With serials crisis scenario, academic libraries have sought alternative solution for open access. Research supports sentiment highlighted that open access approach is dire predictions to the success of the academic library services. Schmidt, Sennyey and Carstens (2005) mentioned that the intention of academic libraries in providing access to scholarly information could not afford to ignore open access initiative and open-source platform.

The number of institutional repositories around the world has grown rapidly and aligned with the growth of literature on institutional repositories. Institutional repositories are considered as a part of digital library that capture original research output and other intellectual property that were produced and generated by communities of institutions in various fields (Crow, 2002). Institutional repositories have been established in academic and research organisations as a tool for institutions' showcase

and facilitated the dissemination of scholarly research outputs widely. Institutional repositories are platform for collecting, storing, disseminating and preserving digital resources and interoperatable by using software that complied with the standard protocol Open Archives Initiative (OAI). Based on the development and implementation all over the world, this platform was championed by academic libraries and offered the scientific research output from its community through open access strategy (Chan, 2004). Rieh and Jea (2008) highlighted that library managers and academic librarians mostly lead in terms of planning, implementing, administrating, maintaining and preserving the institutional repositories for the long-term commitment. Cullen and Chawner (2011) agreed that universities and academic libraries as a part of institution or department had been involved in the transformation of traditional scholarly communication platform to the digital repository generation.

Institutional repositories (IRs) are relatively recent innovation among the universities and academic institutions. Most Malaysian academic libraries adopt and adapt open-source software and technology as a platform for assessing, preserving and disseminating library resources among their communities (Perpun, 2012). IRs contain various types of research results such as intellectual property. With this intellectual property, it gives the academic impact and institutional research visible on websites under university's domain (Antelman, 2004). IRs acts as a platform in the sharing of intellectual property in the context of academic and research institutions (Lagzian, Abrizah & Wee, 2015a).

With the concept of open access, it is free to access and use repository contents without any authentication access hence, not bound with any contract licensed for various purposes such as anyone can read, copy, download, print, share and others. Institutional repositories provide access to the various contents of institution and types of contents such as books, journal articles, conference papers, theses, dissertations, newspaper cuttings, lecture notes, learning objects, maps, pre-prints, post-prints, research reports, audio-visual materials, past year examination papers, book chapters, project reports and others. In terms of access, it can be accessed through web-based via the address. Only the registered users have permissions to access the full-text for certain collections such as theses and examination papers in some institutions.

The institutional repositories have large numbers of advantages to the university in general and specifically to the author (Asadi, Abdullah, Yah & Nazir, 2019a). Institutional repositories do not only benefit the authors or researchers, but also the

university and other intellectual communities. The benefit is due from the sharing of this research information. Through institutional repository initiatives, it will indirectly give impact to the academic libraries' services and is significant in providing new platform for scholarly communication as a whole (Cullen & Chawner, 2010). The main reason that academic libraries adopt and adapt this technology is to convince academicians with the values of submission of their research results in institutional repositories. It helps in not only making their research and publications publicly available on the web, but also in fee-based databases, scholarly journals, or books. Their work is easily to be used and quoted in other research. Additionally, the advantages of institutional repositories to the university is that, it boosts the visibility of the university and reputation of the university through world-wide Internet access (Omeluzor, 2014). Besides, it also supports learning and teaching with the ability to monitor and analyse research performance (Hassan, 2017). Moreover, institutional repositories help in the stewardship and preservation of university's research outputs in the digital format for the long-term, which is free for researchers from thinking about matters related to the maintenance of their articles either in personal laptop or website.

Based on the statistics from OpenDOAR (2021) which is an authoritative global directory of open access repositories, there are more or less 5629 repositories listed as at August 2021 all over the countries compared to year 2006 which only have 100 repositories registered with OpenDOAR. OpenDOAR hosted repositories that provide access to the academic university research output and other resources freely to the users. OpenDOAR has processed and reviewed seriously for each record within their database in order to provide the trusted services to the worldwide community. This platform and services were launched in year 2005 as a collaborative project between two universities namely University of Nottingham and Lund University.

Health and medicine, science and technology general, business and economics, social science general, law and politics, history and archaeology, arts and humanities general, education, ecology and environment, agriculture, food and veterinary, biology and biochemistry, computers and IT, geography and regional studies, language and literature, philosophy and religion, mathematics and statistics, psychology, electrical and electronic engineering, civil engineering, architecture and others have all been covered in the OpenDOAR repository (OpenDOAR, 2021).

In addition, OpenDOAR supported a wide range of research output formats, including journal articles, theses and dissertations, books, chapters and sections,

conferences and workshop papers, reports and working papers, other special item types, bibliographic references, learning objects, datasets, patents, software and other data. At the same time, this repository contains multiple language such as English, Spanish, Japanese, German, French, Portuguese, Turkish, Croatian, Russian and others. English language is the dominant language in the OpenDOAR repository compared to other languages. The content of institutional repositories is also diversed and the majority of repositories being in English (Lone, Rather & Shah, 2008; Roy, Biswas & Mukhopadhyay, 2013). Loan and Sheikh (2016) revealed that the primary resource language is English, which is followed by Spanish and Japanese. Ahmad, Alreyaee and Rahman (2014) identified the growth rate and development of repository material content in Asia and discovered that the growth pattern is increasing, with Japan, India and China being the major contributors. In sharing of research materials, most institutional repositories continued to use English as the content language of choice.

The concept of Institutional Repositories (IRs) has been dealt extensively in the literature and has generated many academic publications both in specialised journals and those of more general scope. According to Lynch (2003, p. 328), 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". Crow (2002) defined institutional repositories as digital collections for capturing and preserving the intellectual output of a single or multi-university.

Dorner and Revell (2012) defined that institutional repositories or IRs are the recent innovation used by universities, polytechnics and colleges as a platform for open access to the academic outputs and research students. The academic outputs include conference papers, research findings, lecturer notes, slide presentations and others that are related to the teaching and learning activities.

Open access repositories through institutional repositories can transform the research scene from one of isolation and marginalisation, to one of inclusion and international cooperation (Abrizah, Noorhidawati & Kiran, 2010). Open access for scholarly articles means free online access to the readers or libraries. Through open access concept, it removed financial, technical and legal barriers designed to limit access to scientific research articles to paying clients and subscription database by the academic libraries (Suber, 2002).

Understanding and surmounting current challenges and barriers is critical for

institutional repositories success. Previous research has looked into a variety of issues that impede institutional repositories, but there has yet to be a comprehensive survey of librarians' perceptions to identify and understand the relative importance of the issues confronting institutional repositories. The current study investigats academic librarians' perspectives on the significance of challenges in various dimensions of institutional repositories, as an initial attempt to gain a more comprehensive understanding of these challenges. The study's unique contribution is that it examined librarians' perceptions of institutional repositories across multiple dimensions, with an explicit focus on challenges and barriers. Participants' ratings revealed the most and least critical areas of challenge from the perspectives of librarians involved in institutional repository services (Joo, Hofman & Kim, 2019).

Zamani and Izhar (2017) in their research in knowledge repositories implementation highlighted that due to the rapid advancement of information communication technology in today's world, communities tend to maximise or take full advantage of technology as an effective tool in facilitating their daily task in teaching and learning efficiently. The implementation and utilisation of institutional repositories as an enabler for library users to work are not only easier, but also faster in terms of assisting them in searching and retrieving the resources needed systematically. Libraries' management need to keep up with the latest and rapid progress of today's technology so that university communities will not leave the others. Its implementation and usage of institutional repositories especially among academics and practitioners are very important in assisting their responsibilities effectively and efficiently. This is because the institutional repositories act as a tool and platform for maintaining the academic output of the university for a long period of time (Westell, 2006).

Institutional repositories are indeed one of the many effective platforms that help a lot in engaging people with valuable resources by exposing and serving them easily and quickly with a range of reliable knowledge through various provision of available digital resources for access at anytime and anywhere. Schneider and Hunnius (2003) mentioned that institutional repository practices contributed to improve all aspects of experience-based processes. Westell (2006) agreed that institutional knowledge or repositories are collections of digital scientific works that describe the intellectual assets of an institution or university and available for access electronically.

Institutional repositories are transformation of information sharing approach from the traditional printed or physical practices into electronic or digital material. It is

becoming an important scenario that needs to be addressed and be considered in any academic institutions. In fact, information dissemination techniques have also changed due to the advancement of the Internet and information communication technology (ICT) (Mondoux & Shiri, 2009). Unfortunately, the shift in the culture of knowledge sharing from traditional methods is done through face-to-face interaction with electronic means through the implementation of an institutional repository and is certainly not an easy task (Westell, 2006). This is where the importance of this study is taking place in identifying critical success factors of institutional repositories and its institutional repositories performance. This research aims to review factors that are important or contribute to the successful implementation of the institutional repositories among academicians leading to measuring its performance knowledge for higher education institutions and specifically for academic libraries in Malaysia.

1.1.1 Success Factors

In an organisation, there are certain important factors for the success of an organisation. If the objectives that are related to the core factor are not achieved, the organisation will face failure. In the implementation of the institutional repositories platform, there are several factors that drive and lead to the success of the project's implementation. Academic libraries should have clear direction and strategies in the development process of institutional repositories project.

Daniel (1961) has first introduced the concept of Critical Success Factors (CSF) to assist the companies to formulate their strategies and projects. CSFs concept are widely used and applied among business organisations. Rockart (1978) defined CSF as a small number of areas where satisfactory results will ensure successful competitive performance for individuals, departments or organisations. CSF is one of the key areas where things must go smoothly for a business to grow and manage goals to be achieved. Caralli (2004) has created a simple terminology of "Critical Success Factors (CSF)" as a key factor. In order to simplify the understanding, it is defined as a "factor" that is "critical" to the "success" of the organisation's strategies or projects. Anggia, Sensuse, Sucahyo and Rohajawati (2013) have aligned with a definition given by Caralli (2004), whereby critical success factor is a set of factors that should be considered in the success of the organisation project. Critical success factor (CSF) is an approach that encourages managers to be aware of the key elements that are available for the improvement of

organisational performance. Critical success factor (CSF) also acts as a significant indicator for measuring the performance of the organisation to continue to survive and succeed (Altaher, 2010).

Gai and Xu (2009) defined critical success factor (CSF) as a satisfactory outcome that acts as organisational competitive advantage and will lead to the success of organisational performance. Scholars began to pay attention in implementing critical success factors (CSF) for institutional repositories. Therefore, the organisation should come out proper institutional repositories systems that are integrated with specific technological tools. The system design and interface must be simple, comfortable and in accordance with the needs of library users (Gai & Xu, 2009).

CSF is considered as an important element that helps to the success of an event or organisation. These elements are mandatory factors to be considered while conducting an event or else the event may not go smoothly. CSF is significant in helping an event or organisation to improve their performance by playing their role as a liaison between the event and the event itself. CSF is an enabler to ensure the success of an event. CSF is seen as an enabler in the context of development and implementation of Institutional Repositories (IR) among academic libraries. If CSF is implemented, it will boost the learning practices from the best practice organisations (Deros, Yusof & Salleh, 2006). Through effective implementation of CSF in institutional repositories, it will help to enhance the benefit and able to pursue the objective of institutional repositories implementation and mission of libraries in dissemination of universities' research output (Singeh, Abdullah & Kaur, 2020).

Russell and Day (2010) identified the value of content as a crucial element that also had an impact on repository deployments. According to Dorner and Revell (2012), library administrators must not only make sure that content is added to the repositories, but also are promoted to library users as helpful information resources if they are to be successful. Services that enhance the content are thought to assist a successful IR (Chavez, Crane, Sauer, Babeu, Packel & Weaver, 2007; Ramirez, Parham, Martin, Hanlon, Anderson & Davis-Kahl, 2010).

Additionally, it was noted in the literature that for an IR to be successful, its users must practise self-archiving. According to Kim (2010), a crucial aspect that either encourages or discourages the use of self-archiving methods is the perception of the culture surrounding self-archiving (worries about copyright, extra time and effort and technical skill). Author's attitudes toward self-archiving and the quantity of deposits, as

well as usage evaluation, were highlighted by Xia and Sun (2007) as key success criteria. Staff collaboration and participation in submissions are crucial components of open access, according to a study by Starkman and Earwage (2008).

According to Dorner and Revell (2012), librarians play crucial roles in educating users about copyright and other intellectual property rights so that these facilities are compliant with such rights (Tripathi & Jeevan, 2011). In addition, Jain (2011) emphasised the need for clear policies regarding ownership, copyright concerns, required deposits and encouraging academics to self-archive. She claimed that all these things could be accomplished with success by thoroughly publicising the advantages of an IR to all stakeholders.

Based on the literature search, there are several surveys and case studies that lead to discuss specifically to make institutional repositories project successful. Although CSF is an important element in the planning of an institution's project, there is still a lack of knowledge related to CSF to ensure the implementation of library projects is more successful, especially in the development of institutional repositories among academic libraries in Malaysia. CSF is also considered as a method that is used in measuring the success of the implementation of institutional repositories system.

However, in general, there is agreement on what constitutes the success of IR. Since there is empirical research on the use of CSFs in IR projects, this study aims to address this gap by determining the factors that are important for IR to be available for use, as well as the strategies and conditions that promote and influence the IR performance. Nevertheless, the elements and criteria to measure the success factors of the institutional repositories performance have not been established (Palmer, Teffeau & Newton, 2008). How to evaluate the effectiveness of IRs is still a topic of heated controversy. Some studies assess the influence of open access publication using scientometrics and citation-based methods (Curty & Qin, 2012).

1.1.2 Performance Measurement

Normally, success factor of institutional repositories performance can be determined through the access and IR usage. Due to the IR concept is new in the Malaysian academic libraries services, the content of research material is still low, limited and non-open access. In addition, IRs are designed as an institutional-based, the content that contributed to IRs are very different compared to those disciplinary

repositories. This is a challenge for academic libraries to identify the researcher's interest. The normal criteria for measuring system performance like access, satisfaction and usability may or may not be relevant compared to specific repositories like online databases (Shearer, 2003).

According to Cullen and Chawner (2010), there is no formal structure to evaluate the repositories performance. In New Zealand, most libraries considered their respective repositories to succeed. Some libraries say that success is measured by their comprehensive repository. Other libraries consider the growth and use of their repositories, though limited, to be their greatest success. Successful institutional repositories would elevate the libraries visibility and importance not only at the institutional level, but also at the national and global levels. These are the key to the ability of institutions to respond to future needs for more dynamic cross boundary communications services (Halder & Chandra, 2012).

There is no comprehensive study of IR success factors in libraries and information science context, therefore, there is no research on factors in some real-life contexts of IR activities. In addition, successful IR projects are difficult to obtain because very few managers, as described in the literature, want to share their secrets. Palmer et al. (2008) highlighted that as a new technology in digital library initiatives, the requirements and evaluation criteria for performance of institutional repositories have not been set up.

1.2 Study Setting

Lim (1974) wrote in an earlier study that the functions of a university library in Malaysia were to support the university's teaching and research functions as well as to provide community service. In addition, the university library indirectly contributed to national development. Despite many innovations, the foundation of library functions remains relevant today, with additional ones in the information and communication technology (ICT) age. Libraries must improve their services to keep up with technological advancements both for the present and future generations. The use of a computer and a network to access and provide electronic resources (e-books, e-journals, e-theses) are now very common in university libraries.

The university library exists to impact knowledge, to provide services and to support the university's mission and vision. It is a repository of information. It

contributes knowledge to their community in a variety of ways, including resources, collection, research and credentialing, as well as enhancing human intellectual capacity (Hart & Kleinveldt, 2011). It provides adequate and timely information, as well as excellent services, to support specific university's teaching, learning and research activities. Librarians, as the support group in the library, play important roles in delivering quality services to universities and as such, they must be equipped with a set of skills to manage various library activities.

Librarians in organisations, particularly those working in university libraries, are involved in the operation and management of libraries. They work in three main areas: administrative services, technical services and user services. However, their tasks are being made more difficult by the increasingly complex and constant change in the organisational, technological and information environments. As a result, librarians must keep up with new tasks and roles, advanced technologies and systems, new forms of information, information media and information sources. Many researchers emphasised the importance of reinventing librarians' job scopes in order to keep up with technological changes (Goetsch, 2008; Gilstrap, 2009). University libraries, on the other hand, must adapt to these changing needs by providing appropriate training and skill workshops in order to ensure the survival of librarians in today's ever-changing world (Giesecke, 2011; Stoffle & Cuillier, 2011).

Malaysia is experiencing a rapid growth in its higher education. According to the Ministry of Higher Education (2010), there are currently 20 public universities (Table 1.1). Five of these, namely, Universiti Malaya (UM), Universiti Sains Malaysia (USM), Universiti Kebangsaan Malaysia (UKM), Universiti Putra Malaysia (UPM) and Universiti Teknologi Malaysia (UTM) are designated as research universities, while the rest are categorised as non-research universities.

Table 1.1 List of public universities in Malaysia

No	Name of University	Status
1	Universiti Malaya (UM)	Research university
2	Universiti Putra Malaysia (UPM)	Research university
3	Universiti Sains Malaysia (USM)	Research university
4	Universiti Kebangsaan Malaysia (UKM)	Research university
5	Universiti Teknologi Malaysia (UTM	Research university
6	Universiti Teknologi MARA (UiTM)	Non-research university

7	International Islamic University Malaysia (IIUM)	Non-research university
8	Universiti Utara Malaysia (UUM)	Non-research university
9	Universiti Malaysia Sarawak (UNIMAS)	Non-research university
10	Universiti Malaysia Sabah (UMS)	Non-research university
11	Universiti Pendidikan Sultan Idris (UPSI)	Non-research university
12	Universiti Sains Islam Malaysia (USIM)	Non-research university
13	Universiti Sultan Zainal Abidin (UniSZA)	Non-research university
14	Universiti Malaysia Terengganu (UMT)	Non-research university
15	Universiti Tun Hussein Onn Malaysia (UTHM)	Non-research university
16	Universiti Teknikal Malaysia Melaka (UTeM)	Non-research university
17	Universiti Malaysia Perlis (UniMAP)	Non-research university
18	Universiti Malaysia Pahang (UMP)	Non-research university
19	Universiti Malaysia Kelantan (UMK)	Non-research university
20	Universiti Pertahanan Negara Malaysia (UPNM)	Non-research university

There are five university libraries in Malaysia that have been selected in this study. The selected public university libraries are Universiti Malaya (UM) library, Universiti Putra Malaysia (UPM) library, Universiti Kebangsaan Malaysia (UKM) library, Universiti Sains Malaysia (USM) library and Universiti Teknologi Malaysia (UTM). These libraries are selected in terms of supporting their research universities in preparation, management and dissemination of research information produced by the university communities.

1.3 Problem Statement

A problem statement is important because, in many cases, it will be difficult to clearly state the problem due to its ambiguity. If the problem is not clearly stated, garbage-in, garbage-out (GIGO) will occur (Panneerselvam, 2007). The goal of creating an institutional repository is to increase the visibility and sharing of university research output by making it open access (Macha & Jager, 2011). Academic libraries are increasingly involved in the management of electronic scholarly products and in the evolving scholarly communication process via institutional repositories. Although institutional repositories can facilitate easier access to university research output, they are not widely used in some academic institutions.

Christian (2009) found that some of the problems that have been identified will be detrimental to the development of institutional repositories such as lack of open

access awareness among researchers and academic members in research institutions. Through her research, 74% of the respondents mentioned that they are not familiar with the open access concept that is implemented at academic and research institutions. Also, with limitation of copyrights knowledge, it is hard to make their research work available in the open repositories.

Adeyemi, Appah , Olufunmilayo and Imuwahen (2017) found that in developing and implementing institutional repositories, the universities faced several factors that hinder the smooth and successful development of this repository such as lack of awareness of the institutional repositories existence, open access concept, copyright issues, inadequate information communication technology infrastructure, outdated technology and degradation of media. Besides, Vardakosta and Kapidakis (2017) highlighted the main issues pertaining the implementation of institutional libraries like collections of IRs, IR platform itself, research collaboration and emphasis on the open assess and data management as per university strategy and directions.

Overall, it can be said that institutional repositories in Asian countries are not as successful as they would have been expected from the considerable benefits attached to the principles of sharing (Abrizah et al., 2010). In the context of Malaysian academic libraries, the awareness on the existence and usage of institutional repositories are perceived low and limited on empirical studies and findings. Even among the top four research-intensive universities in Malaysia, according to Kiran and Chia (2009), institutional repositories are not widely used. Yoowang (2012) who conducted a study on the daily operations of institutional repositories found that several issues that were related to personnel, faculty commitments and content recruitment was a challenge that academic library directors faced in managing the universities' institutional repositories.

There are several problems that have been identified based on the literature and they are:

1.3.1 Lack of Attitudes in Knowledge Sharing

Many researchers found that the content development of institutional repositories came from faculty contributions (Westell, 2006; Tribodean, 2007; Yakel, Rieh, Markey, Jean & Yao, 2009). The reluctance of academicians to share their research output through institutional repositories is quite related to knowledge sharing attitude with few other issues such as plagiarism, copyright management, lack of self-

efficacy, insularity and others (Abrizah, Hilmi & Kassim, 2015; Yang & Li, 2015; Kim, 2011). Institutional repositories in Asian countries are not as successful as it would have been expected from the considerable benefits attached to the principles of sharing (Abrizah et al., 2015). Most repositories projects have faced similar issues like low submission rate, low faculty participation, the need of academic appreciation and recognition (Kim, 2007; Rieh, Markey, Jean, Yakel & Kim, 2007) and lack of motivation to send their research output (Joo, Hofman & Kim, 2019).

1.3.2 Lack of Self-Archiving

There are few obstacles that have been identified in generating institutional repositories content especially in the early stage of implementation. The major resistance to share scholarly research output through self-archiving in institutional repositories for those practising self-archiving, time as well as technical infrastructure were often quoted as the obstacles to open access repositories. Based on the current situation, academics and researchers are not interested and not diligent to deposit their research outputs to the IR systems because of lack self-archiving mandates to the university members (Jain, 2011) and non-existence of sufficient incentives for their commitments to deposit research output to repositories (Bonilla-Calero, 2014). Abrizah, Hilmi and Kasim (2015) found that the highest motivation for them to self-archiving to IR were related to improvising their personal performance and expectation to the intellectual world-wide communities. Asadi et al. (2019b) discovered that attitude, facilitating conditions and social influence had affected user's intention to self-archiving to IR. Yang and Li (2015) found that based on their research findings, majority of respondents were aware and 40% respondents published their work on open access journals. However most of them were not informed with clear procedures for uploading their research output to the university's institutional repositories.

1.3.3 Lack of Awareness on Usage of Institutional Repositories

Kim (2011) in his study related to the awareness of faculty members about the existence of institutional repositories found that the level of awareness on the repositories service had increased to some institutions, but it was still very low in terms of usage of IR among students and staff in supporting their learning and teaching

activities (Makori, Njiraine & Talam, 2015). The use of institutional repositories is jointly determined by the level of awareness and attitude (Bamigbola, 2014). The findings that were aligned with Abrizah (2010) found that faculties in a research-intensive university had little awareness of open access initiative and institutional repositories. The results determined that IR were limited in terms of usage and underpopulated among faculty members.

Joo et al. (2019) as well as Macha and Jager (2011) suggested that libraries may want to consider using search engine optimisation (SEO) techniques to make their resources well-indexed by web search engines in order to increase the visibility of institutional repositories. SEO techniques can be a compelling way to better distribute the resources collected in institutional repositories to diverse groups of web users, ultimately increasing the visibility of institutional repositories (Macha & Jager, 2011; Arlitsch, O'Brien & Rossmann, 2013; Arlitsch & O'Brien, 2012; Onaifo & Rasmussen, 2013). Zamani and Izhar (2017) also mentioned that IR functions are still lacking in terms of system interface, system development and system navigation.

1.3.4 Lack of IR Policy

Generally, based on a survey conducted in Asia, it reported that most universities' repositories that stored the common types of content and evidence showed the existence of low policies to support the implementation of IR (Abrizah et al., 2010).

Many previous exploratory studies especially on the adoption, expansion and implementation of electronic thesis and dissertation repositories found the gap in implementation of the policies initiatives. They reported the absence in providing the comprehensive policies in managing the institutional repositories and electronic theses and dissertations repository (Corletey, 2011; Sengupta, 2014; Baro, Godfrey & Eze, 2014; Baro & Otiode, 2014). In India, the Vidyanidhi project in implementation of national repository for e-theses has failed as there was no provision being made for the institutional repositories submission policy (Sheeja, 2011).

The Electronic Thesis and Dissertation (ETD) often applies a more restrictive sharing policy that prohibits modification and profitability, with full protection of intellectual property laws or restricts distribution to entire campus access (Schopfel & Prost, 2013). The ETD indicates lack of institutional policies and strategies to support open sharing of information resources (Makori et al., 2015).

1.3.5 Lack of Copyright, Intellectual Property and Plagiarism Awareness

Copyright issues is one of the reasons why authors are reluctant to submit their research output to institutional repositories (Bonilla-Calero, 2014; Lagzian, Abrizah & Wee, 2015b) hence it brings big challenges for IR librarians (Makori, Njiraine & Talam, 2015). Through previous literature findings, researchers and faculty members do not clearly understand and are confused with copyright act. At the same time, they have fear with the plagiarism sentiment. These issues have effected activities of self-archiving research outputs to IR (Bamigbola, 2014; Abrizah et al., 2015; Bonilla-Calero, 2014).

Authors are worried with the copyright agreement that they have signed with the journal publishers by depositing their journal article to the institutional repositories or submitting to repository unit. Researchers are unlikely to know about copyright issues, although most publishers allow authors to make their articles accessible through university IR. Based on ten survey respondents conducted by Singeh, Abrizah and Karim (2013), open access initiative in academic libraries showed that only one respondent is confident with the copyright status of his article published in the previous journal to be uploaded to the institution repository. The issues of copyright and plagiarism were not only problems for institutional repository, but they were also the obstacle for digital library administrator as well (Singeh, Abrizah & Karim, 2013).

1.4 Purpose of Study

The purpose of this study is to examine the success factors of institutional repositories and its IR performance in Malaysian academic libraries.

1.5 Research Objectives

The main objective of this study was to identify the perceptions of academicians on the success factors of institutional repositories and its IR performance in Malaysian academic libraries.

The objectives of this study are:

i) To identify the perceptions of academicians on the success factors of institutional repositories (knowledge sharing, self-archiving, IR usage, IR

policy, IR procedure and copyright awareness) and its IR performance in Malaysian academic libraries.

ii) To compare the success factors of institutional repositories in terms of age, gender, grade, education level, service, institution and field of study.

iii) To examine the relationships between the success factors of institutional repositories (knowledge sharing, self-archiving, IR usage, IR policy, IR procedure and copyright awareness) and its IR performance.

iv) To measure the effect of success factors on IR performance.

1.6 Research Questions

To achieve the above objectives, the following research questions were used to guide the study. Question i) is exploratory while Questions ii), iii) and iv) are tested as hypotheses. The research questions are:

i) What are the perceptions of academicians on the success factors of IR (knowledge sharing, self-archiving, IR usage, IR policy, IR procedure and copyright awareness) and its IR performance in Malaysian academic libraries?

ii) Are there differences on the success factors of IR in terms of age, gender, grade, education level, service, institution and field of study?

iii) Are there relationships between the success factors of IR (knowledge sharing, self-archiving, IR usage, IR policy, IR procedure and copyright awareness) and its IR performance?

iv) What are the predictors of success factors that measure IR performance?

1.7 Hypotheses

The following conjectures from Questions ii), iii) and iv) are to be tested in the forms of statistical hypotheses:

i) There are significant differences regarding various success factors of institutional repositories between selected demographic groups (age, gender, grade, education level, service, institution and field of study).

ii) There is a significant relationship between knowledge sharing and IR performance.

iii) There is a significant relationship between self-archiving and IR performance.

iv) There is a significant relationship between IR usage and IR performance.

v) There is a significant relationship between IR policy and IR performance.

vi) There is a significant relationship between IR procedure and IR performance.

vii) There is a significant relationship between copyright awareness and IR performance.

viii) There is a significant predictor of success factors on IR performance.

1.8 Significance of Study

This study has implications for those involved in research and practices on digital world, knowledge sharing, dissemination, digital preservation and reused of research findings in the academic environment. Institutional repositories represent a new method of scholarly communication platform that plays a role in organising, maintaining, preserving and disseminating the research output that was created and produced by academicians, researchers, students and administrators of universities for the scholarly needs in research, teaching and learning activities. Institutional repositories technology will help the transformation of dissemination research findings from physical to digital through electronic media and Internet. The repositories are seen as exchange and reuse of knowledge, although many studies of knowledge sharing are relevant in the context of corporate settings. This study will contribute to the literary body for knowledge management and reuse in academia, especially in institutions of higher learning.

The study also benefits the library management as a whole and specifically to repository manager and teams in identifying the success factors that should take consideration in the implementation and management of universities' repositories. Through the findings, librarians and libraries will have the advantages to enlarge their roles and support service in organising and maintaining repository digital contents as corporate memory for future access and reference, as well as reaching out to other stakeholders in creating institutional's goals and policies. In addition, university

administrators care about an increase in the cost of commercial publishing and therefore, an evolving IR is likely to be a solution to financial problems. Moreover, publishers who feel a threat to a subscription-based business models can adapt or use new open access models of scientific publications. Investigation of professors' motivation for self-archiving and the obstacles they feel, will help all stakeholders to plan and implement better repository for self-archiving.

This study focused on the academicians as institutional repositories content depositor and at the same time as a user of institutional repositories in getting the research outputs for their research need. This study aimed to understand the success factors of institutional repositories that influence the user's intention and perceptions to the institutional repositories. Institutional repositories have represented an important technology in managing the institutional contents that are made more visible and easily accessible all over the world through Internet capability. Institutional repositories as the first technology that was adapted and adopted by the libraries have now survived for more than ten years. It seems desirable to assess its impact in enhancing the sharing activities for research outputs and institution contents. Usually there are new initiatives developed in its purpose and direction in the early years, as it responded to the repository managers and library users.

This study will provide useful guidance for institutional repositories administrator and other librarians who are interested in developing the universities' institutional repositories and monitoring universities research outputs. It will also be a great value to the institutional repository librarians who are engaged directly in the digitisation of their institutional contents to identify the challenges, strategies and scholarly implications in maintaining universities' intellectual outputs and products.

The results of the study will be significant in the following three main areas. The first significance relates to the feedback on the success factor of institutional repositories performance in Malaysian academic libraries. Next, it further explains on the practices of institutional repositories towards research output performance among faculty members in academic libraries. Finally, this study will reveal whether the performance of the institutional repositories services needs to be improved or whether there is a need to develop a framework for their best practices. The results found from this research might prove useful to policy makers of the university, librarians, management and faculty as follows.

Success factors of institutional repositories help in facilitating the repository

management process especially in the particular library in a university. Success factors of IR contributes more values to the library strategic planning, deliberated way of disseminating the intellectual research outputs, smooth internal process and cultural systems and attractive research styles in the campus environment. In addition, institutional repositories have promoted the teaching, learning and research culture which is essential to the academic library services.

Besides, institutional repositories promote invention element as it helps in developing new ideas or concepts among the librarians which are considered to be essential to develop new services, products and skills. A proper planning is needed in order to share the best practice management of institutional repositories in the academic libraries. The complexity of working environment especially in the context of library, technology and information have forced the librarians to stay updated with the new technologies, systems, forms of information, information media, information sources, tasks and roles (Shoid, Kasssim & Salleh, 2012). Therefore, they need to be prepared with the competencies, skills, knowledge and attitudes. At the same time, they need to have the abilities of selecting, acquiring, describing, organising and preserving of any forms of information or sources (Soundararajan, Jayakumar & Somasekharan, 2007).

A new framework in the field of library management and specifically on the management of institutional repositories in academic libraries will be created. These new findings will benefit the librarians and management of academic libraries to improve the skill of acquiring knowledge and to enhance the library services among academicians, researchers, students, library staffs and their stakeholders more efficiently. The research framework may then be utilised by interested researchers, students and readers on their similar studies. The findings will bridge the knowledge gap and academic libraries together with the Malaysian Citation Centre (MCC) and will collaborate to review the existing Malaysian research outputs system by incorporating the entire institutional repositories of universities' libraries into a single platform which can be named as Malaysian Research Repositories.

1.9 Scope of the Study

This study aims to examine the success factors of institutional repositories performance in academic libraries in Malaysia. The study is based on the structure that used questionnaires (which is a quantitative method). The objectives of the study are

based on four research questions that have been developed. In this study, success factors of institutional repositories dimensions are defined in terms of knowledge sharing, content recruitment, usage of institutional repositories, institutional repositories policies and standard of procedures, awareness of copyright and institutional repositories performance from the respondent's perspectives.

Therefore, this study focuses on the academic libraries of five research universities in Malaysia namely, UM, UTM, USM, UKM and UPM. The research university is responsible for actively exploring new ideas, experimenting with innovative methods and taking scientific initiatives in the search and development of knowledge. Among the main missions of the research university is to produce Nobel laureates and provide experimental funds from related industries.

The main reason for selecting the research universities is that, the key performance indicator (KPI) for academicians in research universities is higher compared to non-research universities in terms of published research articles and other publications. The KPIs are more focused on research grants, publication of high impact papers, supervision of postgraduate students and even patents. In terms of quantity and quality control of research publications, research universities targeted two papers that are indexed and cited by national or international refereed journals per individual in a year. Besides the indicator for the impact factors journal, the research universities need to get a total impact factor of at least or more than 5000 (Komoo, Azman & Aziz, 2008). With these KPIs that have been established for research universities, this study examines how ready academicians are to share their research findings with university institutional repositories for community reference and beyond the institution.

In order to make the study more manageable, the researcher chooses to limit the participants from the selected academician from grade DS45 and above. In terms of data analyses, it is based on data from selected university libraries in Malaysia. Like many other studies, generalisability of the results might be limited and might not be generalised to other libraries as well as other types of libraries like the National, public and special libraries in Malaysia. As such, researchers should consider this limitation in their future studies to replicate similar research using different samples of population.

This study is subjected to its limitations associated with the questionnaire, which has the main research instrument of this investigation. The data obtained is based on the information provided by the respondents from the questionnaire. Therefore, the validity and reliability of the questions are subjected to interpretations, although attempts have

been made to minimise the possibilities of these different interpretations by validating, pre-testing the instruments and conducting a pilot study.

1.10 Operational Definitions

The following terms are used in this study:

i) Success factors in simple terms are factors that must be considered in order to determine the success of an institution or project. Success factor is important to the current operating activities of the organisation and its future success.

ii) Institutional repositories or IR is an open access platform that collects, preserves and disseminates university communities' research outputs for the purposes of learning, teaching and research activities. The academic outputs include conference paper, research finding, lecturer notes, slide presentations and others that are related to the teaching and learning activities.

iii) Knowledge sharing is defined as the exchange of information between individuals via a common institutional framework. The main point of this interaction is to involve knowledge. This type of interaction can be referred to as knowledge sharing.

iv) Self-archiving is defined as the willingness of researchers and authors to deposit their research results and publications in institutional or university repositories for free access.

v) IR usage is the usability and the encouragement for more library users to use institutional repositories to find research output for their research activities and work.

vi) IR policy is a documented guidance on how the repository will be used and how it will be developed for the future. Policy explained the institution’s roles and responsibilities towards the development of institutional repositories.

vii) IR procedure is a procedure manual providing systematic guidelines that describe the process for managing documents in the institutional repository starting from creation metadata until downloading full-text by the users.

viii) Copyright awareness is an author's consciousness to copyright act, copyright and intellectual property issues and copyright agreement between authors and

publishers. Normally, in academic environment, librarians will take their roles in advising and explaining copyright solutions to the authors and researchers before submitting their research output to the repository.

ix) IR performance is one of the organisation's principals serves to demonstrate the extent to which the organisation has achieved its planned strategies and goals related to institutional repositories.

1.11 Thesis Outline

Chapter One gives an overview about the research. The background of the study briefly explains on institutional repositories concept, success factors elements and IR performance measurement. This is followed by the explanation on statement of problem, purpose of the study, research objectives, research questions, the hypotheses, rationale of the study, significance of the study, the scope of the study, limitation of the study and operational definitions of the study.

Chapter Two reviews the literature on the speculative and observed literature on the success factors of Institutional Repositories and its performance by previous researchers. The success factors dimensions such as knowledge sharing, content development, IR usage, IR policy, IR procedure and Copyright awareness and IR performance have been presented throughout the review. A proposed conceptual model was also developed based on previous studies.

Chapter Three addresses the details of research methodology, design of the study, the population and samples selected, the questionnaire design, measurement of items and the process in collecting data. This section also gave a picture about the preliminary findings of the research.

Chapter Four describes the analyses and interpretation of data collected in this research. Descriptive statistics and inferential statistics were presented in answering the research questions and testing of hypotheses formulated for this study. Quantitative approach was adopted for this study. The statistical analyses include descriptive statistics and inferential statistics.

Chapter Five concludes the objectives and research questions to achieve the study contribution. This section focuses on the results of the study in relation to the hypotheses or the research questions. It highlights and discusses the main findings,

implication of the study, suggestions from the findings, contribution of the study, research limitation of the study and recommendation for further study. The chapter ends with a concluding remark.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter provides an overview of the published literature on the topic of study from previous research. It focuses on the concepts which are relevant to this research such as the history on the implementation of institutional repositories, development of repositories and indicators of repositories performance in the context of academic libraries platform. The source of information for this review has been obtained from physical and electronic library resources such as journal articles, books, theses, dissertations and conference proceedings either published or unpublished. Sources of information have been obtained from the libraries such as Tun Abdul Razak Library (UiTM), Universiti Malaya (UM) library, Universiti Sains Islam Malaysia (USIM) library and other academic libraries in Malaysia.

Besides, Perpustakaan Tun Abdul Razak (PTAR) Library provides EzAccess for students' access to the online databases that are subscribed by UiTM library. Many databases have been referred to such as EBSCO Host, Emerald Insight, Scopus, Science Direct, Web of Knowledge and others via inside and outside campuses. The keyword used to access relevant articles included *institutional repositories, success factors, implementation of institutional repositories, repositories performance, academic libraries, digital library, knowledge sharing, repository policy, copyright, repository usage and self-archiving.*

The literature also covers information about the success factors of institutional repositories and its performance in the context of Malaysian academic libraries.

The review is organised into five main sections which are as follows:

2.1 Introduction

2.2 Institutional Repositories (IR)

2.3 Different Overview of Success Factors

2.4 Institutional Repositories Success Factors' Perspectives

2.5 Institutional Repositories Success Factors' Dimensions

2.6 Institutional Repositories Performance

2.2 Institutional Repositories (IR)

The advancement of the information and communication technology (ICT) has transformed the libraries' services and technologies from traditional to modern technology. Previously, library was seen as a place for storage and preparation of library materials in printed form and has been transformed into a hybrid library whose collection consists of a combination of printed and digital materials. Through the advancement of information and communication technology facilities, the management of the library should have expanded their services from manual to online library services especially in the context of collecting library materials as well as providing access and preserving their communities' output in digital content. This is a new role and a challenge for academic libraries to adopt and adapt the repositories technology to present their digital content and information in a better way. This is essentially the library's commitment to control these digital contents, including long-term preservation where applicable with the technology changes, as well as the library services in accessing or distribution.

Institutional repositories (IR) is a platform for collecting and managing digital format materials produced by a university or educational institution. In modern technology, institutional repository may be defined differently (Allard, Mack & Feltner-Reichert, 2005). Basically, institutional repositories can be defined as a system that works to acquire, disseminate and protect the university's intellectual property for the purpose of teaching, learning and research needs. It is paralleled to Lynch's view (2003), in which a repository of university institutions is defined as a collection of services provided for institutional management needs and a platform for the dissemination of the digital information materials produced by the communities.

Allard et al. (2005) mentioned that Clifford Lynch and Ray Crow are the popular cited names in contributing the institutional repositories definition among researchers in the information studies and library sciences field. Lynch (2003) defined institutional repositories as follow:

> *"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 organisational commitment to the stewardship of these digital materials, including long-term preservation*

where appropriate, as well as organisation and access or distribution (p. 328)."

While Crow (2002) defined institutional repository as:

"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)."

Based on the two definitions of repository institutions above, both researchers emphasise on several aspects that should be highlighted whereby it involves repositories collections, communities of users and contributors, services offered, access rights and preservation of repositories material for long term. All of these factors are important components that contribute to the success of an institutional repositories implementation and development.

Crow (2002) and Ware (2004) highlighted few characteristics for institutional repositories concept. Basically, it is institutionally defined and it captured the intellectual content of the academic institutions such as research and administration work, teaching and learning materials, scholarly reports as well as articles either published or non-published. Besides, institutional repositories system was developed for the purpose of dissemination of intellectual outputs widely, open and interoperable. The institutional repositories platform plays a significant role as a host of institution to preserve the contents for a long term and contributes to the information management process in collecting, maintaining, storing and disseminating the valuable contents.

Crow (2002) commented that the types of collection and content to be uploaded in the institutional repositories are the definition endorsed by the institution itself. This means that, different institutions have different definitions to achieve their aspirations in collecting, preserving and disseminating their digital content to benefit inside and outside communities. Prosser (2003) informed that institutional repositories serve as a centralised platform for institution contents, it looks like curriculum vitae (CV) in representing the details of the research products and the researchers' infomation over the years.

Shearer (2003) conducted a research study on the Canadian Association of Research Libraries (CARL) institutional repositories in order to determine the success factor of institutional repositories. Through their pilot project, several factors were

identified as to what contribute to the input and use of institutional repositories in Canadian research libraries.

Ware (2004) described an institutional repository as a web-based repository system that was organised by academic institutions to manage their scholarly material; collectively and permanently; support and comply with the Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH) protocol; support the scholarly communication core process such as collect, access and disseminate activities. OAI-PMH is a protocol with interface display that connects one system to another system. This protocol is complemented with institutional repository software to enable the sharing of metadata from one institution with another institution. Besides, this protocol supported both software, open-source software as well as proprietary software. The OAI-PMH allows the two-way communication between two system for harvesting the metadata bibliographic in the institutional repositories. The international service provider such as Google, Yahoo, Ask, Bing and other search engines crawling the metadata provided in the institutional repositories to their database for the purpose of visibility and the searching results comprehensive, easier and faster. Other than that, the system must have a preservation feature to support the repositories collections for a long period of time. Okoye and Ejikeme (2011) agreed with Ware (2004) whereby the repository's material was created by academicians, researchers, students and others to make their intellectual product more accessible within and outside communities.

Krishnamurthy and Kemparaju (2011) viewed differently in terms of defining institutional repositories in which institutional repositories serve as a platform that captured and preserved digital intellectual contents from multiple universities rather than focusses on single university. Institutional repositories are enhancing the universities' platform with valuable outputs to be accessed, used and cited. Besides, institutional repositories is also defined as networked repository which is designed with several functions for collecting, managing, preserving and disseminating intellectual results and works for supporting teaching and learning programmes to academic and public communities (Macha & Jager, 2011; Oliveira, 2011).

In the modern repositories technology, institutional repositories is one of the alternative scholarly platforms that is significant to researchers and faculty members in accessing the latest literature and research. Institutional repositories also give benefit to others than scholarly communities as well as in gaining the research findings and trending topics. Institutional repositories have multiple collections such as index and

non-index articles, open access theses, dissertations, research reports, conference papers, journals and magazine, articles, videos, speeches, examination papers, university publishing books, annual reports, newspaper clippings and others.

According to Budapest Open Access Initiative (BOAI) (2002), institutional repositories act as a platform for open access literature and freely available online which scholars give to the world without expecting payment. It includes their peer-reviewed journal articles, it also includes any unreviewed preprints that they may wish to post online for comment or to alert colleagues to important research findings. There are various degrees and types of wider and easier access to this literature. By open access concept, its free availability on the public internet, allowing 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.

In other words, institutional repositories are providing access to open access articles free of charge and the authors are willing to share and make their research findings accessible through online access without any limitations such as accessing and downloading charges, legal issues and other technical barriers. It shows that, institutional repositories concept is different from the traditional one. For the purpose of accessing information to researchers and other university' communities, libraries should allocate certain budgets and pay an annual subscription fee to ensure obtaining credential from publishers to view and download articles. Based on this factor, BOAI has declared and urged researchers and scholars to publish their research outputs through institution platform and encouraged academic and research institutions implement their own open access journal to support these initiative agenda.

More than 300 research institutions have enforced open access policy that required their researchers to deposit research findings to open access repository with free access, wide sharing and beneficial from the studies conducted (Xia, Gilchrist, Smith, Kingery, Radecki, Wilhelm & Mahn, 2012). As a result, the statistics of Directory of Open Access Journals (DOAJ) 2021 showed that 16,623 indexed journals and 6,319,528 indexed articles in the repositories can be accessed and downloaded full text freely without any barriers and legal issues. OpenDOAR Statistics for 2021 showed that there are 5709 registered open access repositories all over the world. Based on these two types of directories, statistics showed that open access journals and open access repositories are significant platforms to make visible the research outputs with open

access status to the researchers, scholars, post-graduate and under-graduate students and other various categories of readers by professional status.

OpenDOAR (2021) reported the percentage of adopted open source software in the implementation of the institutional repositories. It revealed that majority of the institutions have chosen Dspace (39%), followed by EPrints (11%), WEKO (9%), Digital Commons (5%), Islandora (3%), CONTENTdm (2%), OPUS (2%), HAL (1%) and dLibra (1%). With the advance of open-source software's technology, the idea of developing an institutional repository based on the open-source concept has been sparked among academic libraries in Malaysian public universities. In the Malaysian public academic libraries, Eprint and Dspace are the most popular platform adopted for the implementation of institutional repositories.

In Malaysia, all academic libraries of public universities have developed an institutional repository system. Institutional repositories are a trendy topic for discussion among top management academic libraries to promote research outputs produced by university members. At the same time it gave motivation to academicians who are active in producing their research products. Academic libraries have taken the initiative to develop and implement the institutional repositories in order to increase the visibility of research results and at the same time promote university's researchers and their expertise areas as well as the niche of a university (Abrizah, 2010; Macha & Jager, 2011). Through institutional repositories, library management expects that it will give impact to boost the total university's citation with the full-text access provided. OpenDOAR (2021) reported that in Southeast Asian region, Malaysia is the second contributor of research contents to the institutional repositories.

The implementation of institutional repository services is consistent with Malaysia's open access development and it contributes to the enhancement of research value for public access. This advancement will encourage other researchers to deposit their research outputs to repository systems, with the goal of increasing the level of readability of unlimited accessed materials globally, as well as increasing the visibility of the articles published (Macha & Jager, 2011). This platform expands opportunities for the referred research and also opens up collaborative research space (Zainab, 2010).

The implementation of institutional repositories with the concept of open access has reduced the cost of acquiring library resources, particularly in the context of online database subscriptions. Libraries have played an important role in the development of IR collection content (Revell & Dorner, 2009). The development of this repository has

resulted in the role of librarians, which is important for libraries in today's scholarly communications. Through the open access concept, IR contents can be freely accessed by all researchers, evaluators and society from anywhere via the Internet (Bonilla-Calero, 2014). Furthermore, it benefits authors by assisting in the promotion of their research output to the rest of the world. IRs will remain an important tool for promoting open access and supporting institutional scholarship (Leary, Lundstrom & Martin, 2012).

Institutional repository (IR) is a vital platform for top management to observe and measure university research performance activities and outputs in different perspectives, factors and types of documents. The concept of institutional repositories covered 3 elements which involve collecting of research outputs that have been produced by the institution's staff, providing a one-stop centre platform for searching literature and centralised in preservation to all research articles conducted through university affiliation (Halder & Chandra, 2012).

Asadi et al. (2019a) recognised that institutional repositories (IRs) are the latest innovation as an alternative scholarly communication in the 4th industrial revolution based on an adaptation of information application and communication technology to the information management industry. The meaningfulness of this technology depends on the usage and contribution of research articles by scholars. Therefore, researchers and scholars are encouraged to deposit their respective studies, so that the aspirations of developing the institutional repositories can be realised successfully. Although IR is a new platform of scholarly communication platform, it is still not successful in its implementation by university academic libraries. The major issues are lack of research output contributions by the stakeholders (Abrizah, 2010).

Institutional repositories being an important system for scholarly communication platform, concurrently describe an important source for knowledge management and institutional visibility of higher academic institutions (Lagzian, Abrizah & Wee, 2015a). Similarly, the institutional repository is also a platform that collects institutions' digital content to facilitate the knowledge searching process of its community as well as facilitates knowledge sharing within institutions as it organises valuable knowledge explicit form. It includes the process of managing, preserving, maintaining and disseminating digital institutions intellectual capital. Institutional repositories allow for multiple management of scholarly digital works by the university community which facilitates knowledge sharing process as an institutional repository is

a single integrated system that allows easy recruitment (Ida, Tjakraatmadja & Word, 2015).

Bevan (2007) found that Library Journal, ARL and DLib Magazine described institutional repositories as media in providing institutions research outputs through Internet and have taken the roles in preserving digital research output for their university communities. Institutional repository is also defined as a collection of scientific works that reflects the university's intellectual assets and available for access and being cited (Westell, 2006). Intellectual assets stored in institutional repositories are produced by university communities such as faculty members, researchers and even students and the full-texts are available to be accessed in the campus and off campus. Besides that, Shoeb (2010) agreed that these repositories are also known as a platform to keep valuable research contents in various digital formats that are able to enhance the administrative processes, learning and research process as well. Thus, whether institutional repositories become part of the intellectual infrastructure depends on the extent of the contribution of the university communities.

2.3 Different Overview of Success Factors

Numerous studies on the success factors of institutional repositories have been contributed by many well-known authors. The list of authors is presented below.

2.3.1 Kathleen Shearer

Kathleen Shearer is the Executive Director of COAR (Confederation of Open Access Repositories). COAR is an international repository association with a membership of more than 120 institutions worldwide. COAR is working to create a scientific communication model based on a global network of open access repositories and it is actively promoting the role of libraries in the future of scientific communication. Shearer also works as a consultant for a number of other organisations. She is a research associate with the Canadian Association of Research Libraries (CARL) and a consultant with the Association of Research Libraries (ARL) in the United States.

Shearer (2003) identified ten possible success factors for institutional repositories projects in her research on the CARL institutional repositories project, a

collaborative approach to addressing the challenges of institutional repositories in Canada: archiving policies, disciplines advocacy activities, copyright policies, content type, staff support, quality control, publicities, software, use and organisational culture. Essentially, Shearer (2003) concluded that the uptake and use of institutional repositories is a success factor for institutional repositories. The concept of institutional repositories is institutional based repositories and is quite different from the discipline-based repositories especially in terms of determining the variables that support the management process and usage activities.

2.3.2 Mary Elizabeth Westell

Mary Elizabeth Westell is Director, Centre for Scholarly Communication, Libraries and Cultural Resources University of Calgary. Westell (2006) conducted her research to measure the success of IRs based on selected IRs in Canada through as examination on their website presence and integration with university library and research pages. Through the research, she proposed eight indicators for measuring IR success in Canada: mandate, integration with planning, funding model, relationship with digitisation centres, interoperability, measurement, promotion and preservation strategy.

2.3.3 Marcos Andre Goncalves

Marcos Andre Goncalves is a Computer Science Professor from Universidade Federal de Minas Gerais, Brazil. He and three other researchers had conducted a research titled “What is a good digital library and a quality model for digital libraries”. They proposed six indicators (catalogue, collection, digital object, metadata specification, repository and services) to evaluate the success factors in the implementation of Digital Library. They also have elaborated on the meaning of quality in digital libraries (DL) based on the framework that has been used for digital libraries: 5S (Streams, Structures, Spaces, Scenarios and Societies). In terms of methodology, they conducted a focus group with librarians that have experienced in library work and scope of digital libraries in order to evaluate all the proposed indicators.

2.3.4 Kenneth Thibodeau.

Kenneth Thibodeau is Director of the Electronic Records Archives Programme at the National Archives and Records Administration (NARA). In the U.S. government, NARA is responsible in collecting, maintaining and preserving all the historical valuable records for the forthcoming reference and evidence.

In the context of the digital world, electronic record was created in variety of formats and has embraced rapid growth in the electronic record volume. His experience in the electronic records and archives have been more than thirty years' and was known as one of the internationally recognised experts in this field.

Thibodeau (2007) proposed five dimensions to evaluate the success of digital repositories based on the open archival information system reference model to evaluate the success of digital repositories: service functionalities, orientation, content coverage, collaboration and state of development.

The following are abstract models of what a digital repository should be, what functions it should fulfil and whether it deserves trust in order to situate digital repositories along several axes:

Service: Is the repository aware of the various groups of stakeholders it serves and is aware of their respective needs? How well does it meet those requirements?

Chronological Orientation: Does a repository prioritise asset preservation or meeting the needs of a user community?

Coverage: does a repository aim primarily to preserve all or at least the noteworthy products of a given producer or set of producers or to build a collection best suited to the needs of its designated user community, regardless of source?

Collaboration: Does a repository works alone or in collaboration with other organisations to achieve success?

State: Is there a moderate consideration of the preceding factors based on the stage of development of the repository?

2.3.5 Mao Yanchun and Wang Jin

Both researchers are from the School of Computer, China University of Mining and Technology, Xuzhou Jiangsu, China. Yanchun and Jin (2009) provided an abstract frame of reference for evaluating digital repositories. They proposed five quality criteria

which are interface usability, collection quality, service quality, system performance and user satisfaction. The digital library model that has been suggested is appropriate for an undeveloped region. It consists of a number of quality indicators to help digital library teams and system administrators to identify the constraints, content quality, system monitoring, facilitate assessment and how to set the priorities for implementation of digital repositories platform.

2.3.6 Yumin Zhao, Zhendong Niu, Yujuan Cao and Lin Dai

Zhao, Niu, Cao and Dai (2007) proposed five critical success factors such as performance, security, recource, user, management and maintenance to evaluate digital libraries. The evaluation framework analysed the different ideologies and criteria of digital libraries evaluation.

2.3.7 Fatemeh Lagzian, Abrizah Abdullah and Mee Chin Wee

Fatemah Lagzian is a graduated PhD student from Department of Library and Information Science in the Faculty of Computer Science and Information Technology, Universiti Malaya (UM). Her studies are mostly focussed on the Digital Libraries and Institutional Repositories. Her expertise is on the critical success factors on the deployment of the implementation of institutional repositories and digital libraries.

Abrizah Abdullah is a Professor at the Department of Library and Information Science in the Faculty of Computer Science and Information Technology, Universiti Malaya (UM). She has produced conference and journal articles that are related to the digital libraries, institutional libraries, open access repositories and open science concept. She is the chief editor for Malaysian Journal of Library and Information Science which is indexed in Scopus and Social Science Citation Index (SSCI). Currently, she is one of the members of the Malaysian Open Science Alliance, Academy of Sciences Malaysia. She also chairs the Working Group on Capacity Building and Awareness and a member of the Steering Committee for the International Science Council project on the Future of Scientific Publishing.

Mee Chin Wee is an information systems lecturer at Universiti Malaya (UM), Kuala Lumpur, Malaysia. She has published a number of papers related to computers in education, computer age instruction, computer assisted assessment, online

collaboration tools, critical success factors to the use of computers in education and data visualisation techniques.

The model for digital library critical success factors consists of six dimensions that motivation, resource, people, process, location and time) may help the institutions to develop a new Digital Library and at the same time assist librarians to identify critical factors that should be considered to successful implementations (Lagzian, Abrizah & Wee, 2013a). This model has helped developers, librarians and practitioners to ensure that every relevant factor should be covered during their system development strategies.

Lagzian, Abrizah and Wee (2015b) had distributed 322 web-based survey questionnaires to IR manager worldwide to get their feedbacks and overviews in critical factors that contribute to the success of institutional repositories. Through their research, the results indicate six important factors which are management, services, technology, self-archive practices, people and resources that should be considered in institutional repositories implementation.

The proposed study employed the unified theory of acceptance and use of technology (UTAUT) as its main theoretical framework, with five hypotheses proposed to investigate users' intentions to self-archive in IRs. The data for this analysis were gathered from 177 Malaysian researchers as well as authors and the structural equation modelling (SEM) method was used to test the research model (Asadi et al., 2019a).

The study employs a survey method to determine the relative importance of six major challenges confronting institutional repositories: data, metadata, technological requirements, user needs, ethical concerns and administrative challenges. According to the survey results, academic librarians see limited resources, such as a lack of budget and staff, as the primary impediment to the development and/or deployment of services in institutional repositories. The study also identified critical challenges in various aspects of institutional repositories, such as the sheer volume of data, institutional support for metadata creation and data sensitivity (Joo, Hofman & Kim, 2019).

To develop the indicators, a thorough review of the literature was conducted to identify existing indicators used to evaluate repositories. With a total of 48 components, these were divided into five categories: technology, procedures, content, marketing and personnel. An online survey was conducted with the managers of repositories at 66 Spanish research institutions to verify the degree of fulfilment of the selected indicators (Serrano-vicente, Melero, & Abadal, 2018).

2.4 Institutional Repositories Success Factors' Perspectives

Prior research on the success factors for implementing digital and IR has not been conducted in great depth. Shearer (2003) first identified ten potential success factors, including archiving policies, disciplines advocacy activities, copyright policies, content type, staff support, quality control, public relations, software, use, and organisational culture, for the IR projects of the Canadian Association of Research Libraries. Westell (2006) proposed eight input indicators: a mandate, integration with planning, funding model, partnership with digitization centres, interoperability, measurement, promotion, and preservation strategy—to assess the efficacy of IR in Canada. Thibodeau (2007) proposed a framework based on five dimensions to evaluate the effectiveness of digital repositories: service functionalities, orientation, content coverage, collaboration, and state of development.

In their comparative case study of five IRs in colleges and universities, Markey et al. (2009) argued that success should be determined by both internal (content, services) and external factors (staff, community). According to Proudman's 2007 analysis of the European DRIVER research project, the CSFs necessary for populating repositories and their services are management and organisation, content and services, infrastructure and technical, policy, advocacy, and organisational networks. Cassella (2010) proposed a set of performance indicators to gauge the efficacy of IR. She created 14 internal and three external indicators that IR managers could use to demonstrate the worth and efficacy of their repositories. A few surveys have sparked discussions on the specific factors that contribute to an IR's success. Services and content recruitment are the main causes (Thibodeau, 2007). (Shearer, 2003; Bell et al., 2005; Ferreira et al., 2008). Previous research (Shen et al., 2006; Thong et al., 2002) have shown that a digital repository's target audience's acceptance and sustained funding for its long-term viability are key factors in success (Westell, 2006).

For IR implementation to be successful, management commitment and support are essential for ensuring preservation and maintenance, IT infrastructure, digital rights management, and institutional mandate (Jain, 2011; McCord, 2003; van Westrienen & Lynch, 2005). According to Cullen and Chawner (2012), establishing a repository is a significant undertaking for an institution and calls for a commitment of personnel and financial resources to ensure the repository's establishment and upkeep are successful.

The importance of content was viewed by Russell and Day (2010) as a crucial

factor that also had an impact on repository implementations. In order for IRs to be successful, according to Dorner and Revell (2012), library managers must not only make sure that content is added to the repositories, but also that library users are made aware of them as excellent information sources. Services that enhance the content, according to Chavez et al. (2007) and Ramirez et al. (2010), support a successful IR. The literature also made it clear that for an IR to be successful, its users must practise self-archiving. Kim (2010) found that one important factor that either encourages or discourages self-archiving practices is perceived self-archiving culture (worries about copyright, extra time and effort, and technical ability).

Author attitudes toward self-archiving and the quantity of deposits, as well as usage evaluation, were highlighted by Xia and Sun (2007) as key success factors. Staff collaboration and participation in submissions are crucial components of open access, according to Starkman and Earwage's (2008) study. According to Dorner and Revell (2012), librarians play crucial roles in educating users about copyright and other intellectual property rights so that these facilities are compliant with such rights (Tripathi & Jeevan, 2011). In addition, Jain (2011) emphasised the need for clear policies regarding ownership, copyright concerns, required deposits, and encouraging academics to self-archive. She claimed that all of these things could be accomplished with success by thoroughly publicising the advantages of an IR to all stakeholders.

However, Markey et al. (2009) found that there is generally little consensus regarding what makes an effective IR. Since there has not been much empirical research on the use of CSFs in IR projects, this study aims to fill this gap by identifying the elements that are essential for its availability in IR as well as the policies and circumstances that promote and affect IR development. To obtain feedback and an overview of the key elements that contribute to the success of institutional repositories, Lagzian, Abrizah and Wee (2015b) conducted survey questionnaires to IR managers around the world. Their research has produced six key findings that should be taken into account when implementing institutional repositories: management, services, technology, self-archive practices, people and resources.

2.5 Institutional Repositories Success Factors' Dimensions

IR is a platform very close to library services and also suitable for the library to be the owner of the system in the academic university environment. Based on the

background of information management, librarians can manage IR properly with the understanding of copyright issues, dublin core standard metadata and open access concept in order to ensure the successful implementation and development of IR for the purpose of the university context (Abrizah et al., 2010).

According to Jain (2011), the following steps should be taken to make IR more successful and long-lasting:

i. extensive promotion and publicising of the benefits of IR to faculty and all other stakeholders.
ii. the establishment of clear policies regarding ownership, IR contents, quality standards, copyright issues and so on.
iii. adoption of a strict institutional implementation policy requiring the deposit of all staff research outputs as well as student dissertations and theses.
iv. think of IRs as ongoing projects rather than one-time events.
v. clear articulation of vision, strategy and tactics, whether the vision is institution-centred, researcher-centred, or public-centred.
vi. provision of a full range of academic and research support services to academia and researchers, such as e-mail e-print requests and closed access deposit through IRs.
vii. long-term support from senior management and academia
viii. adequate resource provision (finance, space, human and technology); and the implementation of incentives to encourage academics to publish through IRs.

2.5.1 Knowledge Sharing

Information content is an important component in the development and measurement of the successful implementation of the institutional repository. Many researchers agreed that the success indicator of institutional repositories can be predicted through the content development and involves the contributions from faculty members to the university repositories (Westell, 2006; Thibodeau, 2007; Yakel, Rieh, Markey, Jean & Yao, 2009). Although the content of institutional repositories has grown, the quantity of content stored in institutional repositories remained low. The evidence has been based on several previous studies that were conducted in the early

stages of development and implementation of institutional repositories.

According to Ware (2004), a major challenge for the development and implementation of IR is the faculty participation and the difficulty in persuading faculty members to use institutional repositories. As a result, Chan (2004) conducted a study of the Toronto Institute institution repository (Tspace) during the repository implementation period, with faculty participation and contribution being entirely voluntary. The reason for the slow sharing of articles to institutional repositories is the reluctance to adopt a new culture and technology through self-archiving, the lack of confidence in university repositories and copyright issues.

Rieh et al., (2007) mentioned that majority of their respondents agreed that success of institutional repositories is related to institutional repositories contributors. Their contributions are the significant success indicators and without their contribution the recruiting content for IR is difficult. The contribution of articles from academics is a key factor that determines the success of the repository services offered by the library in the dissemination activities of research outputs. Most repositories projects have faced similar issues like low submission rate, low faculty support and sharing of their research outputs, especially in early implementation and development stage. The faculty perceptions on the value of sharing resources and open access are important in designing and tailoring the institutional repositories as per needed by library users.

Kim (2007) has conducted a study among 67 professors in a US university that have experienced in depositing their content to institutional repositories. It was found that there are two types of factors that motivate and hinder academicians from sharing their research results to university institutional repositories and these are based on extrinsic and intrinsic factors. In the context of extrinsic factor, it included several issues in terms of accessibility, publicity and reliability of documents in institutional repositories, professional and institutional recognition and academic appreciation on their research findings. While, in the intrinsic factor, the academicians focused more to altruistic intentions and self-interest which encouraged them to proceed for sharing the full text in institutional repositories. Besides that, few aspects like cost factors related to copyright issues, additional time and effort are required to make an institutional repositories contribution. Kim also stressed that trust and identification are considered important factors in the context of institutional repositories and can be considered as contextual factors.

In Kim's study in 2011, she used 621 professors as samples on the same issues

about motivation and hindrance among academicians to share their research findings to the institutional repositories. In this study, she found that the major factors were about the copyright and preservation of institutional repositories contents. Most academicians were motivated to be involved in contributing their contents to the institutional repositories because of their belief that the contents in the repository can be easily accessed by others and stay permanent at the repository. Through the institutional repository's services, it provided the advantages to the content contributors and the platform itself gave benefits to the repository users and in the context of higher education for academic library users. In the preservation factors, professors felt highly confident and trustworthy with institutional repositories functions and considered as the best place to preserve and make their research visible for a long time (Kim, 2011).

Manjunatha and Thandavamoorthy (2011) found in their research findings, the awareness about the existing of university institutional repository is low but most of them have positive attitude and interest for sharing their research output to the IR and make it open access. When comparing IR users and non-users, it shows that the assistant professors and research scholars are highly interested in using and depositing their research articles to the IR university.

When users and non-users were compared according to their university designation, research scholars and assistant professors were found to be the most committed to using and sharing their research work in institutional repositories. Based on the findings, it shows that 30% of the users of IR are research scholars. It shows a good signal and positive impact on familiarity with the use of institutional repositories. In the questionnaires, the researcher asked specific questions related to the reasons why the respondents are unwilling to share their articles to university's IR. A total of 394 (43.2%) respondents mentioned that they were not interested to deposit their articles because of the reasons that other users will copy their research outputs without permission (53%), 24% do not know the self-archiving process and its existence in the university's IR. The other respondents said that they need to allocate time and effort for sharing and self-archive to IR.

Joo et al. (2019) highlighted that IR users lacked the motivation to send and deposit their research articles to the repository. This statement is supported by several previous studies done by Abrizah et al. (2015), Kim (2011) as well as Yang and Li (2015) who recognised that this issue is the greatest problem among academics to deposit their materials because of the time taken in doing the uploading process. This

statement is similar with research findings from perspective of IR users that was conducted by Abrizah et al. (2015) and Kim (2011). This is clearly one of the factors that prevents researchers from contributing to the repository and as a big challenge in the user's point of view. Clearly, awareness of institutional repositories is the main factor that influences user participation in data sharing and research output (Westrienen & Lynch, 2005; Joo, Kim & Kim, 2017).

Each of the higher education institutions in Indonesia has contributed to a single portal like Garuda as a representative of Indonesian knowledge resources, which is a good network of knowledge sharing among scholars that is available. The culture of knowledge sharing among Indonesian scholars is growing and benefiting scholars and Indonesian higher education institutions not only on a national, but also on an international scale (Farida, Tjakraatmadja, Firman & Basuki, 2015).

The vast majority of scientists, engineers, artists and physicians are aware of and enthusiastic about contributing their research to institutional repositories. Humanities and social science researchers, on the other hand, were found to have a low level of awareness of the institutional repository but were interested in contributing their research work to the University Institutional Repository. They also have a positive attitude towards providing free access to their university's scholarly research results (Manjunatha & Thandavamoorthy, 2011).

In the context of Malaysia, Abrizah (2009, 2010) highlighted that the rate of sharing culture to the institutional repositories contents implemented by the Malaysian academic libraries is still low and majority of them has not fully accepted the self-archiving concept (Singeh et al., 2013). Institutional repositories transformation technology was introduced in a conservative way and widely controlled especially all the subjects that are related to the stereotypical academic culture and complex research management policies (Abrizah, 2010). Her findings were consistent with other literature that showed reluctance to change attitude, ingrained behaviours and resistant to adopt new working environment to support the institutional repositories (Ware, 2004).

Despite the institutional repositories that gained support from academic members in education institutions, some academicians seemed to be careful in depositing or submitting their research results to the repositories. Technology of institutional repositories, plagiarism issues on research findings and time consuming in self-archiving are seen as inhibiting issues in knowledge sharing to the institutional repositories. These issues have also been noted in several other studies done by Davis

and Connolly (2007), Seaman (2011), Swan and Brown (2005), Covey (2011) as well as Cullen and Chawner (2011) that delved on the humanists experience. Some academicians are worried on the qualities of research work and lack of self-efficacy and these contributed to resistance barrier on the knowledge sharing culture. It seems that a lot of emphasis related to open access publishing is given to the notion of trust to the quality assurance and trusted repositories contents.

2.5.2 Self-Archiving

Self-archiving is an action taken by the authors in depositing their research publication to university platforms like institutional repositories, research repositories, subject repositories and others. Manjunatha and Thandavamoorthy (2011) found that many researchers are interested and volunteered in contributing their research content to the university institutional repositories. The content of institutional repositories is one of the criteria for evaluating the institutional repositories services and implementations. Markey et al. (2009) also agreed that self-archiving as one of the success factors dimensions and Critical Success Factor (CSF) model (Lagzian et al., 2015a) for institutional repositories implementation analysis. Swan and Brown (2005) declared that the reasons of authors' reluctance to self-archiving their research articles to the institutional repositories were due to perceive of time and perceive of technical issues of the platform.

Abrizah, Hilmi and Kassim (2015) received the respond from Library Information Science academic that the highest motivation for them to share their research outputs to the institutional repositories were related to the performance expectations. Similarly, findings of Venkatesh, Morris, Davis and Davis (2003) found that authors were highly expecting benefits from knowledge sharing in research performance, thus, improving their personal performance and sharing contents brought more prestige to their academic profession.

Lawal (2002) has conducted a study in colleges and universities in USA as well as Canada to determine the participation of the respondents among academicians from nine scientific fields in depositing their research outputs to the institutional repositories. Based on the study, it was found that physics and astronomy disciplines showed the highest participation in depositing and sharing their research outputs to institutional repositories. This is followed by several disciplines such as mathematicians, computer

scientists, psychologists and biological scientists. The reasons for depositing their research outputs to the institutional repositories included the visibility of their research products and author's exposure to the intellectual world-wide communities. The other reasons for not depositing their materials included publisher policies and technological restriction issues.

In his study, Pelizzari (2005) found different findings on the perceptions from social science faculties. The findings showed that all respondents knew about open access contents and more than half stated that they already had open access contents freely available on the web. Pelizzari reported a positive acceptance of open access principles among academicians from social science discipline. Most of them agreed to deposit the open access version only to the institutional repositories because they worried that other researchers would modify their deposited contents.

Rowlands, Nicholas and Huntington (2004) reported that the level of preference to deposit and self-archive research content to institutional repositories among authors and researchers was very low. The finding also shows low awareness to adapt open access institutional repositories as an alternative model for publishing and sharing their research articles. Besides that, the finding for the level of copyright awareness among authors and researchers was in line with the findings for self-archiving and alternative publishing model. Fifteen percent from total respondents were not interested to submit their research outputs to the institutional repositories because of unsatisfactory action with the quality and preservation of digital content environment.

Carr and Brody (2007) stressed the success of the IR development based on the commitment and the seriousness of sharing research articles by authors. Authors need to be consistent in depositing the results of their journal publications with open access status. These contents are very important in the content development of the library's digital collection and concurrently assist university's budget in online databases subscription.

Russell and Day (2010) mentioned that the contents of institutional repositories were important indicators in measuring the success of institutional repositories implementation. Dorner and Revell (2012) highlighted that the success of the institutional repositories was related to the repository content itself. The library and repository manager's role not only focuses on the content input in the repository, but also it actively promote the significant and valuable contents to the scholarly communities. Chavez et al. (2007) and Ramirez et al. (2010) believed that the roles

played by library and repository managers were added value to the success of institutional repositories services.

The work involved identifying appropriate material, digitising it into PDF format and applying the appropriate Creative Commons licence in accordance with the university's open licence policy. To increase content recruitment, authors have been given the option to self-deposit via a simple registration process. To facilitate easy indexing and ensure consistency of data input, an electronic copy of the user guidelines is available on the web portal (Leng, Ali & Hoo, 2016).

According to the results of Structural Equation Modeling (SEM) obtained by Asadi et al. (2019b), "attitude, facilitating conditions and social influence" have statistically significant influence on users' intention to self-archive. Researchers do not anticipate that self-archiving in institutional repositories will improve their research performance, thereby increasing their personal merits.

Libraries play an important role in increasing the visibility of research outputs in the field of information retrieval. Librarians must educate researchers on how to achieve open access and its benefits (as at the University of Minho), as well as inform scholars and researchers on the benefits of publishing in an IR, using methods such as email. Information has to be given about how to publish in open access to all university academicians, saying that freely available online materials can save money and improve teaching and demonstrate how the visibility of research can be improved with open access (Macha & Jager, 2011; Bonilla-Calero, 2014).

To encourage institutional repository participation, academic libraries must actively educate potential users on the benefits of sharing data through their institution's institutional repository. An institutional repository can help to foster a culture of data sharing and reuse in academia (Cragin et al., 2010; Rani & Buckley, 2012; Kim, 2017; Witt, 2008). Branin (2005) emphasised the importance of users; in order for an institutional repository to be truly useful to its community, individuals within the institution must understand the benefits of their repository and be willing to submit their digital assets to the repository as well as fully utilise the assets in the repository. Library managers must create relevant educational workshops or materials to assist researchers in better understanding the benefits of depositing their works and alleviating any concerns (copyright issues) about depositing articles (Joo, Hofman & Kim, 2019).

In Australia, authors (63%) and administrative staff (63%) are increasingly self-archiving. In fact, the majority of the items (more than 60%) were obtained from the

Current Research Information System (CRIS); in other words, they are automatically deposited in the repository once introduced by authors. Another method of importing metadata to the repository is to download metadata from Web of Science (WoS) and Scopus. All of these outcomes result in more work for repository managers, who are required to review records (CAUL, 2014).

An international study, however, discovered that 54% of deposits were mediated, particularly by repository staff (Dubinsky, 2014). When these findings are compared to those of a 2009 study (Melero et al., 2009), in which 56% were deposited by librarians and 24% by the authors themselves, it is clear that authors' self-deposits have increased significantly. Authors depositing their research outputs in repositories are more likely to bring about a cultural change that will ensure that an institutional repository and, ultimately, open access, becomes an integral part of an institution's research activities. However, such processes depend largely on having infrastructure that allows interoperability with other institutional systems (Lagzian et al., 2015b).

Most depositors are required to check editorial policies regarding self-archiving permissions prior to depositing articles. This relates to how the editorial policy is consulted, because the easier it is to find, the more likely it is that researchers will consult it. There are various approaches in this area: some provide links to SHERPA/RoMEO from the repository and some have reported that they also include/embed reuse licences in the record metadata (CAUL, 2014). In 83% of cases, librarians review records before making them public; 13% of managers said documents are deposited after the embargo; and a small percentage (4%) have the option of a document request button if the document is temporarily embargoed (Serrano-Vicente et al., 2018).

While research publications have some appeal, many people are put off by the reality of depositing. The message that publishing in open-access forums as well as established peer-reviewed scholarly outlets lead to higher citation rates has not been accepted by the academic community, despite the fact that there are clear benefits for those who are willing to be early adopters, including increased citation and scholarly reputation (Makori, Njiraine & Talam, 2015).

Foster and Gibbons (2005) explored among 25 respondents from University of Rochester faculty members with different backgrounds such as Political Science, Economics, Visual and Cultural Studies, Physics and a few more fields in order to identify the faculty needs from institutional repositories platform. Based on their

research study, it was found that, faculty members were not willing to take part especially to deposit their research outputs if the process takes additional time and effort.

Swan and Brown (2005) through their large scale research involving 1,296 respondents from disciplines of social science, art and humanities and science across various countries including Western Europe, Japan, North America, United Kingdoms, Western Europe, Central and South America, Australia, Africa and Asia found that 66% of respondents had self-archived through institutional repositories, discipline repository, personal website and university repository at least one article in 3 years. The rest of the respondents mentioned that why they do not self-archiving to any repositories is because of copyright infringement and perceived as a stumbling block.

Similarly, in the same period, Wust (2006) highlighted through the study conducted, most of respondents have no experience with depositing their research outputs in institutional repositories and do not know about institutional repositories. Some of respondents feared with losing control over their research findings and expressed highly concern about copyright issues. Similarly with the results from the research that was done by Pickton and McKnight (2006), they highlighted few respondents who agreed with the obstacle statement. They expressed their concern if they self-deposit their research findings through institutional repositories or university repository, they may not be able to publish their work elsewhere later. They also feared and worried on several issues like ethical principles, copyright and plagiarism.

Abrizah, Hilmi and Kassim (2015) conducted research that is concerned with motivation and resistance among library and information science academicians. They found that the main obstacles to share the results of scholarly research through self-archiving in institutional repositories for those who practise self-archiving are concerned to few issues related to plagiarism, limitation of time, lack of effort to deposit, technical system, lack of effectiveness and self-discipline. All the findings were similar to the previous studies that were completed by Davis and Connolly (2007), Seaman (2011), Swan and Brown (2005), Covey (2011), Cullen and Chawner (2011) which examined experience by humanists about institutional repositories. Lack of confidence with the quality of work and lack of self-efficacy were seen as the dominant barriers in contributing their research outputs and inclusion of their teaching and learning resources.

Lagzian, Abrizah and Wee (2015b) conducted a research on measuring the gap

between perceived importance and actual performance of institutional repositories among 354 repository managers of institutional repositories world-wide. They found that self-archiving practices were the first key critical success factors in measuring the implementation performance of institutional repositories. They also highlighted that self-archiving factor could also influence the success of digital libraries as institutional repositories, as one of the types of digital library system or platform. This finding may be valuable to the repository manager in designing the implementation programme that was related to institutional repositories content development. It could be an indicator to set priorities on the level of performance for the desired institutional repositories collections.

The previous literature also emphasised that successful institutional repositories required self-archiving practices among their users. Kim (2010) identified that a perceived culture of self-archiving was an important factor that drives or slows down the self-archiving practices among university communities. Xia and Sun (2007) emphasised the total items deposited and the author's attitude towards self-archiving initiative can be used as an evaluation criteria. Starkman and Earwage (2008) stressed that staff participation and collaboration in submission were also considered as key factors toward open access initiative and creating the new culture for institutional repositories development.

Singeh et al. (2013) mentioned that if the researcher is aware of the benefits of institutional repositories to themselves, they will be fully supported and involved in self-archiving their research publications to institutional repositories. The awareness on the institutional repository platform will remain an important factor in determining the usage of repository and the performance for this platform. A big picture and understanding of the advantages of institutional repositories with the concept of open access strategies are essential for its widespread usage among university members and research communities (Dulle, Minish-Majanja & Cloete, 2010). Most of the respondents had experienced using this platform for searching scholarly materials, self-archiving their research materials and asking their students and other researchers for usage purposes.

Similarly, Papin-Ramcharan and Dawe (2006) also highlighted in their research that if researchers are unaware of the existence and benefits of the repository, then they cannot self-archive. Therefore, it is essential to campaign that a large number of respondents were not aware with the existence of institutional repositories. They

claimed that library professionals can be used as change agent at university level. Harnad and McGovern (2009) emphasised the importance of institutional repositories mandates that will safeguard deposits to repository, maintain the quality of file deposited and lead to the growth of institutional repositories contents and performance.

Manchu and Vasudevan (2018) investigated awareness of institutional repositories and open access publishing in India and discovered that many researchers are aware of institutional repositories and open access publishing. The Internet, online resources, friends and colleagues were the primary means by which the researchers learned about institutional repositories and open access publishing. The study also revealed that most researchers do not know how to deposit their research work and their other reasons included copyright issues, low quality, and people seeing their publications. Kaba and Said (2015) discovered that 90% of respondents were familiar with OA resources and thought the resources were useful to their academic activities.

Ammarukleart (2017) found that there is a lack of communication and collaboration between libraries and faculty members in the implementation of institutional repositories in her study on the factors influencing faculty acceptance and use of institutional repositories in Thailand. Academic members were one of the main stakeholders in contributing to the development of institutional repositories contents in universities and high education environments, as well as users of institutional repositories. According to the results of her survey and interviews, the majority of academicians are unaware of the existence and importance of institutional repositories in their universities. She discovered that only 25% of all academicians contributed to institutional repositories. According to data analysis from interviews with faculty members, they were unaware of the benefits of institutional repositories and requested explanations from libraries. Librarians must persuade them of the benefits of self-archiving to institutional repositories. According to the researcher, libraries should have good reputations and connections with academicians so that they can easily obtain support for content contribution to repositories. The study also recommended that repository librarians collaborate with faculty members on all aspects of the teaching and learning environments.

2.5.3 IR Usage

Davis and Connolly (2007) implemented research among faculty members from

various faculties and disciplines including sciences, social sciences and humanities about their perceptions of not using Cornell's Dspace. The results determined that Cornell repositories were limited in terms of usage and underpopulated among faculty members. The scenarios happen because of insufficient knowledge about the institutional repositories and lack of motivation on the value of Cornell's Dspace contents in order to support their literature search and research activities. Most of respondents used their personal blog and website to highlight and disseminate their research articles.

Abrizah (2010) found that in her study among research universities in Malaysia, most respondents were aware with the existing institutional repository in their universities, but they do not have motivation and are reluctant to use and create their research outputs in the repositories with several reasons. Based on that, the findings show the slow support and usage by the library users (Abrizah, 2010; Singeh et al., 2013a, b).

The technology must be simple and easy to use in order to save researchers' time and attract more users to institutional repositories. Scholars were asked how they found literature for their research projects, as well as which sources they used. According to the findings, printed books and journals were the most familiar and popular source, as mentioned by 356 (20.87 %) academic scholars. Others mentioned library websites (12 or 7.03 %), open access journals (184 or 10.8 %), google scholar (180 or 10.55 %), library OPAC (120 or 7.03 %), subject portals (75 or 4.4 %), online subscription databases (125 or 7.32 %) and others (129 or 7.57 %). According to the findings, 31.04 % (n = 530) of academic scholars learned about institutional repositories from the Internet, 30.75 % (n = 525) learned about IRs from subject journals and 16.40 % (n = 280) learned about IRs from other sources (Manjunatha & Thandavamoorthy, 2011).

Cullen and Chawner (2010) found in their survey that academics have been slow to adopt the concept of institutional repositories and show little interest in using repositories for their own work or to access other people's work. Implications of this factor have caused the number of deposits to remain low. Academics see this concept of institutional repositories mirroring online database and subject or discipline repositories appear to have greater value for community academics.

According to Halder and Chandra (2012), a large number of people at Jadavpur University are unaware of the institutional repository, IR software and the reasons for developing an institutional repository. Nowadays, the IR system allows access to

scholarly content in the shortest amount of time and even from remote locations. Its ease of use and simplicity are enticing more patrons to use institutional repositories. To properly utilise its beauty, only a broad range of user awareness is required.

According to Joo et al. (2019) as wellas Macha and Jager (2011), libraries may want to consider using search engine optimisation (SEO) techniques to make their resources well-indexed by web search engines in order to increase the visibility of institutional repositories. SEO techniques can be a compelling way to better distribute the resources collected in institutional repositories to diverse groups of web users, ultimately increasing the visibility of institutional repositories (Macha & Jager, 2011; Arlitsch, O'Brien & Rossmann, 2013; Arlitsch & O'Brien, 2012; Onaifo & Rasmussen, 2013).

Almost all repositories provide usage and download statistics and they provide mechanisms for importing and exporting metadata and digital objects. Repositories that allow documents to be shared via social media and that support the export of results are also prevalent, albeit to a lesser extent. Most repositories have not developed altmetrics, despite the fact that many institutions intend to use them in the future (Serrano-vicente et al., 2018).

According to Makori, Njiraine and Talam (2015), based on the findings of his study, it can be concluded that the concept of IRs was taken up with enthusiasm by many institutions of higher learning, but it was not well followed through after the initial phase of activity, as evidenced by research. As a result, repositories are growing slowly, simultaneously integration and use are progressing slowly. The research also discovered that user perception and awareness are predictors of IR integration and use. As a result, the case made in this study is that in order to increase the value and use of IRs, critical masses of quality content are required. Extending the repository's role, integrating functionality with other resources and increasing exposure through collaborative projects are critical to realise the repository's full potential.

Manjunatha and Thandavamoorthy (2011) also suggested that technology must be simple and easy to use in order to save researchers' time and attract more users to institutional repositories. Based on their findings, they have made the following recommendations to improve user awareness and use of institutional repositories at the university level which are:

All universities must make a policy on decision regarding the establishment of open access institutional repositories in their respective institutions.

1. Researchers should be educated about the use of institutional repositories through seminars and workshops held in their respective university departments.

2. An orientation programme on the benefits and effective use of institutional repositories should be conducted on a regular basis.

3. University libraries should integrate their online catalogues with their institutional repositories.

4. Lecturers should encourage students to deposit their research work in open access repositories.

5. Universities should provide research scholars with training on how to deposit and access research articles from open access institutional repositories.

6. Open access repositories, databases and online journals must be linked from the library's website (Manjunatha & Thandavamoorthy, 2011).

According to Bamigbola (2014), the level of awareness about IRs among faculty members is increasing, but there is a variation across agriculture disciplines. The existence of IR, its meaning and its benefits were not translated into use. Furthermore, while there was a general positive attitude toward IR, faculty submissions of scholarly works were low.

Most of IRs are designed based on the needs of their institutions. IR need to be well-managed in terms of content creation and usage in order to achieve the IR implementation and information sharing aspirations. A customisation browsing interface can be very useful and intuitive for library users and also make IR more engaging as a scholarly platform for different types of content (Koenig & Mikeal, 2010; Gul, Bashir & Ganaie, 2019). Ukwoma and Okafor (2017) noticed that DSpace institutional repositories provide a user-friendly interface view and access to its content is easy because documents are organised by community (faculty), sub-community

(department) and aggregation (type of material).

Wust (2006) mentioned that system usability and ease of use may influence their willingness for sharing their research articles to institutional repositories. The findings showed that institutional repositories users may not be willing to use and share their research output if the system interface is too complicated. Therefore, to get support from researchers and faculty members, overcoming this problem would be the right solution.

Theodorou (2010) conducted his research in order to determine the reasons why acceptance and the content development of open access repositories are still slow through analysing researchers' opinions on open access institutional repositories among 20 academic institutions of social and natural sciences in Europe and North America. Most respondent are willing to submit their research to institutional repositories if the criteria for publishing as per journals standard (library databases). Some of them highlighted on the quality of paper indexed in open access institutional repositories and they felt that open access repositories do no have a high reputation platform and power for attracting readers in accessing. Manchu and Vasudevan (2018) conducted a study at the Kerala State University of Calicut and discovered that researchers are uninterested in OA because they believe the resources are poor quality and also concerned about copyright issues.

According to Gurikar and Hadagali (2019), most researchers learn about OA resources and use search engines to find them. They are specified as OA sources that are not as good as traditional journals, but they believe that it is still a useful information. Ashraf and Haneefa (2017) investigated the use of OA by research scholars at Calicut University and discovered that Electronic Theses and Dissertations (ETD) are the most commonly used sources, followed by OA journals (43.11%), with a low level of use of OA repositories and e-books.

Zamani and Izhar (2017) through their research on the critical success factors for knowledge repository implementation found that there is a lack of promotion from top management, academicians, systems experts and academic librarians in usage of scholarly repositories among university students. Likewise, knowledge repository technology functions are still lacking in terms of system interface, system development and system navigation. These issues need action and role from everyone in the university especially top management, staff and also system experts in dealing with this problem effectively so that users can efficiently and regularly use a knowledge repository and acquiring the valuable benefits through repository services. It is very

important to inspire the active usage among library users or students. Knowledge repositories platform should be a powerful tool in conveying useful knowledge in fastest approach. Through knowledge repository usage, knowledgeable generation can be cultivated throughout knowledge sharing and exchange activities.

Dulle, Minish-Majanja and Cloete (2010) did a research on the encouragement and promotion of open access resources. University and academic library should conduct workshops and seminars that are designed specifically for awareness and understanding of open access concept such as specialised training sessions for researchers and academics to demonstrate access to the institutional repositories and open access publications. Besides, university and library can provide additional information related to open access culture at the university and library website to be accessed by university members. In order to enhance the access to institutional repositories platform, university and library should take initiatives in highlighting the strategies on the open access and actively convince the researchers and authors on the possibility of open access repositories for the dissemination of their research results.

In order to increase open access content in institutional repositories, libraries need to work together with academicians and researchers. The libraries' role is considered as key mediators in the success of institutional repositories implementation. Arunachalam (2004) argued that librarians should take a leading role in promoting the movement of open access repositories in their respective institutions. One of the activities that may be recommended for reference and research librarians is to help identify the current status for self -archiving and sharing repositories content. With the data trend, it will assist repository manager to formulate the strategies to increase the collections and usage through world-wide download articles and citations. This recommendation is aligned with Revell and Dorner (2009) who suggested that subject librarians are in a strong position to act as agents of change because they promote institutional repositories as innovative resources. The librarian's skills are able to help and train students and academics in information searching and retrieval.

Haddow (2008) found the success of institutional repositories depends on the assistance by librarians in depositing the research articles to institutional repositories compared to self-archiving method. Universities need to work with libraries in promoting open access repositories because of the librarian's skill in digital preservation of institutional repositories. Aligned with Swan (2008), it was found that the quality of metadata was completed and complied with digital content preservation standard that is

being used by the entire libraries in the world.

Chiramba and Bhebhe (2019) found several issues affecting the institutional repositories usage dimension. The issues that were identified through their research on the current status of institutional repositories in 11 universities at Zimbabwe were related to content development and its management, submission of full-text to the repositories, self-archiving to repositories, open access publishing platforms, repository discovery, repository access and preservation of digital repository contents. For example, institutional repositories were designed based on the institutional oriented, therefore this repository platform was developed to cater to the needs of the universities and at the same time neglecting the researcher's needs. The repositories implemented were lacking in most of the cases. The growth rate of institutional repositories contents in most of the universities in Zimbabwe were much slower due to the lack of support and commitment by their researchers. Besides, the repositories resources among universities were not linked to one another as well as it has restricted the dissemination of research materials among universities communities and other scholars (Chiramba & Bhebhe, 2019).

2.5.4 IR Policy

The success of the management content and operation of institutional repositories is related to the formulation of the policy and the strategy implementation to the institution. Institutional repositories policy is a vital factor especially in developing repository platform. A policy will give a clear picture and direction of IR implementation. Candela, Castelli, Ross, Thanos, Pagano, Kou-trika and Schuldt (2007) defined policy as rules and regulations, including digital rights, govern operations and is a core concept for institutional repositories. It is essential for libraries and universities to ensure that there is a clear copyright and self-archiving policies (Probets & Jenkins, 2006). Chen, Conway, Crabtree, Misra, Moore and Tibbo (2015) stressed the significant of institutional repositories policies to manage all the administrative tasks including deleting process, ingesting files, uploading repositories metadata, deleting files, adding storage system and selecting storage sources when ingesting files. Another study that was done by Anyaoku, Echedom and Baro (2019) on digital preservation practices in university libraries highlighted that most of institutional repository's implementation have digital preservation policies that drive the implementation and preservation of their

content.

All issues related to institutional repositories such as types of IR content to accept or reject, copyright issues, self-deposit or library deposit rules and procedures, access right to the IR contents and others are comprehensively documented (Asamoah-Hassan, 2010). Riddle (2015) agreed that IR policy should be ready before an institution's repository system or platform is selected. Before the platform for the repository was chosen, the policy development process began. The library formed a committee to examine the library and institutional environment and make recommendations on the direction of digital material at the institution (Riddle, 2015) and library management should form a steering committee to investigate the IR policy. Based on that committee, all planning and future directions of the development and implementation of institutional repositories are aligned with the institution and environment needs. IR allows policy makers to evaluate more and more thoroughly the types of documents that will be uploaded including monographs, theses, conference papers and the like. This situation is different from traditional services that rely solely on physical journal articles. IR services will involve a wide range of fields such as engineering, social sciences and humanities, which have traditionally not been available locally for accessing information purposes. Bonilla-Calero (2014) argued that Web of Knowledge has indirectly improved the quality of searching and retrieving the right research articles.

Lagzian, Abrizah and Wee (2015b) conducted research on measuring the gap between perceived important and actual performance of institutional repositories. It was found that most repository manager did not implement institutional repositories successfully. Based on this scenario, it will give effect to the growth performance of the institutional repository content and usage. According to Yang and Li (2015), copyright concerns, as well as the perception of IR contents as being of lower quality, are the second most significant barriers. Workshops or seminars on copyright, data management and intellectual property are desperately needed. Several survey participants appreciated this survey because it provided many web links to the resources mentioned for them to explore further and as a result, they learned a lot from it. Despite the best efforts to make faculty aware of the abundance of resources made available by the libraries, it appears that some of the services and resources are still unknown to the audience. This only serves to emphasise the importance of ongoing communication; after all, there is no such thing as too many reminders.

The growth of institutional repositories and open access publishing is forcing authors, librarians, publishers, research founders and policymakers to think on how to assess the quality and quantity of scholarly outcomes in a particular subject area. They must take into account that, the growing trend towards open access and use open access output as part of their decision-making and decision tools. However, at the same time there is a need to recognise that the entire sphere of scientific publishing is in a state of extreme and not a single tool has appeared to conduct an assessment of open access articles (Bonilla-Calero, 2014).

According to Joo et al. (2019), institutional repositories are becoming more interested in providing open access to copyrighted materials (Dawson & Yang, 2016). As a result, library managers must develop a well-structured policy on ownership and rights management, which is critical in assisting users in uploading materials to the repository. There are also some suggestions for proper management to which librarians should refer when managing research data in institutional repositories. A combined agreement of Creative Commons Attribute licence and Creative Commons (CC0), for example, can be used to share scientific intellectual property through repositories (Hrynaszkiewicz & Cockerill, 2012; Hrynaszkiewicz, Busch & Cockerill, 2013).

Knowing the annual volume of content entered into repositories allows for the calculation of an average per institution. A much more detailed study would be required to determine the proportion of research at each institution that is open access. However, these indicators provide insight into the proportion of documents that are available in full text and, as a result, repositories compliance with institutional mandates or recommendations; this information allows for the monitoring of open access policies at the national and international levels (Serrano-vicente et al., 2018).

Higman and Pinfield (2015) conducted an empirical study to determine the effects that funder policies have on approaches to Research Data Management (RDM). Even though they are not fully enforced at the moment, these policies have a significant impact on the content of institutional policies as well as the priorities of support service staff and researchers, either directly or indirectly. Policies are the most easily accessible and interpreted statement of funders' position on research data management (RDM) and they are clearly taken into account by higher education institutions when developing their own policies.

According to Gul et al. (2019), institutional repositories content management policies in South Asia are not promising. Administrators must take this issue seriously

in order for content creation and management to have a clear picture. The use and advocacy of institutional repositories compliant content is heavily reliant on well-defined content management policies that must be properly documented and populated.

Policy formulation and implementation are two factors that are quite related to the success of the management digital content in any digital libraries or repositories. Cayabyab (2015) argued that policy imposition played a significant role in the implementation of any project, especially in electronic thesis and dissertation projects. Many of the previous exploratory studies especially on the adoption, expansion and implementation of electronic thesis and dissertation repositories found the gap in implementation of the policies initiatives. They reported the absence in providing the comprehensive policies in managing the institutional repositories as well as electronic theses and dissertations repository (Corletey, 2011; Sengupta, 2014; Baro, Godfrey & Eze, 2014; Baro & Otiode, 2014).

Salau, Oyedum, Abifarin, Udoudoh and Alhassan (2020) mentioned that based on previous literature reviewed on electronic thesis and dissertations, the success or failure of projects in several countries and higher institutions is normally the lack and inadequacy of mandatory submission policy. For example, the successful project of Networked Digital Library of theses and dissertations (NDLTD) was due to the existence of this policy. In India, the Vidyanidhi project in implementation of national repository for e-theses has failed because there was no provision being made for the institutional repositories submission policy (Sheeja, 2011). This finding was aligned with Riddle (2015) who stated that most of the implementation of institutional repositories projects world-wide operate under a basis of institutional repository policy that does not take into account for widespread and sophisticated usage of the full text. Salau et al. (2020) agreed that the successful development and implementation of institutional repositories in developing countries were due to the existence a comprehensive policy to guide the operation and management of scholarly platform.

However, it was a different situation with the African countries compared to the developed countries in handling issues related to the institutional repositories policies. Corletey (2011) reported four universities in Ghana that had implemented institutional repositories without having a policy. Similarly, Baro and Otiode (2014) reported that in some selected African countries there were delays in the approval of institutional repositories policies and electronic theses dissertations policies. Besides, Wyk and Mostert (2014) also found that University of Zulu, South Africa did not explicitly

mention the preservation strategies on its repositories content either in short period or long period. Institutional repositories and electronic thesis and dissertations in Nigeria did not adopt any research data preservation and are still confronting with the policy issues such as in implementing institutional repositories, content development, funding and even preservation of repository's content for future access (Salau et al., 2020).

Ashikuzzaman (2018) highlighted that without a clear institutional repositories policy it was a constraint in the development and implementation of the institutional repositories. It reflected the content development, self-archiving activities, access to the digital contents, copyright management, preservation strategies and even measurement performance itself. Although academic libraries have existing policies for their printed collections, the management of printed collections were different compared to managing digital contents especially in the scholarly repository platform. It is because the scholarly platform can assess from anywhere and anytime through the Internet. In this context, the access policy plays a significant role to give the grant access without any issues related to copyright management.

Many institutions implemented institutional repositories without comprehensive documented policies especially in several item types such as student portfolios, student research articles, theses, conference papers and courseware. The institutions need to have the documented policies because of the ownership clarification of their community's research work (Branin, 2005). Dawson and Yang (2016) found different perceptions in looking at the importance of institutional repositories policies for several aspects especially that were related to copyright and licensing issues. Both of them felt that copyright and licensing issues were highly risky in destructing the open access practices in institutional repositories compared to types of creative work.

Jain (2011) highlighted that institutional repository should have a comprehensive policy on the ownership of the repository contents, copyright issues to articles deposited, mandatory agreement in self-archiving and encouraging academicians in sharing their contents to institutional repositories. All the elements highlighted can be successfully done through proper promotion and publicity of institutional repositories that benefit all stakeholders.

Singeh et al. (2013) suggested that university need to endorse and implement institutional repositories policies to assure the increase of open access contents. This is one of the basic strategies to improve and enhance open access among scholarly communities. Based on that, research management centre at universities should easily

promote self-archiving through funding policies. This is consistent with Chan (2004), who discovered that some research funding bodies, such as the Max Planck Society in Germany and the Wellcome Trust in the United Kingdom, require grant recipients to publish their research articles in open access platforms for each research project funded by them. Academicians and university researchers must publish their research findings in institutional repositories as a condition of receiving research grants. This is one of the reasons why, according to Kim (2006), grant funders and university or research departmental actions can lead to scholars' decisions to support open access initiatives at the university, national and international levels. The creation of a mandate will almost certainly increase self-archiving in institutional repositories. This is due to previous research by Swan and Brown (2005), Miller (2006), Kim (2006) and Sale (2006) indicating that mandating self-archiving will increase the growth of institutional repository contents and usage. Each researcher will be able to archive their own research material in their university's institutional repository as a result of this.

2.5.5 IR Procedure

A procedure is a process at the operational level that is required to implement a policy for an institution. This is divided into two categories whether the operational practices are formal or informal specifically for the department or throughout the institution. Basically, the statement in the policy is related to "what" the institution does operationally, then in the procedure is to state "how", it means to implement the operational policy statement.

Procedure is a set of actions that is a formal or accepted way of doing something. In the context of IR, library as an owner of IR system is responsible in making a comprehensive procedure especially in creating, maintaining the metadata and depositing the full-text for the purpose of visibility and dissemination of the research outputs. A complete documentation should have content development guidelines, type of repository content, metadata schema and copyright guideline to ensure that all rules and regulations tied to the content of repository can be properly managed and clear in its utilisation (Makori et al., 2015). In the higher education environment, a complete procedure is vital especially for repository staff during their daily operation and repository function.

Serrano-vicente et al. (2018) proposed that key factors for achieving the goal of

institutional repository development include compatibility with repository standards and procedures, the inclusion of depositor assistance features, the implementation of open access in institutions and compliance with intellectual property rights. IR staff must educate the campus community (faculty and scholars) about the submission procedure so that the IR can be filled with a variety of digital content (Gul et al., 2019). Procedure manuals describe the systems for entering, validating and linking documents into the repository. The majority of the repositories surveyed responded that these manuals are available on the web, while the remainder have none or have video tutorials, support tools when documents are deposited, or frequently asked questions (FAQs) instead. Style manuals, which are instructions on how to enter bibliographic data into an institutional repository, are available on the web in fewer cases (Serrano-Vicente et al., 2018).

Yang and Li (2015) found that the majority of responding Texas A&M University (TAMU) faculty are aware of open access journals in their fields and are willing to publish in an open access publication. The most significant barrier that accounts for TAMU's low IR participation rate is a lack of knowledge about the institutional repositories deposit process. According to Bonilla-Calero (2014), the transfer of research results via scholarly publication platforms is an important step in the research process. When knowledge is disseminated, it can help to advance science and technology.

Repository managers can estimate the impact of a university's publication by using institutional repositories, such as how many times an article is accessed (hits), the number of downloads (downloads) and its participation as a link to other websites (visibility). The number of downloads or clicks, like the number of citations, is not necessarily related to importance or influence, so those metrics must be used with caution; however, they provide an important overview of the use of specific results in terms of copyright issues. More systematic guidelines about authors' rights and responsibilities based on copyright agreements with journal publishers are required and academic libraries should consider implementing a system that allows researchers to check their copyright agreements and decide whether to upload their appropriate versions of pre-print articles. Furthermore, it is necessary to educate researchers about the process of article and data deposition and to provide step-by-step instructions about the process, which will reduce their effort expectation when using institutional repositories (Joo, Hofman & Kim, 2019).

According to Barwick (2007) and Jain (2011), clear signs of management support are critical to the success and sustainability of institutional repository implementation. According to the study, self-archiving practices, easy delivery of adequate contents and updates and a clear copyright management statement for its source are all very important in the success of institutional repositories implementation. Copyright issues were cited as a reason why authors refused to submit their work to open access repositories, which would have an impact on institutional repositories input activity (Crow, 2002).

2.5.6 Copyright Awareness

In the development of an IR, issues related to management and research ethics are very significant aspect and has always been the focus of stakeholders. John-Okeke (2008) stated that understanding copyright issues is the key point to building of IR. If this issue is not handled properly, it can be an obstacle in the success of IR implementations. Eke (2011) as well as Musa, Musa and Aliyu (2014) viewed those issues relating to legal and ethical aspects are few of the challenges faced by repository managers in the context of content development. If issues of ethical are not resolved carefully, the benefits of IR developments to the university will not be realised especially in terms of the visibility of articles expert, researchers (Cullen & Chawner, 2008) and institution recognitions and reputations (Pinfield, 2002).

Copyright and intellectual property are important elements that need to be thought carefully when it comes to implementating the IR and managing the universities research outputs. Cullen and Chawner (2010) conducted a study in New Zealand and they found that although researchers contributed contents to institutional repositories, they still had concerns about the issues like intellectual property, quality and prestige of the repository. Rieh et al. (2008) also found that intellectual property rights and participants showed a lack of confidence in institutional repositories and conservation issues.

Meanwhile, Open Access (OA) was selected as a solution to scholarly communication problems and institutional repositories were developed as a digital scholarly platform to implement OA in academia. Therefore, the process of obtaining the accessing rights from academics, university researchers and publishers to disseminate their content as free access is a significant process in collecting institutional

repositories content.

However, most authors are unaware of the existence of university's IR based on the open access concept. When it comes to the concept of open access, most researchers understood in the context of hybrid journals whereby the author or author's institution pay for article processing charges (APC) to allow their articles to be freely accessed through publisher's website and cannot be shared through institutional repositories universities (Vassilakaki & Moniarou-Papaconstantinou, 2015). APC is a publication fee that has been charged to authors to make their full text freely accessible at hybrid and open access journals.

Although OA has many benefits, it also has some drawbacks, such as unfamiliarity, underutilisation, lack of training and support from library staff, emails from substandard journals issues with predatory journals and lack of knowledge about copyright (Gurikar & Hadagali, 2019). They understood what OA resources are, why they are used, and how to use them in a digital environment (Misra, 2019). Several studies showed that majority of researchers are unaware of the importance of OA resources (Manchu & Vasudevan, 2018; Matonkar & Dhuri, 2021; Panda & Santosh, 2017).

Vassilakaki and Moniarou-Papaconstantinou (2015) suggested that librarians had to take on roles as copyright advisors to the library users especially to new researchers and faculty members. Libraries have been seen as an owner system for university IRs, based on that repository administrators should discover better approaches to reconcile with publishers (Singeh et al., 2013). Nevertheless, Simons and Richardson (2012) mentioned that managing copyright is an obvious skill for repository staff and it will slow down the input activities in institutional repositories (Crow, 2002). Leng et al. (2016) agreed that not many librarians are aware of the status of copyright from articles deposited and the uncertainty of copyright status remains a major concern of libraries and librarians. The librarian will normally advise academicians that have signed-over the copyright of the material to a publisher not to submit those materials to the repository. Dawson and Yang (2016) found that the authors of research articles argued that librarians should aggressively involve with faculty members in copyright concession with publisher to make their scholarly work widely visible.

Researchers are also concerned about copyright and intellectual property issues. There is a widespread misconception that self-archiving is a violation of copyright agreements (Harnad, 2006). The authors believed that depositing their articles in an

institutional repository violated their copyright with the publisher. Most researchers are unfamiliar with the copyright act, despite the fact that most publishers allow authors to make their articles available through their university's repository. According to a study on open access initiatives in academic libraries, only one of ten respondents who had kept materials in the institution's repository was aware of copyright issues when submitting previously published journal articles to the library institution's repository (Singeh et al., 2013). This viewpoint is supported by Bonilla-Calero (2014), who claimed that most of them are concerned about copyright, particularly self-archiving in IR, as well as a lack of motivation to publish it due to a lack of incentives and rewards from universities and libraries.

According to Okoye and Ejikeme (2011), it is surprising that while 88.89 % of respondents were aware of open access journals and their benefits, only 13.33 % had published articles in open access journals. According to the responses, librarians value their roles in institutional repositories. However, five (11.11 %) of respondents disagreed that librarians are knowledgeable about vendor licencing and copyright laws.

Allen (2005) found through his research about the contents of 25 institutional repositories in UK, 65% of content contributors to institutional repositories mentioned they understand with the benefits of sharing research outputs to institutional repositories or other university repositories, however they still feel uncertain with the plagiarism issues, copyright agreement and the quality of research products. These issues were cited by respondents as top three risks that need to be taken if something happens in copyright infringement. Similarly, Pickton and McKnight (2006) in their study found that, some researchers were worried about their findings that might be used without any permission. Their concerned were more to the issues on copyright, plagiarism and secrecy of their research work.

Kim (2011) in her research on motivations of faculty self-archiving in institutional repositories found that most professors were concerned about copyright factors and were interested to take part as contributor to institutional repositories contents. The findings implied that professors expected that institutional repositories administrator could manage copyright issues carefully whatever contents were deposited by them. Copyright management policies on institutional repositories materials should be made and faculty members should be well-informed about copyright issues. Through the awareness programme, it will reduce their problems and at the same time will increase their participation to deposit in institutional repositories.

According to Dorner and Revell (2012), librarians in academic institutions need to play their roles and responsibility in promoting and educating awareness on the copyright management issues and other intellectual property rights issues, so that these institutional repositories services and facilities complied with those rights (Tripathi & Jeevan, 2011). Since libraries have been seen as knowledge keeper and implemented the development of institutional repositories, library management should find better ways to coordinate with publishers. Through engagement between libraries and publishers, all the information and issues that were related to copyright infringement rules were easy to handle and share among academicians and researchers in proper manner. This is because copyright remains a big challenge and barrier to cultivate self-archiving and deposit research articles to institutional repositories.

Another issue that is closely related to copyright is plagiarism and it remains as an issue that needs to be addressed. However, both problems of copyright and plagiarism are not the only problems faced by institutional repositories, but also problems for other digital platforms. Plagiarism needs to be handled appropriately and the enforcement to those who are involved in plagiarism need to be taken actions by institution (Singeh et al., 2015).

Dryden (2012) found that few literature had discussed individual confusion regarding the fundamental issues of copyright law and also repeated institution uncertainty about copyright and ownership issues (Hofman, Bayma & Richardson, 2013). Copyright and ownership are considered part of intellectual property issues which are boundary to the repository activities such as data curation, reuse data and data sharing among repository users. Jubb (2008) also identified that data ownership and data usage are part of the constraints in data publishing strategies. In the issues of data ownership, they identified that unclear definition between data ownership in the repository and data sets from third party sources.

The previous literature also examined the functions of institutional repositories as part of the research data management service. Research data management services and copyright management were an integral part of the institutional repositories services that need to be provided by academic libraries in order to support research activities in academic environments. Basically, research data management and copyright management should be conducted in tangent by librarians and repositories manager (Witt, 2012; Tenopir, Birch & Allard, 2012; Chabot, Bivens-Tatum, Coates, Kern, Leonard, Palazzolo, Tanji & Wang, 2016).

2.6 Institutional Repositories Performance

There is no formal structure for evaluating the institutional repositories referenced by any academic libraries. All academic libraries consider their existing institutional repositories have been successful based on their personal indicator and environment. Academic libraries are considered as successful institutional repositories based on their comprehensive institutional repositories collection, growth and use of their repository, items were being downloaded and high number of full-text download, item found in the repositories and is in use. Other success highlighted securing government funding in the initial stage, produced the expertise among academic libraries member to maintain and organise the platform, collaboration among staff at institutions involved in developing institutional repositories and the policy framework of institutional repositories that have been set up in earlier stage. Qualified for all these small successes, they do not represent measures that can be used to assess the benefits for institutions related to the investment of time and energy that has been put into various initiatives, either in terms of the level of acceptance and contribution of scientific communication, or more technical criteria that have been widely used as a standard (Research Libraries Group, 2005).

Basically, the success of institutional repositories performance can be determined through the researcher's uptake and usage. Due to IR concept is new in the Malaysian academic libraries, the content of research material is still low. In addition, IRs are designed as an institutional-based, the contents that contributed to IRs are very different compared to those disciplinary repositories. This is a challenge to IR manager to identify the researcher's interest. The normal criteria to measure performance like access, satisfaction and usability may or may not be relevant compared to specific repositories like online databases (Shearer, 2003).

According to Cullen and Chawner (2010), there is no formal structure in place to assess the performance of repositories. Some libraries believe that their comprehensive repository is a measure of their success. Other libraries consider the limited growth and use of their repositories to be their greatest success. They notice that an item is being downloaded, which indicates that the repository's contents have been discovered and are being used. Other metrics mentioned include obtaining government funding for the project and developing staff expertise in repository development. Collaboration among staff in institutions involved in various consortia, as well as

lessons learned from collaboration, is another success indicator.

It is clear that the rise of institutional repositories and open access publishing is forcing all stakeholders, including authors, librarians, publishers, research funders and policymakers, to reconsider how to assess the quality and quantity of scholarly outputs in any given subject area. They must consider the growing trend towards open access and use open access outputs as part of their policymaking and decision-making tools, while also acknowledging that the entire scholarly publishing environment is in flux and that no single tool has emerged for conducting evaluations of open access materials (Bonilla-Calero, 2014). The institutional repository (IR) has the potential to boost researchers' and universities' visibility, prestige, ranking and public value (Anenene, Alegbeleye & Oyewole, 2017).

Lee-Hwa, Abrizah and Noorhidawati (2013) agreed that there was a scarcity of studies that examined ASEAN countries' digital repositories. These findings could be used by repository managers to generate ideas for improving the repository's web performance through global visibility. The findings suggest that ASEAN repositories that want to be listed in the Ranking Web of World Repositories (RWWR) need to have some degree of visibility and incorporate good practices in their web publication to meet the requirements of RWWR quantitative webometrics indicators, namely visibility, accessibility and usability.

The number of items in institutional repositories had previously been unrelated to the other indicators. This metric could be a candidate for a new metric used to assess university performance (Tsunoda, Sun, Nishizawa & Liu, 2016). Successful institutional repositories would increase the visibility and importance of libraries not only on an institutional level, but also on a national and global scales. These are crucial to institutions' ability to meet future demands for more dynamic cross-border communication services (Halder & Chandra, 2012).

It is necessary to seek out novel but broadly acceptable methods for evaluating research outputs, as well as to analyse the flaws that have been identified when the traditional approach to research output is used to assess the quality of scientific research. As previously stated, these weaknesses include: authors prioritising disseminating their research results in traditional international journals over national or specialist journals; those engaged in evaluation currently cannot use document types such as monographs, conferences, books and the like to evaluate, which are the main means of disseminating the results of some areas, due to service bias; such as the Web of Knowledge's attitude

towards traditional journals; the transfer of copyright to publishers; and the high cost of journal and database subscriptions

IRs are unquestionably an alternative tool for evaluating research outputs. When researchers used these tools, they discovered the following benefits: IRs make it easier to evaluate research output from various perspectives by employing multidimensional approaches that combine various factors and types of documents, as well as taking advantage of the free availability of such open access materials to all researchers, experts involved in evaluation and society as a whole. However, researchers have discovered drawbacks such as users being unsure of how to reuse documents in open access databases and being unsure of the copyright status of the published documents in these databases (Bonilla-Calero, 2014).

The goal of the institutional repository assessment model was to see if their effectiveness and level of integration within institutions could be measured using key elements of internal management (procedures, personnel and content introduction) and external management (technology and marketing). COAR (2017) recommended improving repository interoperability by implementing standard practices to link publications to the corresponding research project, funding entities and institutions. The aspects studied in the technology section of the proposed assessment model covered the objectives of achieving interoperability between repositories, institutional systems and funding entities, in addition to integrating the repository with other university systems (CRIS, the publications service and so on). Furthermore, measurements performed via internal repository elements (statistics) and external repository elements (altimetric and relationship to social networks) promote broader dissemination of the institution's research.

Open access repositories, according to the COAR report (COAR, 2017), can increase the visibility and citations of published articles, as evidenced by usage statistics. The case they studied clearly demonstrates that making the majority of content open access and providing the option of consulting usage statistics pave the way for more effective dissemination of this research (Serrano-Vicente et al., 2018).

According to a study conducted by Lagzian et al. (2015b), the number of records entered is no longer as important in determining the success of a repository as it once was. According to some studies, the success of a repository is more closely related to continuous daily deposits than the total number of deposits, because records can be subject to large-scale automatic deposits. A repository should house an institution's

research findings. As a result, while the volume of content may be one of the factors used to evaluate a repository, it must be related to the institution's total volume of research as well as the policies in place.

Since its bibliometric counterpart (journal circulation) has not been widely used, usage data is an important indicator for the future. The variety of statistics available is very large (visits, visitors, downloads, referrers and referrals), but most repositories do not have open reports available and even when the data is published, the lack of standards prevents comparative analysis (Aguillo, Ortega, Fernández & Utrilla, 2010).

Usage statistics, for example, are not prevalent in South Asian IRs (Gul et al., 2019). This feature should be added so that the actual use of the content can be determined in order to comprehend the performance of institutional research usage. When combined with usage statistics, IR can be a powerful tool for bolstering and benchmarking institutional research outcomes. The successful use and advocacy of institutional repositories content are heavily reliant on well-defined content management policies that must be properly documented and populated.

2.7 Proposed Conceptual Framework of Study

Based on previous research and review of several literature that are related to the institutional repositories and library repositories, a framework on the success factors of institutional repositories performance has been proposed. The independent variables are constructed based on the findings found through empirical studies by several researcher on the institutional repositories topics. Most of previous research in this area have focussed on the deployment of the institutional repositories, implementation of institutional repositories, adoptions of institutional repositories technology, the benefit of institutional repositories, challenges in implementation of institutional repositories and few researchers on success factors of institutional repositories implementation among local and global repositories (Asadi et al., 2019b). Besides this fundamental or primary research, most previous researchers focussed on librarians, repository managers, students in library managements field as targeted group of respondents compared to the academicians and university’s researcher perceptions in producing and sharing their research findings.

The implementation of institutional repositories in the Malaysian academic libraries around 2008 began by adapting and adopting open-source software ePrint and

Dspace. Due to IR concept being new in the Malaysian academic libraries, the research on IR is still limited. Based on the systematic literature review that was conducted by Asadi et al. (2019a), the research directly to the institutional repositories between 2007 and 2018 had 115 articles. 34 articles published between 2007 and 2010, 27 articles in 2011 – 2013, 39 articles published between 2013-2016 and in 2017-2019 had 22 articles. The published articles related to institutional repositories subject since year 2007 until year 2019 were from six major databases such as Science Direct, Institute of Electrical and Electronics Engineers (IEEE Explorer), SpringerLink, Taylor & Francis, ACM Digital Library and Emerald Insight.

The conceptual and theoretical frameworks are limited and mostly focussed on the deployment, implementation and adoption of institutional repositories in the higher learning institutions. This study is significant and will contribute a clearer picture on the future directions of institutional repositories and simultaneously set out better understanding regarding the concept of measuring the IR performance that was implemented in most Malaysia academic libraries. The aspiration of this research will contribute some criteria and guidelines in measuring the institutional repositories that were implemented for several years by academic libraries in Malaysia.

Lagzian, Abrizah and Wee (2015b) conducted previous research in the context of Malaysia on the success factors that were considered in the implementation of IR as well as the perceived importance and actual performance of institutional repositories. Management, Services, Technology, Self-archive Practices, People and Resources are the six factors they identified in their research. Most previous studies used IR managers and librarians as respondents, whereas this study used academicians as respondents to obtain the real situation and perceptions of IR performance. It is significant because they are the authors of the research outputs compared to the librarians and IR manager perceptions who are responsible for management of IR process. So far, studies on measuring performance of IR in Malaysia and outside Malaysia have not been conducted since the idea of IR was introduced.

Lagzian et al., (2015a) stated that previous research contributes to the base line of understanding about conditions and factors that contributed to the success of developments and implementations. Through that, there has been limitation in terms of investigating the institutional repositories scopes, contexts and areas. These results have concluded that no comprehensive study on the success factors' frameworks and models were produced for measuring the actual performance of institutional repositories in the

library context and activities.

Basically, the first independent variable (IV1) which is knowledge sharing is being adopted from Abrizah et al. (2015). Based on their research entitled "Resource sharing through an inter-institutional repository: Motivation and resistance of library and information science", scholars found that motivation for sharing intellectual resources are related to career performance, work expectation, visibility advantage and social influences. The scholars share their resources through university's repositories because of their personnel intention and benefit. The other way around, it is not about the organisation requirement to serve for their community knowledge needs. Their study focussed more on the attitude of knowledge sharing compared to behaviour observation among library and information science academicians. The benefits of implementation of institutional repositories for teaching needs, publishing platform, research collaborations are meaningful if all the barriers highlighted were addressed wisely.

Quinn (2010) mentioned that if the researchers are willing to deposit their research output to the digital repository without any claims, it shows the highest achievement in the implementation of institutional repositories. Academicians who plan to contribute to IR in the future, prefer to publish articles with the concept of open access in order to ensure that accessibility is widely open (Kim, 2007).

Meanwhile, the second independent variable (IV2), self-archiving is being adopted and adapted from the framework by Lagzian, Abrizah and Wee (2015a) on the critical success factors (CSF) for institutional repositories implementation. Based on the respondents of 322 institutional repositories managers, the empirical results indicated six factors that are vital in evaluating the success of institutional repositories implementation. The six factors are people, management, self-archive, resources and technology. Kim (2010) highlighted that those self-archiving practices are important to enculturate the self-archiving attitude for submitting their research outputs to institutional repositories.

Contents of institutional repositories are considered as one of the success factors that affect library users to access and use the scholarly communication platform (Russell & Day, 2010; Lagzian et al., 2015b). Singeh et al. (2013) found that the performance of institutional repositories depended on the readiness and commitment of authors to self-archive and share their research outputs for public access. Almost all academic libraries that implement open access institutional repositories allowed worldwide users to view

and download the full-text included in repositories compared to requesting the permission from the authors or researchers as alternative ways in getting the full-text. Normally, when users faced with too much limitations and restriction, it will affect the effectiveness of institutional repositories services and searching happiness.

The third independent variable (IV3), IR usage is being adopted and adapted based on the research findings by Sawant (2012) whereby the survival of institutional repositories for the long period is closely related to the usage of the platform and the value of collections itself. Similarly, Thibodeau (2007) mentioned that the usage of IR collections is one of the significant criteria that should include in evaluating the success of IR either in the context of development, implementation and deployment stage. The usage of institutional repositories is interrelated with the user's satisfaction, both factors have direct impact in measuring the success of institutional repositories (Deng & Li, 2008; Yanchun & Jin, 2009).

Therefore, to sustain the success of institutional repositories for a long-term, IR and library users should participate actively in using this platform as a source for searching scientific articles and at the same time be a passionate contributor to this platform for helping other researchers to get the scientific findings (Dorner & Revell, 2012). Most researchers cited and highlighted that, content factor is one of the significant independent variables and determine the percentage of the successful IR development or implementations (Shearer, 2003; Bell, Foster & Gibbons, 2005; Ferreira, Rodrigues, Baptista & Saraiva, 2008). In addition, Cullen and Chawner (2010) reported that the level of success of the development of an IR can be seen in terms of the diversity and completeness of a collection.

Institutional repositories policy is the fourth independent variable for this research. Singeh et al., (2020) found that policy is one of the eight critical success factors for evaluating the digital library implementation. The digital library implementation framework consists of several factors such as people, process, content, policy, standards, advocacy, time and location. Policy is a standard rule that explained in detail every element related to the digital rights, process and action that need to be taken in organising the repositories in line with the idea of development (Candela et al., 2007). Probets and Jenkins (2006) highlighted that, copyright policy and content submission policy are very important documents to ensure that all processes run in the right way.

In institutional repositories policy documentation, it will mention and explain

all the administrative tasks such as adding and deleting user, deposit metadata and full texts that follow the copyright compliance, delete metadata that do not follow the Dublin core standard and university requirement (Chen et al., 2015). Universities that implemented institutional repositories must have digital preservation policies. This policy is intended to drive the implementation and preservation of its content. Harnad and McGovern (2009) emphasised that the mandates should be given to the libraries to keep and maintain the institutional contents with high quality infrastructure that leads to the growth of institutional repositories.

The fifth independent variable (IV5), IR procedure is being adopted and adapted based on the research findings by Serrano-Vicente, Melero and Abadal (2018) on the evaluation of institutional repositories in Spain. Based on the research, they came out with five indicators (personnel, technology, procedure, content and marketing) that were used in evaluating the Spanish institutional repositories. Procedure is an important indicator to guide the users to deposit their research outputs correctly and standardised in terms of size type, type of users allowed for deposit, format file that is supported by institutional repositories and other metadata requirement.

Serrano-Vicente et al. (2018) also highlighted that IR procedures play a significant role to ensure system and work process functioned well and properly. Over institutional repositories procedures, users and content contributor can go through the process easily and manageable. It included the compatibility with repository standards, features, open access conception and compliance with intellectual property rights. Examining the procedure elements will give the greater IR management and concurrently able to supervise all policies that have connections to open access repositories at every level either at institution, national or international.

The last independent variable (IV6) for this research is copyright awareness. This variable was adopted and adapted from a study by Shearer (2003) to identify the critical success factors for institutional repositories. The respondents for her study came from Canadian Association Research Libraries (CARL) members and researchers that identified 10 factors namely archiving policies, copyright policies, content type, quality control publicities, organisational culture, staff support, disciplines, advocacy activities, repository software and institutional repositories usage. These contribute as factors in measuring the success of institutional repositories implementation.

In the context of disseminating communities' research output, Creative Commons (CC) or Open License is an integral part of the added value for institutional

repository services (Hey & Hey, 2006). By adapting copyright licensing, IR manger and staff will be protected from any barrier and issues that are linked to deposit articles, online dissemination and reuse institutional repositories collections. Schopfel, Chaudiron, Jacquemin, Prost, Severo and Thiault (2014) noted that European commission and certain government agencies promoted the usage of Creative Commons (CC) licenses to allow content creators to give permission to use their work openly without any boundary. Based on the general rule that was announced by the European Commission, any agencies are able to use and reuse the research outputs without any worries and be careful only for contents that are protected under third party licensed.

Institutional repositories performance is a dependent variable for this study and was adopted and adapted from one of the criteria that was proposed by Yanchun and Jin (2009) in evaluating the digital repositories. Yanchun and Jin (2009) addressed five quality criteria that consist of collection quality, interface usability, service quality, system performance and user satisfaction as evaluating digital repositories indicators. Institutional repositories system is equipped with the searching box and allowed users to use the searching function to retrieve whatever information is available as per keyword entered. Based on this function, the effectiveness of the system performance can be measured through this retrieval element. However, it is inefficient if users do not have clear picture of what to look for and which collection to use.

In addition, Yanchun and Jin (2009) found the system performance's variable is significant for repository managers to identify the system restriction, to monitor system operation, to evaluate quality services and to set preference to the repositories. Based on the results from criteria listed, it will assist library management to clearly identify the level of achievement as well as the characteristics of the desired repository collections.

In order to answer all the objectives stated in Chapter One, the items for independent and dependent variables for this study have been adopted and adapted from Singeh, Abrizah and Karim (2012) based on their research titled "Malaysian authors' acceptance to self-archive in open access repositories" by applying the unified theory of acceptance and use of technology (UTAUT) model; literature focused on the new trends and future applications/directions of institutional repositories in academic institutions from Jain (2011) and Ezema (2013) based on the use of local content information resources in building institutional repositories.

The dimensions focused on knowledge sharing, self-archiving, institutional repository usage, institutional repository policy, institutional repository procedure, copyright awareness and institutional repositories performance. The dependent variable indicated institutional repository performance while the independent variables were measured by success factors of institutional repositories dimensions (knowledge sharing, self-archiving, institutional repository usage, institutional repository policy, institutional repository procedure, copyright awareness) and this is illustrated in Figure 2.1.

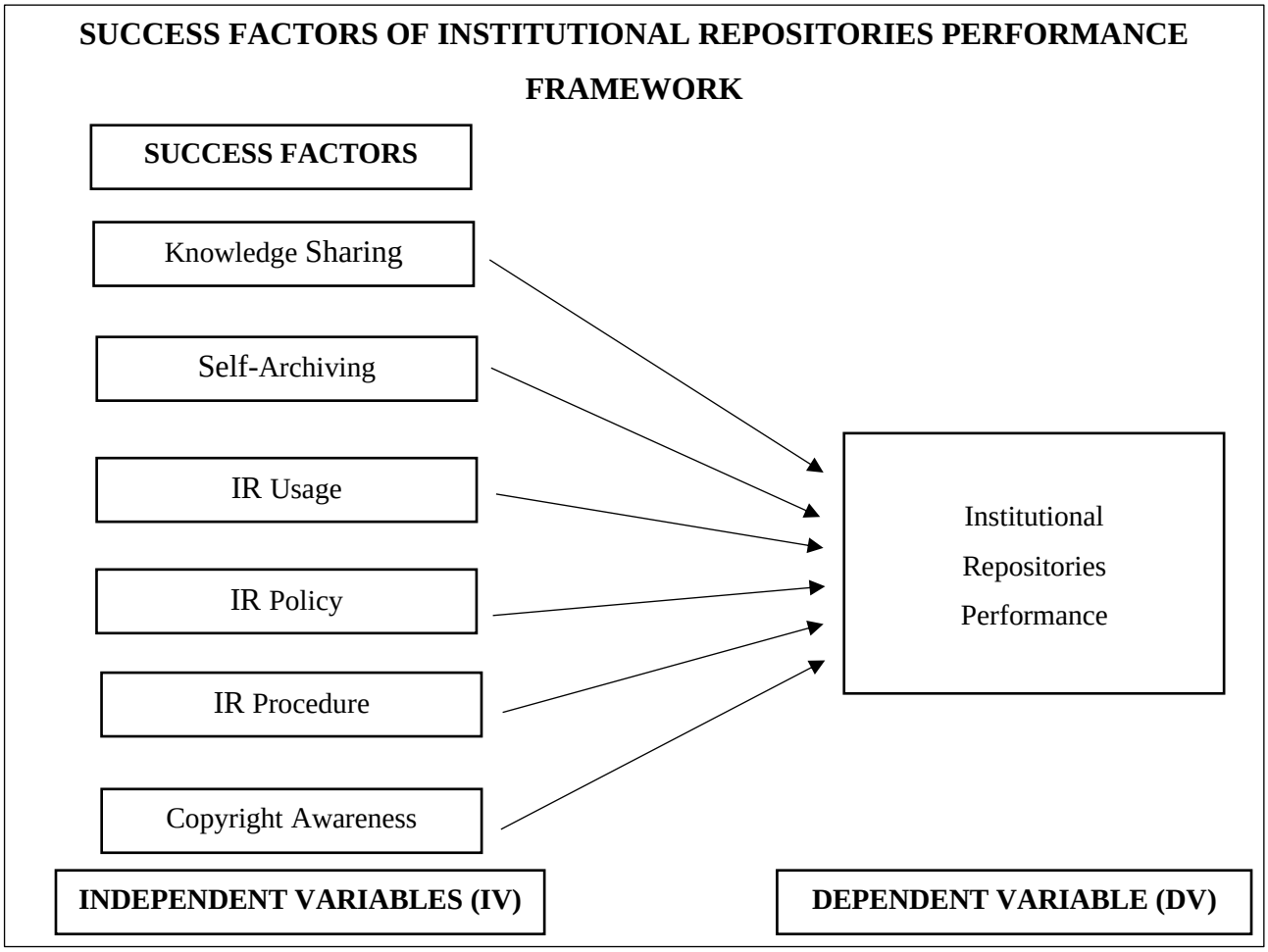

Figure 2.1 Conceptual Framework of Success Factors of Institutional Repositories Performance in Malaysian Academic Libraries

In this study, a conceptual framework on success factors of institutional repositories (IR) performance in Malaysian academic libraries has been constructed as illustrated in Figure 2.1. Based on the framework, the dependent variable is institutional repositories performance while the independent variables are success factors of

institutional repositories (knowledge sharing, self-archiving, institutional repository usage, institutional repository policy, institutional repository procedure and copyright awareness).

2.8 Conclusion

The reviews on the speculative and observed literature on success factors of institutional repositories have helped in improving and sustaining the performance of institutional repositories among academic libraries. The major nature of success factors' dimensions such as knowledge sharing, self-archiving, institutional repository usage, institutional repository policy, institutional repository procedure, copyright awareness and institutional repositories performance have been presented throughout this review. A proposed conceptual framework has also been developed based on previous research. The comprehensive and exhaustive literature on success factors and institutional repositories performance has filled the gap of the study.

Based on the literature, it has been revealed that the academic libraries need to engage with the factors to improve the performance of institutional repositories so that, the mission and vision of the implementation of repository is successfully accomplished. The success factors of institutional repositories framework adapted is to achieve the effectiveness of institutional repositories performance in Malaysian academic libraries.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This chapter explains all aspects related to the research methodology adopted in this study. It starts from research design, population, sampling techniques, research instrument, questionnaire design, pre-test, validity test, pilot test, reliability, data collection process and analysis technique. Awang (2012) defined research methodology as a systematic search for information in order to gain a clear picture of the underlying problem. Thus, research activities consist of a consistent search for information based on objectives related to problems, as well as the submission of specific recommendations to find solutions. Silverman (2005) mentioned that a methodology chapter frames and explains the methodology to be used and how it is applied in research. It justifies in detail each subtopic like research design, sample size, instrument, data collection, data analysis, validity and reliability tests. Finally, this chapter explains data analysis and statistical techniques conducted in the study.

The conceptual framework was developed in the previous chapter based on a thorough review of the study literature using various methodologies and designs. A clear overview of the research design, population, sampling, instruments and data collection process for this study is presented in Chapter Three. Methodology refers to the rationale and philosophical assumptions that underpin a specific study rather than a simple group of methods. Based on a review of the literature, the initial conceptual framework on the dimensions of success factors of institutional repositories and its institutional repositories performance was developed and explained further in this chapter.

This chapter identifies and describes appropriate research methodologies for studying research problems and determining research question outcomes. As a result, this chapter justifies the research design, sample size selection, instruments used, data collection process, data analysis procedures and assessment of the validity and reliability of measures for research use. In this study, data collection and methodology using a quantitative approach are also explained in detail, along with data analysis and statistical techniques.

3.2 Research Paradigm

The conceptual framework for this study is a schematic diagram that is drawn to indicate the variables involved in the study that should be related to one another. This is significant because it will serve as the study's focal point (Awang, 2012). Mertens (2005) as well as Bogdan and Biklen (1998) mentioned that theoretical framework is different from a theory and most of the time it has been referred to as a paradigm and manipulates the way knowledge is studied and interpreted. Paradigm is significant and discussed at the beginning of the chapter together with the research design. Bogdan and Biklen (1998) defined paradigm as a baggy compilation of logical assumptions, concepts or proposition that are related to thinking and research or as an intention and motivation undertaking the research (Cohen & Manion, 1994). A paradigm, on the other hand, can be defined as three elements: a principle of the nature of knowledge, a methodology and legitimacy criteria (MacNaughton, Rolfe & Siraj-Blacthford, 2001). The theoretical paradigms that will be discussed in this section are positivist (and postpositivist), constructivist, interpretivist, transformative, emancipator, critical, pragmatism and deconstructivist. The appearance of different terms often leads to confusion among the early career researchers (Mackenzie & Knipe, 2006).

Postpositivist has been defined as scientific method or science research which is based on the philosophy of rationalistic and empiricist. It originated from Aristotle, Francis Bacon, John Locke, August Comte and Emmanuel Kant (Mertens, 2005). Positivism is applied to the social world as the social world is value free and its explanation of causal nature can be provided. Furthermore, positivists were in charge of testing a theory or describing an experience through observation and measurement. As a result, the predictive and controlling forces that bind people can be identified (O'Leary, 2004). Furthermore, O'Leary (2004) defined positivism as intuitive and holistic, inductive and exploratory, with qualitative findings. When compared to the definitions provided by Mertens (2005), this definition appears to be in disagreement. However, positivist and postpositivist research were aligned with quantitative data collection and analysis methods (Mackenzie & Knipe, 2006).

According to Lather (1986), paradigms in research reflect the researcher's beliefs about the world or issue. A worldview perspective is expressed through a thought or stream of thought, a shared belief that influences the meaning or interpretation of research data. These are abstract beliefs and principles that shape how

researchers perceive world scenarios and issues that arise, as well as how they are interpreted and the reactions that occur in order to make a decision. This is a conceptual lens or point of view through which researchers examine the methodological aspects of their research project in order to determine the research methods to be used and how the data will be analysed.

Denzin and Lincoln (2008) discovered through qualitative research that paradigm is a construction in human life, related to the first or main principle that indicates where researchers come to construct meaning found in analysed data. This clearly demonstrates the importance of paradigms in that they provide trust and order for scholars in a particular discipline, which influences what should be studied, how it should be studied and how the study's results should be interpreted. The paradigm, which is interpreted according to the researcher's philosophy, has a conclusion in the paper and a certain significance to demonstrate the implications for each decision made during the research process. Paradigm can be defined as the researcher's philosophy for drawing conclusions from the research. Furthermore, the paradigm describes how meaning will be constructed from the data collected, based on both individuals and experience. As a result, it is critical that if the researcher writes a proposal, it clearly states the paradigm of the research being conducted.

3.3 Research Design

According to Sekaran and Bougie (2016), a descriptive study is one that is conducted to ascertain and describe the characteristics of variables of interest in a situation, whereas an exploratory study is conducted when little is known. This approach has many advantages, one of which is its ability to provide accurate information on explanation and exploration. According to Awang (2010), a research design is a master plan of methods and procedures for researchers to collect and analyse research data. The most appropriate research design is determined by the research objectives and the specific needs of the research. The researcher must consider the types of data required, design techniques such as surveys, observations, experiments and case studies, sampling methodologies and procedures, tables and estimates in this master plan.

Through research design, data collection methods and procedures (including data collection) are determined (Zikmund, Babin, Carr & Griffin, 2013). In contrast,

Vogt, Gardner and Haeffele (2012) defined research design as the science and art of designing procedures for research studies. Research design provides a clear picture, in particular of the implications of cause-and-effect relationships between research concepts. Moreover, it will guide the researcher throughout the process (Frankfort-Nachmias & Leon-Guerrero, 2016).

In research activities, there are two types of approach: quantitative approach and qualitative approach. Quantitative approach is focused on the numbers in examining the perception of social and human activities compared to qualitative approach that described something in understanding how it happened and its relatedness (Ahmad & Usop, 2011). Quantitative approach is more complex and systematic in order to prove each hypothesis tested to see if each is true. In the qualitative approach, there is no hypotheses testing and it uses 'questions' instead.

This research applied a quantitative approach. The quantitative study is suitable for the research objectives such as to investigate, to explain, to explore and to predict the phenomenal, factors influencing the research output, cause-effect human relationships and hypotheses testing (Creswell, 2014). Zinkmund, Babin, Carr and Griffin (2010) revealed that generally quantitative research is empirical in nature, it involves the numerical assessment and analytical response to the research objectives. Therefore, the intention of this study is to examine the success factor of institutional repositories performance in Malaysian academic libraries. The numerical data collected were analysed for the purpose of seeing the relationship and differences between the success factors of institutional repositories and institutional repositories performance.

Research design is the detailed plan of actions and structure of research that is understood to elicit answers for research questions. This reveals the structure of the research problem and the research plan used to obtain empirical evidence about the significant relationship of the problem (Kerlinger, 1986). Kumar (2011) agreed that a researcher employed the research design as procedural plan in order to answer all the aspects related to validity, objectivity, accuracy and economically of research.

A researcher needs to follow the research design properly to ensure all the methods and procedures selected especially in data collection had obtained the research questions and objectives (Cresswell, 1994; Yin, 2008; Zikmund et al., 2013). Kumar (2011) stressed that the significance of research design is to identify the procedures that need to be taken into action and organise accordingly to compelling research validity, objectivity and accuracy. Besides, it will guide the researcher and gives a clear picture

and direction throughout the research process (Frankfort-Nachmias & Nachmias, 2008).

Research design has several types such as experimental design, cross-sectional design, longitudinal design, case study design and others. The research design that has been selected is based on the nature and purpose of the research study. Moreover, the cross-sectional design is the most appropriate research design for this study because it provides relatively rushed information and data are collected at the same period of time. Babbie (2011) agreed that cross-sectional design is simple, cost-effective, easy to analyse and to fulfil the purpose of the research.

Basically, research method is divided into two types, namely quantitative research and qualitative research. Ahmad and Usop (2011) defined that qualitative research involves in examining and reflecting on perceptions in order to gain and understanding of social and human activities. Qualitative research also focuses on a subject and there are few techniques like case studies and interview used in this approach to obtain the research information and findings (Saunders, Lewis & Thornhill, 2009). However, quantitative research involves developing more systematic and sophisticated procedure to test, prove and verify the hypotheses (Ahmad & Usop, 2011). Saunders et al. (2009) affirmed that quantitative research consists of computed numerical data only. In quantitative research, numerical data is used to measure the respondents' attitudes, opinions, behaviours, specified variables and generalise the results from a total sample population. Normally, the techniques used in quantitative approach are quasi-experiments, randomised experiments, sample surveys, multivariate statistical analyses and others (Blaikie, 2009). In addition, quantitative method used in the study is to measure the relationship between variables and also identify the new variables for better model development in the same field (Hair, Money, Samouel & Page, 2007). In terms of data collection, quantitative methods are more structured when compared to qualitative data collection methods.

The purpose of this study is to investigate the perceptions of success factor of Institutional Repositories dimensions and Institutional Repositories performance in Malaysian academic libraries. Descriptive studies with quantitative methods were adopted in data collections and this method is more to numerical and categorical data. The specific numbers or an amount were accumulated through the analysis process. Creswell (2003) noted that quantitative approach is one that researchers use positivist claims to expand knowledge by using research strategies such as experiments, surveys and collecting data based on predetermined instruments to produce statistical data.

In this research, the researcher used survey method as a strategy in data collection. This method is widely and closely used in social science especially in perception and behavioural studies (Vogt, 2007; Wiersma & Jurs, 2009; Weathington, Cunningham & Pittenger, 2010). The reason for using survey method is because of its efficiency, popularity, versatility and generalisability of the sampling. It is also very easy to quantify and summarise the data collected (Schutt, 2004; Engel & Schutt 2012). Creswell (2014) mentioned that a survey is used to collect the data and assess the opinion, perception and attitude of the respondents. In this study, the researcher gained the perceptions data from the view of academicians as respondents on the success factors and IR factors on performance. A survey by using questionnaire is most suitable in collecting variety of data in a short period related to what people feel, think and act (Balnaves & Caputi, 2001) about the experience on using IR platform and services. Besides, a survey is also the best method in measuring the relationship between variables, especially in the context of correlation and regression studies (Connaway & Powell, 2010).

Descriptive research can act as a focal point on questions and the way the research has been developed, whether the research questions are descriptive or explanatory (De Vaus, 2001). It also involved the causal relationship between variables (Saunders, Lewis & Thornhill, 2000). This kind of research can be managed with a different level of understanding and knowledge related to groups, events and situations. Sekaran (2003) highlighted that these types of research bring out differences between two or more variable factors at few situations. In this research, descriptive method was adopted in order to answer all the research questions related to IR performance as a dependent variable among Malaysian academic libraries.

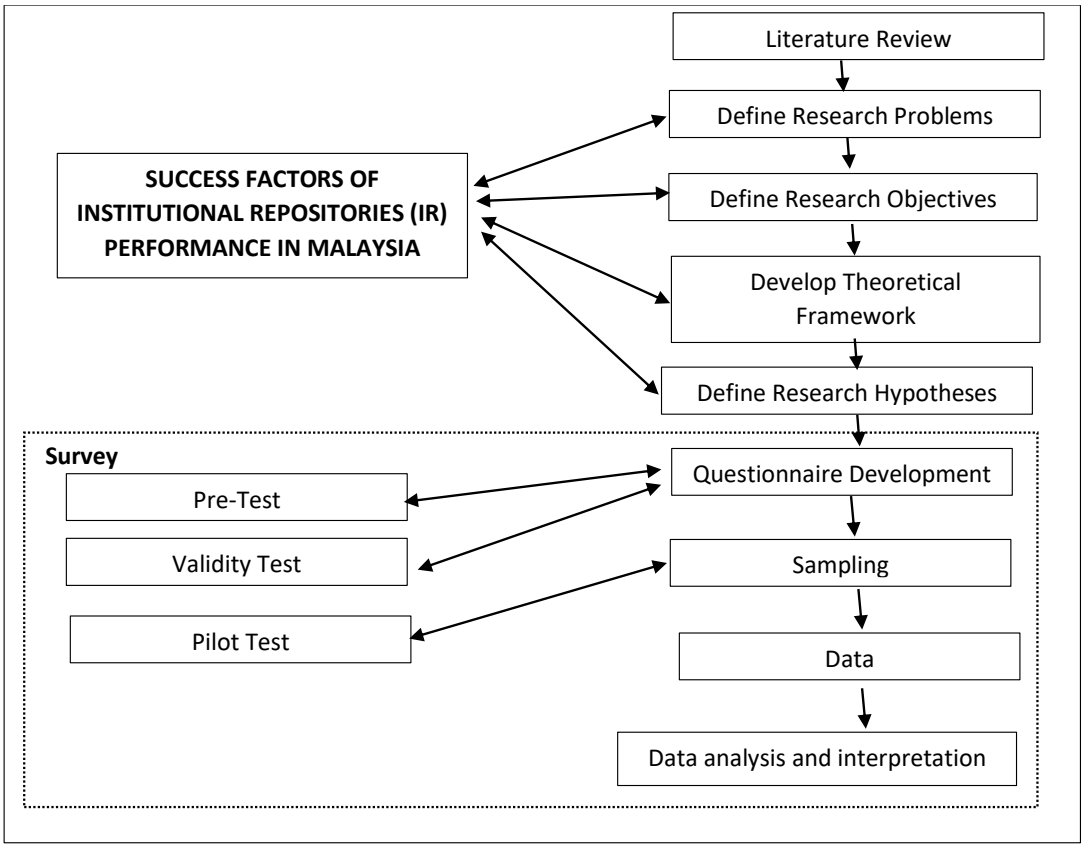

Figure 3.1 Overview of Research Design of the Study

Figure 3.1 shows the flow of the study that was executed. This research study started with the literature search from several subscription online databases such as Emerald, Proquest, Ebschohost and few others. Besides, the researcher has also used several open access platforms to obtain research articles for the purpose of identifying the current status of research scenarios that are related to institutional repositories implementation and development by academic libraries, especially in Malaysian universities. These kinds of resources are used by researchers in writing a literature review chapter and came out with a conceptual framework as a research structure for this study.

To answer the research questions, a survey research method was used in the following stage. Survey research is a data collection method in which a specific group of people was asked to answer a series of pre-determined questions (Baker & Sinkula, 1999). As Davies (1997) pointed out, a survey research is the most common type of quantitative research. It is the systematic collection of information from respondents via questionnaires. A questionnaire was used in this study as an instrument. A set of questionnaires was adapted and adopted from previous studies. The questionnaire was

significant in answering the research questions and objectives as per stated in the early stages of research. The questionnaire was developed covering the diversity of success factors of institutional repositories for measuring its performance. The supervisor checked and validated the questionnaire first. The questionnaire draft was then pre-tested on a few colleagues to ensure its face validity. This set of questionnaires was sent to five experts in the field of study for validation in order to gain their views and opinions on its validity. Then the questionnaire was sent to the supervisor for approval after some changes were made to the contents and wording.

Further, to ensure quality research results generated from the use of research instruments, questionnaires went through pre-tests, validity tests and pilot test. Finally, the questionnaires were distributed to selected academicians in public universities. Respondents answered the questions using a seven-point likert scale. The researcher began the data analysis and interpretation stage after receiving a number of valid and satisfactory returned questionnaires.

3.4 Population

According to Sekaran and Bougie (2016), population is the total number of people, events and things that researcher's interest in studying, exploring and making interpretations in their research studies. It is for a survey in which data from the entire set of units are used to make inferences. Basically, the collective group of individuals or objects is the main focus of a scientific query, which includes the same entities and a common set of characteristics. The non-probability population has become the vital step in designing a research project.

Besides, population is a non-probability sampling technique whereby the researcher selects a sample based on the researcher's criteria for assessment rather than random selection (Zikmund et al., 2013). Data from the total set of units are used to make inferences. Frankfort-Nachmias and Nachmias (2008) confirmed that in empirical data process, the scientific researchers are responsible in collecting and testing the data for detailed explanation and prediction of the research study. According to them, researchers use the samples as a basis for making inferences about the population. A population is a sum total of all units of analysis from which a sample is drawn (Bailey, 1987).

In this research, this study focuses on the academic libraries of the five research universities in Malaysia namely, UM, UTM, USM, UKM and UPM. This is because research university is responsible for actively exploring new ideas, experimenting with innovative methods and taking scientific initiatives in the search and development of knowledge. Among the main missions of the research university is to produce Nobel laureates and provide experimental funds from related industries.

Academicians in research universities have higher key performance indicators (KPI) for published research articles and other publications than academicians in non-research universities. The KPIs are more concentrated on research grants, high-impact paper publications, postgraduate student supervisions and even patents. Research universities set a goal of two papers per person every year that were indexed and cited by national or worldwide refereed journals in terms of quantity and quality control of research publications. In addition, research universities must achieve a total impact factor of at least 5000 to be considered for an impact factor journal (Komoo, Azman & Aziz, 2008). This study investigates how prepared the academics are to contribute their research findings to university institutional repositories for public use using the KPI created for the research universities.

The population chosen were the academicians from grade DS45 until grade VK (Professor) in five research universities in Malaysia. The researcher used the Higher Education Statistics 2017: Ministry of Higher Education https://www.moe.gov.my as a sampling frame for this research.

Table 3.1
The Number of Academicians from Research Academic University

Name of Research University	No. of Academicians
Universiti Malaya (UM)	1098
Universiti Teknologi Malaysia (UTM)	1205
Universiti Sains Malaysia (USM)	1083
Universiti Kebangsaan Malaysia (UKM)	1279
Universiti Putra Malaysia (UPM)	1092
Total	5757

Out of 5757, a total of 357 academicians were selected at random using stratified random sampling. The selected respondents had been chosen based on the Stat Trek Random Number Generator *https://stattrek.com/statistics/random-number-generator.aspx.*

Table 3.2
Determining Sample Respondents Chosen from Population

357 Random Numbers

3234	1228	1489	3764	1166	1673	3211	2827	0920	2411	5225	5240	2496
3442	4833	2189	4364	2066	4733	0959	3826	0982	2227	1550	3580	1720
4241	2435	3626	4279	3849	5140	1266	2903	3749	3910	4956	1820	1243
4502	4710	2557	3257	5386	0528	5117	2865	2335	2396	2212	2765	1105
1858	2657	4487	1697	1612	3395	2273	2581	1658	4426	1881	5286	5055
3049	1781	4057	2988	1966	3503	4648	2742	2704	1289	1304	4317	5263
0897	4010	0429	3887	0798	2780	4118	2803	2519	1843	3872	3541	0306
4256	5448	0344	5670	1205	3088	3196	5571	5732	1020	3641	1535	4795
0774	4379	5079	1451	2350	1181	4686	4156	4218	4033	4587	2926	2150
2950	0552	3518	1904	3688	4095	4402	3480	0490	3703	1351	5348	4871
3603	0121	4809	3787	5325	0713	4563	4525	3111	1597	4610	1328	2719
4303	2250	4180	2619	3073	0183	4625	4341	3664	5694	5363	2127	4549
1512	2165	1735	3026	3380	5017	1635	1796	2842	3934	3357	0859	2596
4672	1143	3272	2642	1474	4979	0221	0282	0098	0651	4748	3972	4771
2373	3811	3726	5509	0159	0467	5301	2312	3995	3172	1412	5163	5424
1943	5102	5609	1389	2534	4856	0590	4932	3418	0675	3149	3011	0367
4072	0244	4440	4894	2004	4917	0405	5486	1758	1427	3949	0613	3334
2458	2027	3319	5202	1082	3457	2089	3134	5755	5178	2680	2888	0736
2965	3565	4464	3295	1043	2042	2104	1919	2473	5040	0036	0836	4195
5632	5547	1574	1981	2288	1366	4133	0060	4994	4042	4203	5248	2112
0006	3266	5002	2850	3550	5679	0821	5409	3158	2627	2689	2504	3058
1398	0621	1421	4780	1989	0375	2159	2566	2873	1951	4718	2174	5579
3819	3342	2074	4349	3280	2258	3796	4941	3035	2996	1582	0068	3081
5556	1190	2774	0721	2651	1090	1544	4411	3096	2812	2135	4165	3834
0598	3020	5740	0636	0206	1497	1851	3488	0106	0267	1313	2405	1828
5087	1067	3143	5371	1743	1113	5702	3450	4449	4510	4326	4879	3219
2443	3242	0844	2282	2197	3980	4387	4695	3772	0783	2466	1643	5640
3635	3895	0414	3573	4080	5617							

The researcher began by listing the population by university and faculty members. In this study, the total targeted population was 5757 as it is expressed as (*N*) from academicians starting grade DS45 until grade VK (Professor) from five research universities. Then, the sample size (*n*) of 357 was selected according to Krejcie and Morgan table (1970). The researcher proceeded by listing randomly a population of academicians in the form of numerical of 1 to 5757 as the total population of academicians. Then, this is followed by selecting random numbers from the list of population by using random number generator (RNG). Finally, 357 respondents were selected to participate in this study. For example, 3234 (the respondent number 3234 from the number list of 5757), 3442 (the respondent number 3442 from the number list of 5757), 5617 (the respondent number 5617 from the number list of 5757) and so on

(see Table 3.2). Therefore, the researcher selected the 3224, 3442 and 5617 from the population list to be part of the sample and this process was repeated until the researcher had all the 357 academicians as required as minimum sample size.

3.4.1 Sampling Technique

The target population is an element in the general population that comprises the study. The population needs to be accurately determined and explained its rationale by selecting a specific population. Population refers to the entire specific selected group of people, events or interesting things that the researcher wants to highlight or wants to explore in his study (Sekaran & Bougie, 2016). The study population uses a non-probability sampling technique, which aims to review data from the entire set of units used to draw conclusions. Basically, a group of individuals or collective objects is the main focus in a scientific query that encompasses the same entities and has similar characteristics (Zikmund et al., 2013).

The steps to obtain reliable data results are very important according to Ngulube (2015). Referring to the writing in the Scientific Journal of Research by Alwi (2015), he referred to the writing statement by Krejcie and Morgan (1970) which summarised the sample size for selected populations. Along with this, the research conducted by Gay and Airasian (2000) as well as Ryan (2013) also have similar opinions and methods.

The population for this study focussed on academicians (Grade DS45, DS51/52, DS53/54, VK (Professor)) from various faculties and fields among research universities in Malaysia. In order to study the entire university in Malaysia it was quite impossible to do in a short period of time, Therefore, research universities namely Universiti Malaya (UM), Universiti Sains Malaysia (USM), Universiti Teknologi Malaysia (UTM), Universiti Kebangsaan Malaysia (UKM) and Universiti Putra Malaysia (UPM) were chosen as a sample from a total population of the Malaysian public universities to represent the entire population. Sample of population is the matter that the researcher wants to study. In probability methods, there are several types of sampling techniques to choose from, including simple random sampling, systematic random sampling, stratified random sampling and cluster sampling. According to Zikmund et al. (2013), sampling techniques assist researchers in obtaining the most appropriate participants for

the study. In order to get a trustworthy result, the sufficient sample size is important (MacMillan & Schumacher, 2001).

According to Saunders et al. (2009), a sampling technique is a method for selecting a sample from a population by reducing it to a more manageable size. Furthermore, Zikmund (2003) and Saunders et al. (2009) stated that there are two types of sampling techniques: probability sampling and non-probability sampling. The probability sampling techniques of stratified random sampling have been used in this study.

3.4.2 Stratified Random Sampling

Stratified random sampling is the process of selecting a sample that is representative of each stratum in a population (Awang, 2012). Researchers can group heterogeneous populations into homogeneous populations in strata in various terms of status for example; socio-economic, ethnicity, religion, gender, marital status and type of household. Stratified random sampling is the method that has been used to improve and ensure that the survey results are accurate or to lower the cost of a survey without losing the accuracy. Stratified random sampling is designed for the large quantitative survey and it involved in separating the samples into sections from each other. Each of the segments is studied separately and locates the results together by using weighted average (Fuller, 1993).

A member of one population has an equal chance of being selected based on their proportion within the population in stratified random sampling. It is also referred to as the process of selecting a sample from a subgroup in the same proportion as it occurred in the population or group (Fraenkel, Wallen & Hyun, 2012). Stratified random sampling is a type of spontaneous sampling that outperforms simple random sampling and systematic sampling in terms of statistical efficacy. The population has been divided into quantifiable strata, which means that members of each stratum share similar characteristics. Members of different strata, on the other hand, have dissimilar characteristics. As a result, when compared to the population, each stratum is homogeneous (Panneerselvam, 2004). Stratified random sampling is more effective than simple random sampling because, due to the same size, a vital segment of the population is well represented and more valuable and distinct information is obtained from each group (Sekaran, 2003).

Due to the availability of the sampling frame, a proportionate stratified random sampling is viewed as the best alternative and is predicted to offer a more accurate estimate of the population mean than simple random sampling (Sekaran & Bougie, 2016). When compared to the overall population, the sample size for each layer in this method is proportionate to the population size of the strata. This indicates that the sampling fraction for each stratum is the same. Using the same sampling fraction for each stratum, regardless of the strata's population size disparities, is crucial when using this technique. It is equivalent to classifying smaller population unique to relative proportions of population groupings.

3.4.3 Sample Size

According to Salant and Dillman (1994), the sample size of a study is determined by four factors: (1) how much sampling error can be tolerated (2) the population size (3) how varied the population is with respect to the characteristics of interest and (4) the smallest sub-group within the sample for which estimates are required. To ensure that the sample results can be generalised, the sample must also be representative of the population it represents.

A sample chosen to represent the population under study is referred to as an element in a population. The sample's findings were extrapolated to the entire population. To obtain a sample that is representative of the population, researchers must use appropriate sampling techniques. There are various sampling techniques available to help researchers obtain samples from the population (Awang, 2012).

It becomes impossible when studying the whole population and therefore, samples from the population have to be taken to represent the whole population. Examples or subsets of population is the thing that the researcher wants to study. Simple random sampling, systematic random sampling, stratified random sampling and cluster sampling are some of the sampling techniques that can be used. This sampling technique helps researchers to find the most appropriate participants or units for the study (Zikmund et al., 2013). A sampling technique is a method for selecting a sample from a population by reducing it to a more manageable size (Taherdoost, 2016). There are two types of sampling methods: probability sampling and non-probability sampling.

Glasow (2005) stated in his writing that sample size is divided into four factors: how many sampling errors are tolerable, the size of the population, how diverse the

population is in terms of interest characteristics and the smallest subgroups in the sample that require estimation. To ensure that the sample results can be generalised, the sample must also be representative of the population it represents.

According to Burns and Bush (2010), sample size influences how accurately the sample findings represent the population. When the sample size is larger, it is more likely that the generalisations are an accurate reflection of the population (Saunders et al., 2009). Krejcie and Morgan (1970) as well as Sekaran (2003) were consulted to determine the sampling size for this study. Table 3.3 shows how the sample size from the given population is calculated.

Table 3.3
Determining Sample Size from Population

N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2800	338
15	14	110	86	290	165	850	265	3000	341
20	19	120	92	300	169	900	269	3500	246
25	24	130	97	320	175	950	274	4000	351
30	28	140	103	340	181	1000	278	4500	351
35	32	150	108	360	186	1100	285	5000	357
40	36	160	113	380	181	1200	291	6000	361
45	40	170	118	400	196	1300	297	7000	354
50	44	180	123	420	201	1400	302	8000	367
55	48	190	127	440	205	1500	306	9000	368
60	52	200	132	460	210	1600	310	10000	373
65	56	210	136	480	214	1700	313	15000	375
70	59	220	140	500	217	1800	317	20000	377
75	63	230	144	550	225	1900	320	30000	379
80	66	240	148	600	234	2000	322	40000	380
85	70	2509	152	650	242	2200	327	50000	381
90	73	260	155	700	248	2400	331	75000	381
95	76	270	159	750	256	2600	335	100000	384

(Source: Krejcie & Morgan, 1970)

Based on the sample size, Sekaran, Robert and Brain (2001) as well as Krejcie and Morgan (1970) recommended a sample size of 357 when the population is 5757.

3.5 Instrument

In measuring instruments, normally researchers employed the survey instrument designed by previous researchers prominent in the respective field. To carry out the research topic, the items in questionnaires need to be adopted and customised to suit the

research area (Kumar, 2018; Goddard & Melville, 2004).

An instrument is any device or material used by researchers to collect data during the course of their research. The questionnaire was used as the data collection instrument in this study. The questionnaires were distributed in accordance with a random number table. Stat Trek's Random Number Generator generates a list of random numbers based on the following researcher specifications: the number of random numbers desired, the maximum and minimum values of random numbers in the list and the use of unduplicate random numbers.

The questionnaire was tested for reliability and validity after it was created. A questionnaire is a pre-written set of questions to which respondents must respond. Because of its ability to be easily distributed and measured, it is known as an efficient material for obtaining data. According to Shaughnessy and Zechmeister (2002), when properly constructed and used, a questionnaire can be a powerful scientific instrument for measuring various variables. Furthermore, the data collected had the highest probability of being valid, as respondents could take their time answering questionnaires at their leisure.

3.5.1 Questionnaire Design

A questionnaire, according to Shaughnessy, Zechmeister and Zechmeister (2000), is a powerful scientific instrument for measuring various variables when properly constructed and used. Sapsford and Jupp (1996) described a questionnaire as a highly structured method of data collection.

A good questionnaire is a cohesive whole the researcher weaves questions together so that they flow smoothly (Neuman, 2000). The questionnaire's appearance and layout are also important. A well-planned and carefully crafted questionnaire boosts response rates and aids in data analysis and summarisation. As a result, a researcher must carefully craft each question on the questionnaire to ensure that it is clear, direct and understandable to the intended audience (Hult, 1996). Neuman (2000) also cautioned that a researcher should be careful with wording and avoid emotional, lengthy and double-barrel questions.

The purpose of the survey instrument in this study is to provide an overview of people's beliefs, attitudes, values and behaviour by measuring the independent and dependent variables (Mokhlis, Mat & Salleh, 2008). A structured questionnaire was

created for the purpose of gathering survey data. To acquire a satisfactory response and cooperation from the respondents, permission to collect data including academician is significant. The design of the questionnaire is crucial to take into account in this review process as it significantly demonstrates the quality of the data obtained, given that the primary purposes of this questionnaire are to meet the study's objectives and provide answers to the research questions (Sommer & Sommer 1991; de Vaus, 2001).

Questionnaires were employed by the researcher to collect data for this investigation. This is because a structured survey is simple to administer, code and analyse using statistics, all of which have a big impact on structured survey (Babbie, 2002). The acquired data were analysed by the researcher using frequency, percentage, mean, standard deviation, correlation, regression and multiple linear regression analysis. By looking at a sample of the population, questionnaire can reveal information about demographics, trends or feelings. It can also generalise the sample to the target population. In addition, surveys reduce translational errors, standardise questions and facilitate response from respondents by managing massive amounts of data and respondents intelligently.

Thus, the questionnaire used in this study was modified and adapted from similar studies done by previous researchers such as Singeh, Abrizah and Karim (2012), Jain (2011) as well as Ezema (2013). De Vaus (2001) added that questionnaires developed by previous researchers, although established and tested, sometimes are not suitable to be used because of several factors such as different samples, variation in the nature of work, culture and so on. Consequently, the proper use of the questionnaire in the setting of this study assisted in the acquisition of correct data that was valid and beneficial to the advancement of knowledge (de Vaus, 2001). As demonstrated in earlier study, a questionnaire's validity and structure, that is the items assessing the idea of assumption, can be enhanced based on the item or the scale (Mitchell & Bates, 1998). According to the context of the study, the researcher chose to include the most pertinent subjective items on each concept's scale of measurement. This is done to prevent having too many questions in the questionnaire as this may increase the length and time required to complete it, which may impair respondents' motivation to participate in the data collection (Mokhlis, 2008).

The construction of the study's questionnaire was inspired by DeVellis (2003). There were six steps that made up the process: (a) selecting a construct (b) creating an item pool (c) deciding on the response format for the measurement items (d) having the

initial item pool assessed by experts (e) giving items to a development sample and (g) assessing the item (DeVellis, 2003).

The questionnaire contains three sections labelled as Demographic Profile, Section A (Success Factors of Institutional Repositories) and Section B (Institutional Repositories Performance). Table 3.4 presents the layout of the questionnaire.

Table 3.4
Layout of the Questionnaire

Section		Items
	Demographic Profile Age Gender Grade Education Level Duration Service Institution Name Faculty Name Field of study	8
A	Dimension of Success Factors Knowledge Sharing Self-Archiving IR Usage IR Policy IR Procedure Copyright Awareness	55
B	Institutional Repositories (IR) Performance	12
	Total	75

3.5.2 Measurement of Items

There are few levels of measurement in the research field such as nominal, ordinal, interval and ratio. Interval, likert and nominal levels of measurement were used to measure all the constructs under this study. Interval was meant to deal with the scale and nominal focus with the construct category (Zikmund et al., 2013). Therefore, all the dimensions were measured using a seven-point Likert scale ranging 1 to 7: (1) Strongly disagree, (2) Disagree, (3) Moderately Disagree, (4) Quite Agree, (5) Moderately Agree, (6) Agree and (7) Strongly Agree as Likert label responses (Simms, Zelazny, Williams & Bernstein, 2019).

The score for 1 indicated the lowest respondent's perceptions to the factors that gave impact on the performance of institutional repositories while a score 7 implied the highest level that significantly impact as a benchmark for measuring the success of institutional repositories performance. Meanwhile, in terms of mean value, mean score

of 5.0 indicated highly satisfied/positive, moderately satisfied/positive for mean score between 3.0 and below 5 and the mean score below 3.0 indicated as not satisfied/positive.

In this study, the questionnaire consisted of eight pages in three sections. There were six dimensions of Success Factor (Knowledge sharing, Self-Archiving, IR Usage, IR Policy, IR Procedure & Copyright Awareness) and Institutional Repositories (IR) Performance. The questionnaire commenced with a definition of success factors and institutional repositories performance. In terms of measurement, sixty-seven items questionnaire was designed on a 1 (strongly disagree) through 7 (strongly agree) Likert Scale and outlined in Section B through Section C. Section A asked about the demographic profile using nominal and ordinal scales.

Section A was labelled "Demographic Profile". This section contained questions on respondent age (years), gender, grade, education level, years of in the organisation, institution name, faculty name and field of studies.

Section B of the questionnaire was labelled "Success Factors of Institutional Repositories" that consisted of six dimensions and listed 55 statements concerning the perception, attitude, knowledge and usage of the institutional repositories. The items began with "I" which means the perception came from the respondent (own perception) and for the items that begin with "My" to get the perception about the institution. Section B was labelled "Institutional Repositories (IR) Performance" and listed 12 statements related to the impact on the researcher, library, university and platform.

Table 3.5
Measurement of Items

Dimensions	Items	Scales	Sources
Knowledge Sharing	11	Seven Point Likert Scale 1 (strongly disagree) – 7 (strongly agree)	Abrizah, Hilmi & Kassim (2015); Quinn (2010); Kim (2007).
Self-Archiving	9	Seven Point Likert Scale 1 (strongly disagree) – 7 (strongly agree)	Lagzian, Abrizah & Wee (2015); Kim (2010); Russell & Day (2010); Singeh, Abrizah & Karim (2013); Singeh, Abrizah & Karim (2012); Jain (2011); Ezema (2013).
IR Usage	10	Seven Point Likert Scale 1 (strongly disagree) – 7 (strongly agree)	Shearer, (2003); Bell, Foster & Gibbons (2005); Thibodean (2007); Deng & Li (2008); Ferreira, Rodrigues, Baptista & Saraiva (2008); Cullen & Chawner (2010); Yanchun & Jin (2009).
IR Policy	9	Seven Point Likert Scale 1 (strongly disagree) – 7 (strongly agree)	Candela, Castelli, Ross, Thanos, Pagano, Kou- trika & Schuldt, 2007). Probets & Jenkins (2006), Harnad & McGovern (2009); Jain (2011).
IR Procedure	7	Seven Point Likert Scale 1 (strongly disagree) – 7 (strongly agree)	Serrano-Vicente, Melero & Abadal (2018); Jain (2011).
Copyright Awareness	9	Seven Point Likert Scale 1 (strongly disagree) – 7 (strongly agree)	Shearer (2003); Schopfel, Chaudiron, Jacquemin, Prost, Severo & Thiault (2014).

Table 3.6
List of Statements on Knowledge Sharing

	Item
Knowledge Sharing is defined as "voluntary interactions between human actors [through] a framework of shared institutions, including law, ethical norms, behavioral regularities, customs and so on … the subject matter of the interactions between the participating actors is knowledge. Such an interaction itself may be called sharing of knowledge" (p. 11) (Helmstadter, 2003)	I … 1.… understand the importance of sharing research output to IR 2.… understand the importance of sharing IR content to institution 3.… voluntarily share my research outputs to IR 4.… agree on IR as sharing platform for research findings 5.… agree on IR as publishing of research findings among researchers 6.… agree knowledge sharing through IR increases readership 7.… agree knowledge sharing through IR increases communication research output 8.… agree knowledge sharing through IR increases collaboration among researcher with other universities 9.… agree knowledge sharing through IR brings more prestige for academicians 10. … agree knowledge sharing through IR increases total citation 11. … agree knowledge sharing through IR increases author level metric (H-Index)

Table 3.7
List of Statements on Self-Archiving

	Item
Self-Archiving is defined as authors' willingness to deposit their research publication either articles, post-print and pre-print to institutional repository or university repository for freely access (Singeh, Abrizah & Karim, 2012).	My university… 1.… convinces authors to self-archive their publication in IR 2.… encourages staff to deposit their publications in IR 3.… promotes a cultural environment within the organisation that supports a high number of resources in the IR 4.… gives incentives to authors deposited the research output to IR 5.… mandates to deposit copies of all university published journal articles to IR 6.… mandates to deposit research reports to IR 7.… mandates to deposit course contents to IR 8.… that have been encourages deposit copies of conference papers presented to IR 9.… encourages to deposit copies of proceeding papers to IR

Table 3.8
List of Statements on IR Usage

	Item
IR Usage is an ease of use and attract more users to access the institutional repositories in order to find the literature for their research work (Manjunatha & Thandavamoorthy, 2011).	Institutional Repositories (IR) of my university …… 1.… provides a user-friendly interface 2.… has suggestions for the search terms 3.… has clear search results pages 4.… provides literature for my research works 5.… is an important information source to assist researchers 6.… systems make available the number of views of full-text files

	7.… systems make available the number of downloads of full-text files 8.… systems have fast browsing speed to encourage people to use it more 9.… systems share information about usage statistics 10. … learning to self-archive is quite an easy task for me

Table 3.9
List of Statements on IR Policy

	Item
IR Policy is a documented guidance on how the repository will be used and how it will be developed. It translate the stakeholder thinking on the purpose and scope of the institutional repository (Riddle, 2015).	My university …… 1.… has an appropriate IR advocacy policy 2.… has workable policies on IR in the university 3.… develops a policy to guide the collection of university contents 4.… establishes IR policy for free access to full-text document 5.… establishes IR policy to provide access to digital resources 6.… establishes IR policy to make scholarly materials available for the future 7.… has a strategic master plan for digital preservation with IR 8.… establishes IR policy as scholarly communications system 9.… establishes IR policy as a system for publishing

Table 3.10
List of Statements on IR Procedure

	Item
IR Procedure is a procedure manual that provides systematic guidelines. It describes the process for managing documents in the institutional repository from the entering information until downloading full text by the users (Serrano-vicente et al., 2018).	My university …… 1.…conducts procedures for successful implementation of IR 2.… provides procedure to self-archive their contents in the IR 3.… provides self-archive manual that is available online 4.… provides procedure in managing IR content during embargo period 5.… provides procedure for authors to check editorial policies before depositing content to IR 6.… provides procedure for metadata format supported by IR system 7.… provides procedure for document version that can be deposited (pre-prints, post-print & pdf version)

Table 3.11
List of Statements on Copyright Awareness

	Items
Copyright Awareness is an awareness programme related to copyright act, copyright and intellectual property issues and copyright agreement between authors and publishers. Normally, in academic environment, librarians will take their roles in advising and explaining copyright solutions to the authors and researchers before submitting their	1.I clearly understand the copyright act 2.I clearly understand my own intellectual property rights 3.I clearly understand publishers copyright 4.I am aware of publishers' policies relating to self-archiving research work in the IR 5.I am concerned about plagiarism

research output to the repository (Vassilakaki & Moniarou-Papaconstantinou, 2015).	6.I am concerned about other publishers owning the copyright of previously published material 7.I am concerned that if I deposit my work in the University Institutional Repository, I may not be able to publish it elsewhere later 8.I am aware that my library provides advice to communities of the University about copyright for material which I would like to deposit 9.I am aware that my library provides advice to members of the University about journal embargo policies for material which I would like to deposit

Table 3.12
List of Statements on Institutional Repositories (IR) Performance

	Items
Performance measurement (PM) is one of the principals organisation function to show the extent to which the organisation has reached their planned strategies and goals (Fard, Naha & Mansor, 2011).	Institutional Repositories (IR) … 1.… increases visibility of authors 2.… increases the research impact of authors 3.… gives the work of authors more exposure 4.… helps authors organise their research 5.… helps authors preserve their research in long-term 6.… facilitates the dissemination of scholarly research 7.… assists in globalisation of Malaysian research findings 8.… promotes the global ranking of university 9.… promotes international collaborations among researchers 10. … gives new mode of scholarly communication 11. … gives new mode of scholarly publishing 12. … allows harvesting by Google Scholar for worldwide sharing scholarly research

3.6 Pre-Test

A pre-test is a test given to subjects before exposing them to a treatment to measure the dependent variable (Sekaran & Bougie, 2010). Pre-testing of questionnaires is an important step that must be completed prior to the actual survey. This is to ensure that the data obtained is accurate and relevant to the research objectives. According to Sekaran and Bougie (2010), the purpose of pre-testing a questionnaire is to ensure that the questions used are appropriate and that the language used is simple to understand.

The purpose of a pre-test is to ensure that the expectation of the researcher in terms of the information that was obtained from the questionnaire are met. The first draft of the questionnaire tends to be long and often lacked important variables. Therefore, the objective of the questionnaire pre-test is to identify and correct the deficiencies. The comments and suggestions were used to improve the questionnaire in this study.

In this study, the questionnaire was answered by five academicians, two from

the Faculty of Major Language Studies at Universiti Sains Islam Malaysia (USIM) and three from the Faculty of Information Management at Universiti Teknologi MARA (UiTM). Following the pre-test, the questionnaire was edited once more to meet the research requirements. According to Kassim and Nor (2005), a survey can only be trusted if respondents understood the items in an instrument and can provide appropriate responses.

3.7 Validity and Reliability

Validity and reliability are two crucial concepts to consider when approving and validating a research instrument. According to Ahmad and Usop (2011), validity describes the accuracy of instrument assessment, while reliability describes the consistency of results of repeatable research measurement tests. The best research instrument should be both valid and reliable in order to obtain the best results. It does so because it demonstrates the rigour of a research process and reflects the credibility of research findings. As a result, it is the responsibility of the researcher to ensure that a measurement is accurate and consistent.

The extent to which a measurement accurately represents the concept it is intended to measure is referred to as its validity (Kumar, 2011). The ability of a research instrument to measure what it is intended to measure is referred to as validity. The researcher used three approaches in this study to assess the validity of research instruments: face visibility, content validity and construct validity. Face validity denotes that the items intended to measure a concept do so on the surface and appear to measure the concept. According to Sekaran and Bougie (2016), some consider face validity to be the basic and minimum index of content validity. Content validity, on the other hand, is concerned with the relevance and representativeness of questionnaire items. It is determined by how well a measurement reflects the specific intended domain of content (Ahmad & Usop, 2011). A panel of judges can attest to the instrument's content validity (Sekaran & Bougie, 2016).

A validation process for the questionnaire will be done to check the validity of the questionnaire. Validity, according to Sekaran (2003), is evidence that the instrument, techniques, or process used to measure a concept actually measures the intended concept. A total of five local and international experts in digital content and institutional repositories made up of two professors, two associate professors and one

Chief Librarian were involved in validating the questionnaire for this study. They were two Professors from Digital Content and Media Sciences Research Division Professor, National Institute of Informatics (NII), Japan , two Professors from Centre for Graduate Studies, Universiti Sains Islam Malaysia (USIM) and the two professors are Head of Malaysian Citation Centre (MCC), Ministry of Higher Education, Deputy Director, Research Management Centre, Universiti Putra Malaysia (UPM) and a Chief Librarian, Universiti Utara Malaysia (UUM) Library. They provided comments on the questionnaire in terms of the clarity of the words used and the appropriateness of the variables selected. These feedbacks were used as a guideline in making appropriate changes to finalise the questionnaire. They checked for face and content validity to determine whether it reflected the real meaning of the concepts adopted. Corrections were made based on the experts' suggestions and comments.

To assess the usefulness of measures, various types of validity tests were used. It is about the accuracy of the measuring instrument. Content validity determines the sample's representativeness in relation to the entire set of statements used to measure the various concepts and reveals how well the dimensions and components are defined (Sekaran & Bougie, 2010). The term "validity" refers to how well the items represent the entire universe (Salkind, 2006).

The face and content validity of this research instrument were determined by expert evaluation and pre-test results. All of them are experts in digital content, digital repositories and institutional repositories. They were given a complete instrument package that included a brief introduction, research objectives, research questions, targeted respondents, a research framework and the entire set of research instruments. The researcher asked them to evaluate and assess the instrument by indicating whether the constructs are well represented by the instrument items and to provide suggestions and comments later. Their suggestions and feedback were taken into account. All of the experts agreed that the instrument was well-designed and used the appropriate items to measure all of the constructs.

Convergent and discriminant validity were used to evaluate construct validity. When the scores obtained with two different instruments measuring the same concept are highly correlated, convergent validity is established. Discriminant validity is established when two variables are predicted to be uncorrelated based on theory and the score obtained by measuring them empirically found to be so (Sekaran & Bougie, 2016).

By examining the factor loadings of each construct item, the construct validity

was tested in terms of convergent validity. A factor analysis in SPSS was used to assess convergent validity. A factor analysis was performed to confirm whether the number of dimensions conceptualised could be empirically verified. The factor analysis was used to: (1) reduce a large number of manifest variables into a smaller number of latent variables for modelling purposes, (2) reduce a large number of manifest variables into a smaller number of latent variables for modelling purposes, (3) determine the underlying dimension between manifest and latent variables, (4) validate a scale by composing item load on the same factor and (5) discard any items that have a cross-load on more than one factor (Gorsuch, 1990).

In the early stages of scale development, principal components analysis (PCA) is thought to be appropriate (Churchill, 1979). The instrument's 67 items were subjected to principal component analysis with varimax rotation with eigenvalues greater than one and factors rotated with varimax rotation. The goal was to find the instrument's underlying dimension with as little information loss as possible (Velu & Nordin, 2011).

3.8 Pilot Test

A pilot study on the instrument was conducted. The main reason for conducting the pilot study was to test the validity and internal reliability of the instrument in measuring the variables of the study. A minimal ambiguity in constructing the statements or questions may create confusion among the respondents, resulting in contradictory responses (Kumar, 2011). The pilot study was conducted to find out whether the questions used were clear.

Teijlingen, Rennie, Hundley and Graham (2001) mentioned that a pilot study can be a specific pre-testing of research instruments such as questionnaires or interview schedules. Roscoe (1975) stated that a minimum of 30 respondents are enough for most of the research. Babbie (2013) suggested that the pilot test sample should be selected exactly in the same manner as the final survey. Thus, in this study, a pilot study was conducted one month before the real study with a small scale of 50 respondents.

After collecting data, the internal consistency reliability coefficient (Cronbach's alpha) was computed for each factor of knowledge sharing, self-archiving, IR usage, IR policy, IR procedure, copyright awareness and IR performance. The pilot study's findings would benefit this research in the following ways:

1. To elicit feedback from respondents in order to identify any potentially

confusing statements.

2. To clarify, correct and revise the questionnaire statements based on the pilot study respondents' comments.

3. To determine whether respondents understood the questionnaire's instructions (there is no ambiguity in the questions).

3.9 Reliability Test

The internal consistency of the questions/statements or instrument is referred to as reliability. When an instrument measures the same thing more than once and produces the same results, it is said to be reliable. In other words, a reliable instrument measures what it is supposed to measure. Experts reviewed the item content to determine the relevance of the items, scales, directions, words used and statements chosen. The internal consistency of the questions/statements is reflected in the Cronbach's Alpha procedure of SPSS by the value of Cronbach's Alpha or coefficient, which is given in a range from 0 to 1.

The term reliability refers to whether or not scores on an instrument are internally consistent and stable over time, as well as whether or not there is consistency in test administration and scoring (Creswell, 2009). Data from the pilot study and the real study will be used to assess the reliability of the questionnaire. Cronbach's Alpha will be used in this study to assess the instrument's reliability. Each question in the questionnaire will be tested to determine the reliability of the questionnaire's results. The closer the reliability coefficients are to 1.0, the better, according to Sekaran (2003). In general, reliabilities less than 0.60 are considered poor, those between 0.70 and 0.80 are considered acceptable and those greater than 0.80 are considered excellent.

3.10 Data Collection Process

Data collection is the process of gathering information. Data collected or obtained for investigation from the original location of the incident is called primary data. Sekaran (2003) stated that there are two types of data, primary and secondary. Khanduri (2012) as well as Leedy and Ormrod (2001) added that data is considered primary if it is gathered directly by the questioner for a specific purpose. Meanwhile, secondary data is data that has been chosen by an enquirer who is not one of the original

data's creators for purposes that may differ from the original purpose.

Interviews, questionnaires and observations are the most commonly used data collection methods and each method can be used with great value (Sekaran, 2003; Saunders et al., 2009). Surveys or questionnaires collect academicians' perspectives on the success factors of institutional repositories (knowledge sharing (KS), self-archiving (SA), IR usage, IR policy, IR procedure, copyright awareness (CA) and IR performance (IRP)). The questionnaire was designed to make it easier for respondents to complete. The respondents' information was gathered using a well-structured questionnaire method. As a result, the questionnaire was distributed to the respondents using a self-administered procedure.

Data processing is a systematic and scientific process by which the obtained data will be evaluated, checked and tested through several methods including the hypotheses testing. These steps ensure that the data acquired will be analysed in the precise manner in order to fulfil the research objectives. The data processing has four steps: (i) getting data ready, (ii) feel for the data, (iii) testing data goodness and (iv) testing the hypotheses.

In this study, questionnaires were distributed personally by the researcher to a total population of 357 (n = 357) comprising academicians (Grade DS45, Grade DS51/52, Grade DS53/54 and Grade VK (Professor)) of research universities in Malaysia. The respective research universities were Universiti Malaya (UM), Universiti Sains Malaysia (USM), Universiti Teknologi Malaysia (UTM), Universiti Kebangsaan Malaysia (UKM) and Universiti Putra Malaysia (UPM).

Questionnaire with a cover letter explaining the aims of the study was distributed by post beginning April 2019. The respondents were given two to three months to reply and return their feedback. Some of the questionnaires were then personally collected by the researcher and some were sent back by courier where the respective librarian dealing with collecting the questionnaires posted the questionnaires back to the address mentioned in the questionnaires. Follow-ups were made for a few times with the respective librarian in charged to distribute and collect the questionnaires. Finally, within 4 months the total response rate for this study was 72% or equal to 257 respondents who had responded to the completed questionnaire.

3.11 Data Analysis Technique

The data analysis process began after the questionnaires were returned by the respondents. To analyse data, descriptive and inferential statistics were used. Data analyses were carried out to test the hypotheses and to find the answers to the research questions. This study's data were analysed using the Statistical Package for the Social Science Software (SPSS) version 22.

The description of the data is the first step in data analysis. Descriptive statistics are the fundamental measure for describing the average scores of the variables and demonstrating how different the scores are from one another. Descriptive statistics are used in this study to describe the mean and standard deviation.

The independent-samples *t*-test was used to measure the difference between two groups regarding the variable in the case of normally distributed data and an analysis of variance (ANOVA) was used to examine the significant mean differences among more than two groups regarding the variables. Correlations between all variables were investigated in order to test the hypotheses. Spearman's rho test was used in this study to describe the strength and direction of a linear relationship between two variables.

3.11.1 Factor Analysis

In this study, factor analysis was used to reduce from a large to a small number of variables. This is thought to be useful in developing a scale. The three goals of factor analysis are to (1) understand the structure of the set of variables, (2) modify questionnaires to measure the underlying variables and (3) reduce the number of items on the scale (Field, 2009).

Factor analysis is a data reduction technique. The goal of factor analysis is to reduce or summarise a large set of variables by groups among the inter-correlations of a set of variables using a smaller set of factors or components. A factor analysis can be carried out using a variety of methods (such as principal axis factor, maximum likelihood, generalised least squares). After the initial extraction of factors, there are many different types of rotations that can be performed, including orthogonal rotations such as varimax and equimax, which impose the restriction that the factors cannot be correlated and oblique rotations such as promax, which allow the factors to be correlated with one another.

Factor analysis is a catch-all term for a variety of computational techniques. They have the goal of reducing the number of variables that belong together and have overlapping measurement characteristics to a manageable number. The predictor-criterion relationship discovered in the dependence situation is replaced by a matrix of interrelationships among several variables, none of which is considered dependent on another (Cooper & Schinder, 2006). It was used to see if the questionnaire was measuring the intended constructs correctly (Seymour & Nadasen, 2007).

The goal of factor analysis is to group the original input variables into factors that underpin the input variables. Each factor took into account one or more input variables. The total number of factors in the factor analysis was theoretically equal to the total number of input variables. However, after factor analysis, the total number of factors in the study could be reduced by removing insignificant factors based on a specific criterion (Panneerselvam, 2007).

Another goal of factor analysis is to reduce or summarise a large set of variables using a smaller set of factors or components by examining the groups among a set of variables' inter-correlations. Neuman (2000) defined factor analysis as a set of statistical techniques that "assists researchers in the construction of indexes, testing the unidimensionality of scales, assigning weights to index items and statistically reducing a large number of indicators to a smaller set."

Mayer and Sutton (1996) stated that factor analysis is a very complex statistical procedure which is correlational in nature and can determine the commonalities among a set of measures. This procedure is very useful because it reduces the complexity of a given set of measures by showing which measures are more or less synonymous with one another. When measures group together, it is inferred that there is an underlying variable that accounts for the clustering. This underlying variable is referred to as a factor.

Hair et al. (2007) determined that Kaiser-Meyer-Olkin (KMO) values equal to and greater than 0.50, along with a measure of sampling adequacy (MSA) greater than 0.50 and a factor loading greater than 0.50, were adequate criteria for determining data reduction relevance and grouping items. Furthermore, Field (2009) as well as Igbaria, Livari and Maragahh (1995) recommended accepting variables with loading greater than 0.5.

3.11.2 Independent-Samples *t*-Test

This study also examines the differences in perceptions on success factors of institutional repositories dimensions between respondents of different demographic profiles. Jackson, Hobman, Jimmieson and Martin (2009) defined that independent-samples *t*-test as a parametric statistical test is responsible in comparing the means of two different samples of participants. These two samples show similarity as they are from the same population. This is accomplished through the use of a statistical test of significant difference, either parametric or otherwise, depending on whether the variables are normally distributed or not. In this study, the value of perceptions score was normally distributed to all the success factors of institutional repositories dimensions. Therefore, the parametric statistical test which is the appropriate statistics to use in this analysis is the independent-samples *t*-test as it involves the respondents (position, gender, age, education level and working experience).

The *t*-test is used to determine whether or not there is a statistically significant difference between two sets of scores (Coakes & Ong, 2010). T-tests are classified into three types: (1) one-sample *t*-test, (2) an independent-sample *t*-test and (3) a paired sample *t*-test. The *t*-test compared the means and standard deviations of the two groups of the variable to see if there is a statistically significant difference in the means.

According to Coakes and Ong (2010), there are several assumptions underpinning the independent-samples *t*-test.

The general assumptions for *t*-test are:

1. Data should be measured on an interval or ratio scale.
2. Sampling score: it should be randomly chosen from the population frame of interest.
3. There should be a normal distribution in the population.

Meanwhile, the specific assumptions for independent-sample *t*-test are:

1. Group independence: respondents should only appear in one group and these groups should be unrelated.
2. Variance homogeneity: the groups should be drawn from populations with similar variance. It can be tested for equality of variance using SPSS's Levene's test.

Based on the general assumptions Numbers 1, 2 and specific assumption Number 1 which were related to the research design and research question respectively,

it was appropriate to use independent-samples *t*-test in order to answer the proposed hypotheses. Meanwhile, general assumption Number 3 and Number 2 under specific assumptions were tested using SPSS function.

Specifically, independent – samples *t*-test was used to answer the hypotheses, which was to compare the means of success factors of institutional repositories among groups of respondents between gender and education level. The result shows whether to reject or accept the hypotheses been made earlier. In case of the null hypotheses being chosen, if the result is ($p < 0.05$), the researcher will reject the null hypotheses and accept the alternative hypotheses that the variances are equal.

3.11.3 One-Way Analysis of Variance (ANOVA)

The one-way analysis of variance (ANOVA) has the same opinion as the independent-sample *t*-test, but ANOVA is a technique used to test two groups by examining the variances of the samples taken. Furthermore, ANOVA is used to compare more than two groups as well as to test the significance of difference between two samples (Tabachnik & Fidell, 2007). ANOVA aids in testing the design and assisting researchers in accepting or rejecting the null hypotheses. ANOVA was used in this study to compare mean differences among age group, grade, duration served in the organisation (years), institution name and field of studies because they involve more than two groups. The ANOVA results indicate whether or not the means of the various groups differ significantly from one another, as indicated by the *F* statistic. The *F* statistic determines whether two sample variances differ or are from the same population.

There are two assumptions applied in Analysis of Variance (ANOVA):

1. Normal Distribution – the population from which the samples were drawn should have a normal distribution.

2. Variance Homogeneity – the scores in each group should have homogeneous variance (Coakes & Ong, 2010).

Homogeneity will be checked through Levene's test. It should be not significant, which means the variance for the compared group is equal. Then based on multiple comparison tables, the mean score will be determined whether it has significant differences or not.

3.11.4 Pearson's Coefficient and Correlation

Inferential statistics refers to the use of correlation analysis to determine the relationship between various variables such as dimensions of success factors of institutional repositories. The data analysis procedures will test the statistical significance of the relationships between variables being studied. Triola (2008) observed that there is a correlation between two variables when one of them is related. According to Stangor (2007), the correlation coefficient value ranged from r = -1.00 to r = +1.00. The number of ranges indicates the magnitude and direction of the association.

The Pearson's coefficient (r) between the six success factors implies that the absolute value of r manifests the strength of association between two variables as follows: Less than 0.2 is considered very weak; between 0.20 and 0.39 is considered weak; 0.40 – 0.59 is considered moderate; 0.60 – 0.79 is considered strong; and 0.80 – 1.0 is considered extremely strong (Evan, 1996). Davies (1997) defined the scale used to describe the independent and dependent variables as follows: 0.7 and above is a very strong relationship, 0.50 to 0.69 is a strong relationship, 0.30 to 0.49 is a moderate relationship and 0.10 to 0.29 is a weak relationship.

In this study, Pearson's correlation coefficient was used to determine the relationships between success factor of institutional repositories dimensions and the relationships between success factor of institutional repositories dimensions and institutional repositories performance.

3.11.5 Multiple Regression Analysis

Multiple regression analysis is a statistical technique that predicts a person's score on one variable based on their scores on several other variables. Regression is an extension of bivariate correlation and considered as a second step of data analysis which is based on correlation with the purpose to measure the variance by independent variable on dependent variable. All independent variables enter the regression equation at the same time in the multiple regression model. Multiple regression analysis is used in this study to investigate the simultaneous effect of several independent variables on an interval scale dependent variable. In other words, regression results are based on an equation that represents the best prediction of a dependent variable from a set of

independent variables (Sekaran, 2003).

Regression analysis, according to Byrne (2002), is a set of statistical techniques that results in the formation of a relationship between a dependent variable and one or more independent variables. As a result, if the dependent variable is categorical, the values of the independent variables can be used to predict the value of the dependent variable or the likelihood of an event occurring.

According to Hair, Anderson, Tatham and Black (1998) as well as Tabachnick and Fidell (2007), regression has grown in popularity in many areas of research because it is used to determine the relationship between one dependent and one or more independent variables. In this study, a regression analysis might estimate the effect of the success factor dimensions on institutional repositories performance. Institutional repositories performance would be the dependent variable to be explained or predicted by the success factor dimensions.

3.12 Conclusion

The research design used to achieve the research objectives has been discussed in this chapter. This chapter described the research methodology, study design, conceptual framework, population and sampling technique chosen from the questionnaire design, contents and data collection process. It also explained the pilot study's validity and reliability process. The researcher's experience throughout the entire data collection process was also mentioned. The next chapter presents the analysis, which included both descriptive and inferential statistics, as well as data analysis techniques used to analyse the data of the study. The following chapter discusses the analysis and findings of the study.

CHAPTER FOUR
DATA ANALYSIS AND FINDINGS

4.1 Introduction

This chapter describes the results of the data analyses. This is a survey-based quantitative study and stratified random sampling was used as a probability sampling technique. From the study, a total of 357 respondents that made up of selected academicians from five research universities (UM, USM, UTM, UPM and UKM) in Malaysia were surveyed. The total number of respondents (N = 357) were mainly from academicians from Grade DS45, Grade DS51/52, Grade DS53/54 and Grade VK (Professor). Respondents were chosen using a random number table generated by Stat Trek's Random Number Generator. Only 257 (71.9%) of the 357 total respondents returned the questionnaires, making them usable for further analysis by the Statistical Package for the Social Sciences (SPSS). Respondents were asked to give their opinions and understanding on their perceptions of success factors of Institutional Repositories' dimensions and performance in the library. Furthermore, this chapter also presents and discusses the data analyses from the objectives of the study which are:

i) To identify the perceptions of academicians on the success factors of institutional repositories (knowledge sharing, self-archiving, IR Usage, IR Policy, IR Procedure and Copyright Awareness) and its IR performance in Malaysian academic libraries.

ii) To compare the success factors of institutional repositories in terms of age, gender, grade position, education level, duration served in the organisation (years) and field of studies.

iii) To examine the relationships between the success factors of institutional repositories (knowledge sharing, self-archiving, IR Usage, IR Policy, IR Procedure, Copyright Awareness and IR performance) and its IR performance.

iv) To measure the effect of success factors on IR performance.

The first part of the chapter analysed on the profile of respondents and background. It includes respondent's age, gender, grade, education level, duration served in university, university name and field of studies. Then, the second part

emphasised detailed analyses on each of the success factors of Institutional Repositories (IR) dimensions and IR performance items. The success factors of Institutional Repositories (IR) dimensions comprise six variables (Knowledge Sharing, Self-Archiving, IR Usage, IR Policy, IR Procedure and Copyright Awareness).

Subsequently, factor analyses, reliability analyses, descriptive analyses and comparative mean analyses between selected categories are also presented for each dimension. The results of hypotheses testing using correlation are discussed. Finally, multiple regression analysis measured the effects of IR success factors dimensions on IR performance.

4.2 Profile of Respondents

The study sample is made up of academicians starting from the lecturer's scheme of grade DS 45 until grade VK (Professor from special grade C to a higher-grade A) from five research universities (UM, USM, UTM, UKM & UPM) in Malaysia. It comprises 257 respondents from a recommended sample size of 357 when the population is 5757. From the feedback, a total of 257 questionnaires were returned for further analysis with a total response rate of 72%. The categories of respondents are presented and discussed separately as below.

4.2.1 Age

Figure 4.1 shows that about 111 or 43.2 % of respondents belonged to the 30 - 39 age group, followed by those in the age 40 - 49 (98 or 38.1%), respondents by age more than 50 years old (41 or 16 %) and below 29 years old (7 or 2.7%). The finding indicates that 209 or 81.3% of those sampled are 30 - 49 years old.

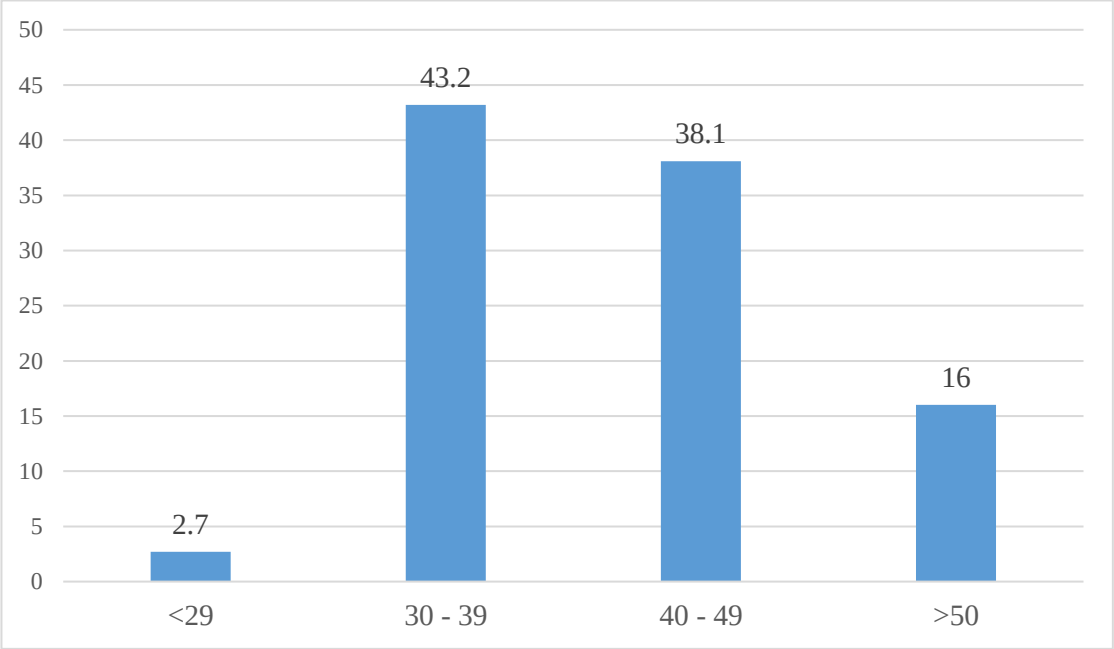

Figure 4.1 Distribution of respondents by age

4.2.2 Gender

Figure 4.2 shows that the sub-sample of academicians is made up of 257 individuals from five research universities. A total of 133 or 51.8 % respondents are female and 124 or 48.2 % are male.

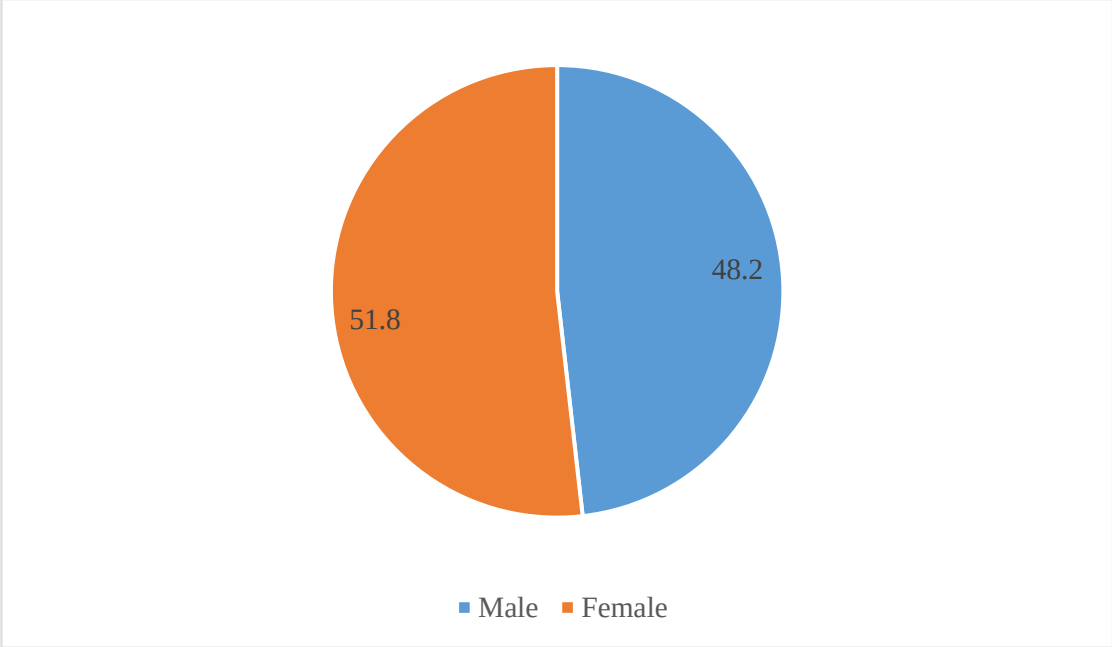

Figure 4.2 Distribution of respondents by gender

4.2.3 Grade

Majority of the respondents (168 or 65.4%) are in grade DS 51/52 compared to 67 or 26% in grade DS 53/54, followed by grade VK (12 or 4.7%). The least number of respondents are in grade DS 45 (10 or 3.9%) (Figure 4.3).

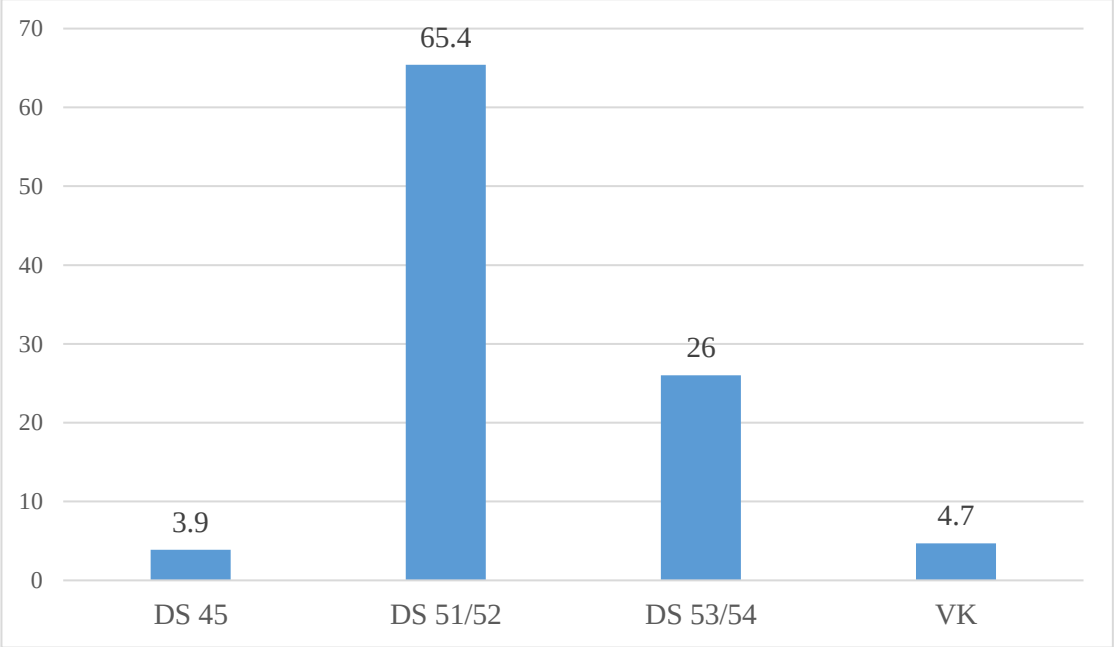

Figure 4.3 Distribution of respondents by grade

4.2.4 Education level

In terms of education level, Figure 4.4 shows the largest proportion (87.5%) are respondents who have PhD (*n* = 225) compared to 12.5% who have Master's degree (*n* = 32).

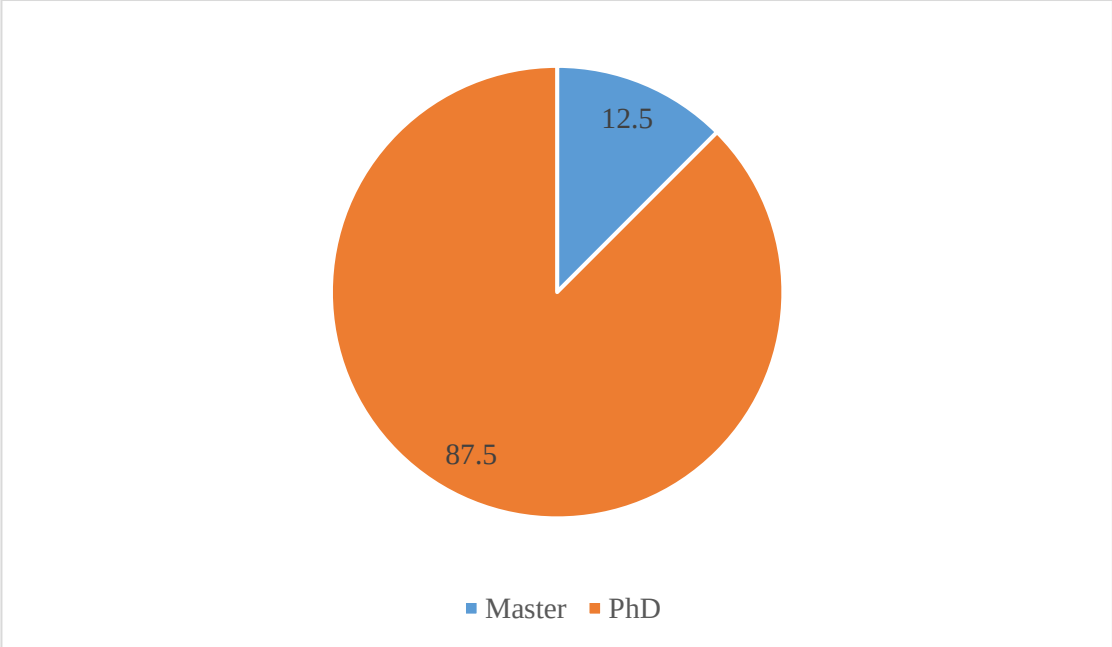

Figure 4.4 Distribution of respondents by education level

4.2.5 Service

For working experience, Figure 4.5 shows that 34.2% or 88 of the respondents have worked for 1-5 years. This is followed by 23.7% or 61 who have worked for 6 - 10 years, 15.6% or 40 who have worked for 11 - 15 years and 12.8% or 33 who have worked for 16 - 20 years. Fewer percentage of respondents (6.6% or 17) have worked for 21 - 25 years, followed by 4.3% or 11 who have worked for 26 - 30 years. A small number (2.7% or 7) have worked more than 31 years.

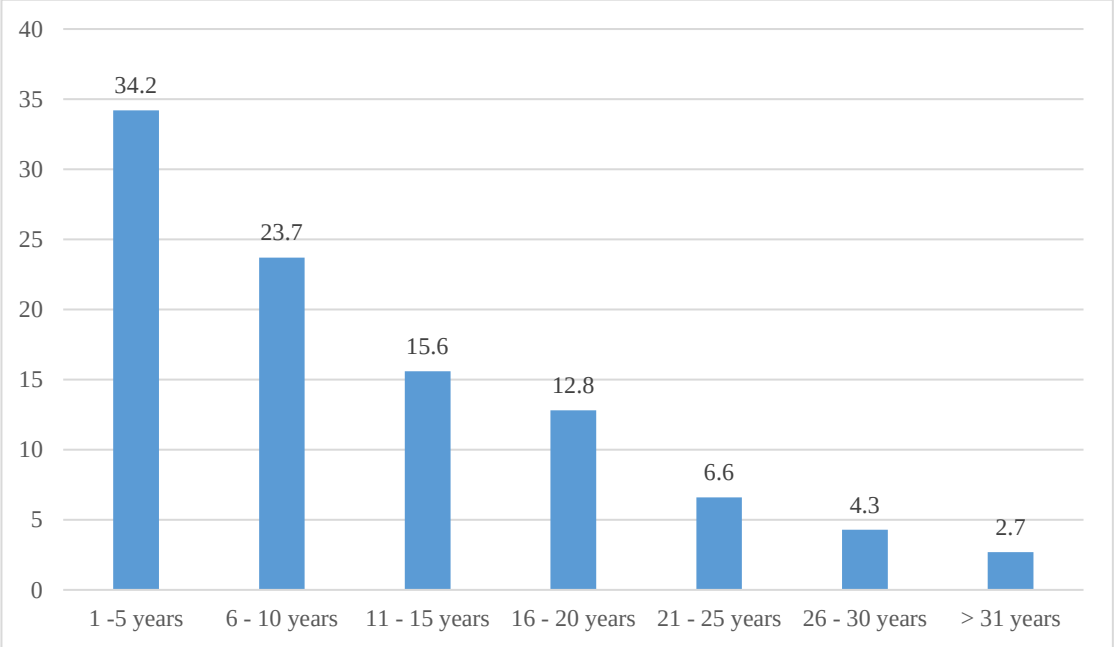

Figure 4.5 Distribution of respondents by service/working experiences

4.2.6 Institutions

In terms of institutions, respondents are quite well spread over the five universities (Figure 4.6). UPM represents the greatest number of respondents (80 or 31.1 %) then followed by USM (79 or 30.7%), UM (48 or 18.7 %) and UTM and UKM (25 or 9.7 % respectively).

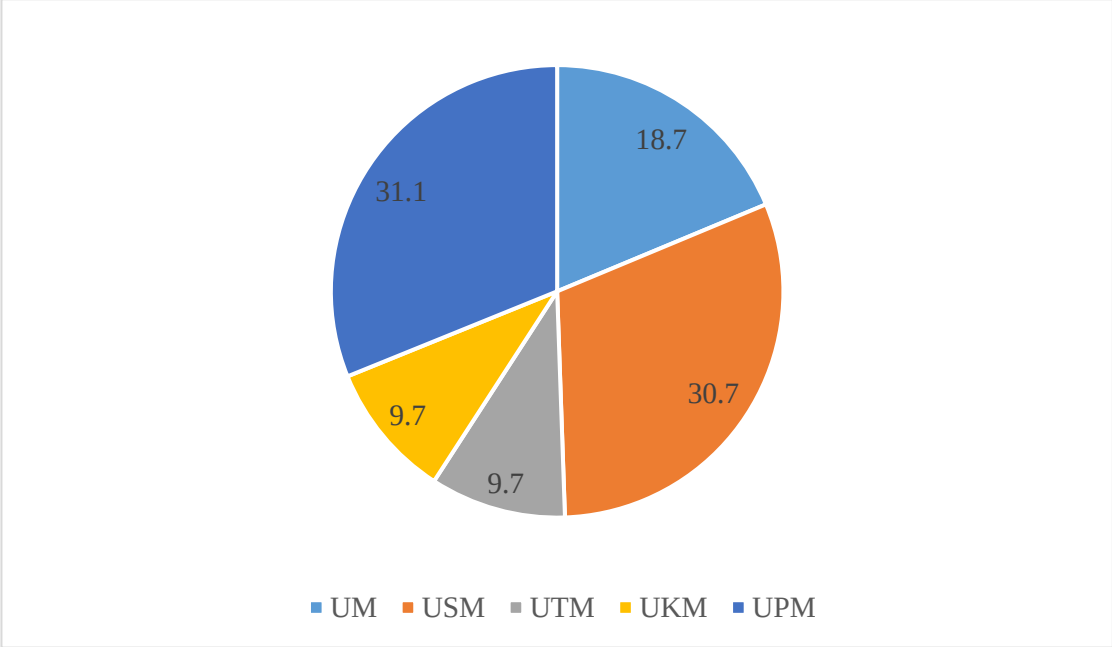

Figure 4.6 Distribution of respondents by institutions

4.2.7 Field of study

In terms of field of studies (Figure 4.7), the majority of the respondents are in Science and Technology field (119 or 46.3%) followed by Social Science (86 or 33.5%), others (23 or 8.9 %), Business and Administration (15 or 5.8%) and Art and Humanities (14 or 5.4%).

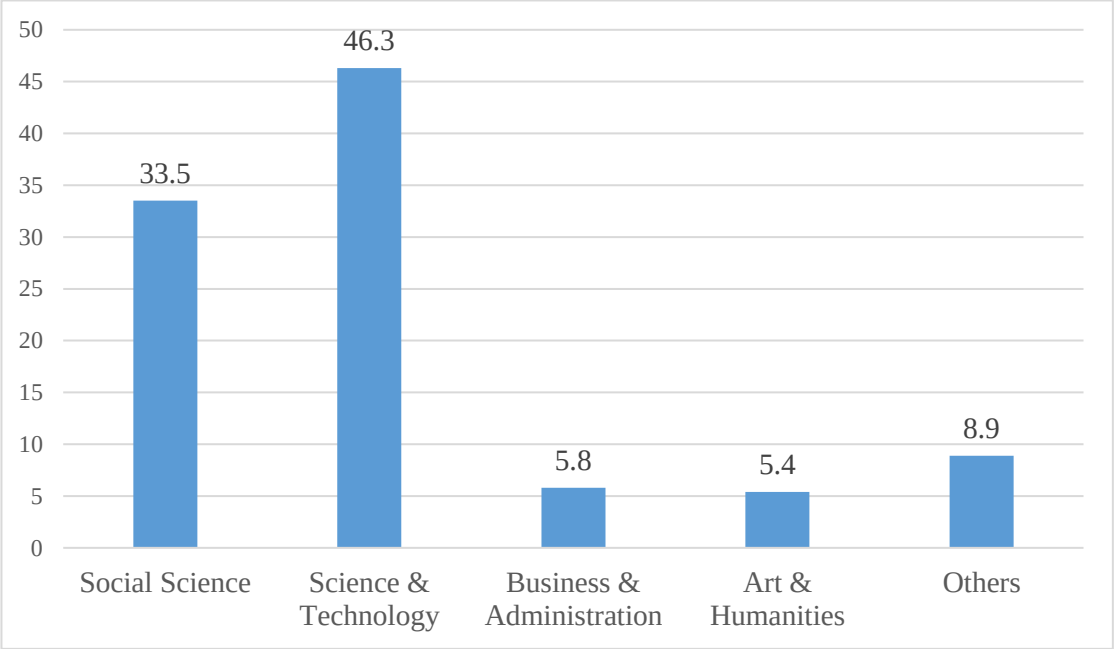

Figure 4.7 Distribution of respondents by field of study

The summary statistics for the profile of respondents are presented in Table 4.1. From the total of 257 respondents, the gender population is almost the same, with females over 3.6 %. Most of the respondents are in grade DS 51/52(65.4%) and majority have PhD (87.5%) as the highest level of education. In this research, the 1 - 5 years of service category shows the greatest number of respondents (88 or 34.2%) and followed by 6 - 10 years category (61 or 23.7%). UPM and USM represents the greatest number of respondents compared to the other three institutions. The respondents from Science and Technology field are highly interested and committed to take part in this research.

Table 4.1
Summary of Respondents' Profile

Variable	Category	Number of respondents	Percent of sample (%)
Age	<29	7	2.7
	30-39	111	43.2
	40-49	98	38.1
	>50	41	16.0
	Total	**257**	**100**
Gender	Male	124	48.2
	Female	133	51.8
	Total	**257**	**100**
Grade	DS 45	10	3.9
	DS 51/52	168	65.4
	DS 53/54	67	26.0
	VK	12	4.7
	Total	**257**	**100**
Education Level	Master	32	12.5
	PhD	225	87.5
	Total	**257**	**100**
Service	1-5 years	88	34.2
	6-10 years	61	23.7
	11-15 years	40	15.6
	16-20 years	33	12.8
	21-25 years	17	6.6
	26-30 years	11	4.3
	>31 years	7	2.7
	Total	**257**	**100**
Institutions	UM	48	18.7
	UPM	80	31.1
	USM	79	30.7
	UKM	25	9.7
	UTM	25	9.7
	Total	**257**	**100**
Field of studies	Social Science	86	33.5
	Science & Technology	119	46.3
	Business & Administration	15	5.8
	Art & Humanities	14	5.4
	Others	23	8.9
	Total	**257**	**100**

4.3 Results and Discussions

4.3.1 Factor Analysis

In this study, factor analysis was used to narrow the attribute space from a larger to a smaller number of variables. This is thought to be useful in developing a scale. The three goals of factor analysis are to (1) understand the structure of the set of variables, (2) modify questionnaires to measure the underlying variables and (3) reduce the number of items on the scale (Field, 2009).

Factor analysis is a data reduction technique. The goal of factor analysis is to reduce or summarise a large set of variables by groups among the inter-correlations of a set of variables using a smaller set of factors or components. A factor analysis can be carried out using a variety of methods (such as principal axis factor, maximum likelihood, generalised least squares). After the initial extraction of factors, there are many different types of rotations that can be performed, including orthogonal rotations such as varimax and equimax, which impose the restriction that the factors cannot be correlated, while oblique rotations such as promax, allow the factors to be correlated with one another.

In this study, factor analysis was performed using principal component analysis (PCA) with varimax rotation. The requirement of doing this factor analysis is that the scales must at least be an interval scale (Likert scale 1 – 7). Hair, Black, Babin and Anderson (2010) determined that Kaiser-Meyer-Olkin (KMO) values equal to and greater than 0.50, as well as a factor loading greater than 0.50, were adequate criteria for determining data reduction relevance and grouping items.

The KMO, according to Zikmund et al. (2013), indicates how well an instrument validates its construct, whereas factor loading indicates how strongly a measured variable is correlated with a factor. Accepting variables with loadings greater than 0.5 is recommended by Field (2009) as well as Igbaria, Livari and Maragahh (1995). Only items with a loading of 0.5 or higher were loaded in this study. SPSS was used to perform factor analysis on all questionnaire items in this study, using principal component factor analysis (PCA) and varimax rotation. The summary of KMO results for all dimensions are presented in Table 4.2.

Table 4.2
Summary of KMO Factor Analysis Results for all Dimensions

Dimensions	KMO
Knowledge Sharing	0.905
Self-Archiving	0.898
IR Usage	0.931
IR Policy	0.936
IR Procedure	0.931
Copyright Awareness	0.852
IR Performance	0.943

The summary KMO factor analysis for all dimensions ranged between 0.852 to 0.943. The lowest KMO values were Copyright Awareness (0.852), followed by Self-Archiving (0.898), Knowledge Sharing (0.905), IR Policy (0.936), IR Usage and IR Procedure (0.931) respectively and IR Policy (0.936). The highest KMO was 0.943 for IR Performance dimensions. Based on the results, KMO values between 0.8 and 1 indicated that the sampling was adequate.

As a result, the detailed KMO results for all dimensions are as follows:

4.3.1.1 Factor Analysis Results for Knowledge Sharing

The resulting factor loading in the rotated component matrix was high for all seven items with the highest value was 0.890 and the lowest value was 0.801. All the items were included in the subsequent analysis. Kaiser-Meyer-Olkin (KMO) value of 0.905 was considered excellent since it exceeded the recommended value of 0.6 (Kaiser, 1974). The two measures (KMO value closer to 1.0 and the Bartlett's test significance value close to 0.0) suggested that the data were appropriate to proceed with a factor analysis procedure. The seven items loaded account for 63.5% of variance explained with Eigenvalue of 6.981. The summary statistics are presented in Table 4.3.

Table 4.3
Factor Analysis Results for Knowledge Sharing

Factors	**Loadings**
Knowledge sharing 5	0.819
Knowledge sharing 6	0.836
Knowledge sharing 7	0.890
Knowledge sharing 8	0.809
Knowledge sharing 9	0.830
Knowledge sharing 10	0.801
Knowledge sharing 11	0.810
Eigenvalue	6.981
Percentage of variance explained (%)	63.5%
Kaiser-Meyer-Olkin (KMO)	0.905
Bartlett's Test of Sphericity Approx. Chi Square	2691.959
Df	55
Sig.	0.000

4.3.1.2 Factor Analysis Results for Self-Archiving

The principal component factor analysis (PCA) with varimax rotation was performed for the nine items of the self-archiving construct. All the items were above 0.5 thus, all were retained for further analysis. The results indicated that the Bartlett's Test of Sphericity was significant (Chi-square = 2566.818, *p*-value <0.000). The Kaiser-Meyer-Olkin (KMO) measures of sampling adequacy was 0.898 and above 0.5. The extracted factor can explain 72.8% of the variance in the items with Eigenvalue of 6.555. The summary statistics are presented in Table 4.4.

Table 4.4
Factor Analysis Results for Self-Archiving

Factors	**Loadings**
Self Archiving 1	0.780
Self Archiving 2	0.856
Self Archiving 3	0.826
Self Archiving 4	0.795
Self Archiving 5	0.891
Self Archiving 6	0.893
Self Archiving 7	0.862
Self Archiving 8	0.890
Self Archiving 9	0.881
Eigenvalue	6.555
Percentage of variance explained (%)	72.8%
Kaiser-Meyer-Olkin (KMO)	0.898
Bartlett's Test of Sphericity Approx. Chi Square	2566.818
Df	36
Sig.	0.000

4.3.1.3 Factor Analysis Results for Institutional Repositories (IR) Usage

The summary of factor analysis for IR usage is presented in Table 4.5. The KMO value of 0.931 presented a high degree of intercorrelations among the variables, thus showed an adequate sampling. The resulting factor loading in the rotated component matrix was high for all items with the highest value was 0.895 (IR Usage 4) and the lowest was 0.800 (IR Usage 10). Thus, all the items were proceeded for further analysis. The extracted factor can explain 73.1% of the variance in the items with Eigenvalue of 7.313.

Table 4.5
Factor Analysis Results for IR Usage

Factors	Loadings
IR Usage 1	0.842
IR Usage 2	0.842
IR Usage 3	0.878
IR Usage 4	0.895
IR Usage 5	0.893
IR Usage 6	0.876
IR Usage 7	0.807
IR Usage 8	0.844
IR Usage 9	0.868
IR Usage 10	0.800
Eigenvalue	7.313
Percentage of variance explained (%)	73.1%
Kaiser-Meyer-Olkin (KMO)	0.931
Bartlett's Test of Sphericity Approx. Chi Square	2679.070
Df	45
Sig.	0.000

4.3.1.4 Factor Analysis Results for Institutional Repositories (IR) Policy

The result for Institutional Repositories (IR) Policy variables show that all the nine items were included in the subsequent analysis. All the items were loaded from value 0.872 to 0.933. The value was considered high, thus all the items were retained for subsequent analysis. The extracted factors can explain 84.2% of the variance in the questionnaire items with Eigenvalue of 7.579 and KMO of 0.936. The summary statistics are demonstrated in Table 4.6.

Table 4.6
Factor Analysis Results for IR Policy

Factors	Loadings
IR Policy 1	0.915
IR Policy 2	0.932
IR Policy 3	0.932
IR Policy 4	0.930
IR Policy 5	0.933
IR Policy 6	0.919
IR Policy 7	0.920
IR Policy 8	0.905
IR Policy 9	0.872
Eigenvalue	7.579
Percentage of variance explained (%)	84.2%
Kaiser-Meyer-Olkin (KMO)	0.936
Bartlett's Test of Sphericity Approx. Chi Square	3326.858
Df	36
Sig.	0.000

4.3.1.5 Factor Analysis Results for Institutional Repositories (IR) Procedure

The principal component factor analysis (PCA) with varimax rotation was performed for the seven items of the IR procedure construct with loading the highest value (0.956) and the lowest value (0.912). All the items were retained for further analysis as the accepting values were above 0.5. The total loaded items extracted can explain only 88.0% with Eigenvalue of 6.161 and KMO of 0.931. The summary statistics are illustrated in Table 4.7.

Table 4.7
Factor Analysis Results for IR Procedure

Factors	**Loadings**
IR Procedure 1	0.912
IR Procedure 2	0.956
IR Procedure 3	0.941
IR Procedure 4	0.948
IR Procedure 5	0.940
IR Procedure 6	0.947
IR Procedure 7	0.922
Eigenvalue	6.161
Percentage of variance explained (%)	88.0%
Kaiser-Meyer-Olkin (KMO)	0.931
Bartlett's Test of Sphericity Approx. Chi Square	2695.157
Df	21
Sig.	0.000

4.3.1.6 Factor Analysis Results for Copyright Awareness

The principal component factor analysis (PCA) with varimax rotation was performed for the six items of the copyright awareness construct. All the items were above 0.5, thus all were retained for further analysis. The results indicated that the Bartlett's Test of Sphericity was significant (Chi-square = 1905.681, *p*-value <0.000). The Kaiser-Meyer-Olkin (KMO) measures of sampling adequacy was 0.852 and above 0.5. The extracted factor can explain 55.6% of the variance in the items with Eigenvalue of 5.005. The summary statistics are presented in Table 4.8.

Table 4.8
Factor Analysis Results for Copyright Awareness

Factors	**Loadings**
Copyright Awareness 1	0.855
Copyright Awareness 2	0.847
Copyright Awareness 3	0.860
Copyright Awareness 4	0.830
Copyright Awareness 5	0.601
Copyright Awareness 6	0.716
Eigenvalue	5.005
Percentage of variance explained (%)	55.6%
Kaiser-Meyer-Olkin (KMO)	0.852
Bartlett's Test of Sphericity Approx. Chi Square	1905.681
Df	36
Sig.	.000

4.3.1.7 Factor Analysis Results for Institutional Repositories (IR) Performance

The summary of factor analysis for IR performance is presented in Table 4.9. The KMO value of 0.943 presented a high degree of intercorrelations among the variables, thus showed an adequate sampling. The resulting factor loading in the rotated component matrix was high for all items with the highest value at 0.882 (IR Performance 6) and the lowest at 0.827 (IR Performance 5). Thus, all the items were proceeded for further analysis. The extracted factor can explain 73.1% of the variance in the items with Eigenvalue of 7.313.

Table 4.9
Factor Analysis Results for IR Performance

Factors	Loadings
IR Performance 1	0.866
IR Performance 2	0.877
IR Performance 3	0.880
IR Performance 4	0.841
IR Performance 5	0.827
IR Performance 6	0.882
IR Performance 7	0.877
IR Performance 8	0.863
IR Performance 9	0.874
IR Performance 10	0.857
IR Performance 11	0.878
IR Performance 12	0.853
Eigenvalue	8.972
Percentage of variance explained (%)	74.8%
Kaiser-Meyer-Olkin (KMO)	0.943
Bartlett's Test of Sphericity Approx. Chi Square	3527.636
Df	66
Sig.	.000

4.4 Reliability Analysis

The researcher computes the Cronbach's alpha for each component. As shown in Table 4.10, the values of Cronbach's alpha are higher than 0.7. It is important to note here that all reliability measures have exceeded the minimum value of 0.6 as recommended by Nunally (1978).

Table 4.10
Summary of Reliability Statistics

Variables	Number of items in a component	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items
Knowledge Sharing	11	0.941	0.942
Self-Archiving	9	0.951	0.953
IR Usage	10	0.959	0.959
IR Policy	9	0.976	0.977
IR Procedure	7	0.977	0.977
Copyright Awareness	9	0.893	0.896
IR Performance	12	0.969	0.969

As shown in Table 4.11, the total items are 67 that consist of independent variables (58 items) and dependent variable (12 items). The detailed items by variables are knowledge sharing (11 items), Self-Archiving (9 items), IR usage (10 items), IR policy (9 items), IR procedure (7 items) and Copyright awareness (9 items) and IR performance (12 items). It can be summarised that Cronbach's alpha value of knowledge sharing (0.942), Self-Archiving (0.953), IR usage (0.959), IR policy (0.977), IR procedure (0.977) and Copyright awareness (0.896) and IR performance (0.969) exceed 0.7. The next step is to transform the individual score of these seven items into its individual mean representing variable for further analysis. The same procedure goes for other variables respectively.

A reliability analysis using Cronbach's alpha was performed on 67 questionnaire items. The overall Cronbach's alpha reliability coefficient of the questionnaire items is 0.970, as demonstrated in Table 4.11. All scales are considered reliable if the value is 0.70 or higher (Nunnally & Bernstein, 1994). The results show that the entire instrument has high reliability for further analysis. It was determined that respondents were aware and had knowledge to respond to the entire questionnaire items.

Table 4.11
Total Reliability Analysis Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Knowledge Sharing 1	349.4436	2837.560	.392	.978
Knowledge Sharing 2	349.4903	2838.946	.377	.978
Knowledge Sharing 3	349.6693	2831.269	.396	.978
Knowledge Sharing 4	349.4125	2842.290	.362	.978
Knowledge Sharing 5	349.5253	2832.828	.455	.978
Knowledge Sharing 6	349.5019	2831.087	.449	.978
Knowledge Sharing 7	349.4669	2827.039	.484	.978
Knowledge Sharing 8	349.6187	2819.792	.495	.978
Knowledge Sharing 9	349.6654	2803.075	.601	.978
Knowledge Sharing 10	349.5253	2815.813	.547	.978
Knowledge Sharing 11	349.5720	2810.636	.566	.978
Self-Archiving 1	350.4786	2783.110	.680	.978
Self-Archiving 2	350.3346	2785.528	.669	.978
Self-Archiving 3	350.2451	2789.522	.693	.978
Self-Archiving 4	350.9416	2768.157	.601	.978
Self-Archiving 5	350.6381	2774.412	.666	.978
Self-Archiving 6	350.6420	2779.762	.646	.978
Self-Archiving 7	350.6965	2777.579	.651	.978
Self-Archiving 8	350.4397	2788.177	.657	.978
Self-Archiving 9	350.4475	2783.061	.669	.978
IR Usage 1	350.1012	2787.404	.689	.978
IR Usage 2	350.1167	2786.471	.682	.978
IR Usage 3	350.1284	2788.753	.696	.978
IR Usage 4	350.2802	2777.359	.762	.978
IR Usage 5	350.1556	2779.327	.768	.978
IR Usage 6	350.2724	2777.527	.771	.978
IR Usage 7	350.3541	2777.792	.710	.978
IR Usage 8	350.2490	2783.875	.683	.978

IR Usage 9	350.4436	2769.326	.756	.978
IR Usage 10	350.3191	2777.554	.717	.978
IR Policy 1	350.3813	2773.409	.780	.978
IR Policy 2	350.3891	2776.418	.761	.978
IR Policy 3	350.3541	2779.276	.738	.978
IR Policy 4	350.4280	2778.355	.732	.978
IR Policy 5	350.3113	2780.317	.731	.978
IR Policy 6	350.2957	2771.748	.762	.978
IR Policy 7	350.4825	2768.977	.770	.978
IR Policy 8	350.4786	2770.055	.760	.978
IR Policy 9	350.3930	2772.880	.729	.978
IR Procedure 1	350.3541	2775.612	.764	.978
IR Procedure 2	350.4125	2769.845	.770	.978
IR Procedure 3	350.4708	2773.227	.742	.978
IR Procedure 4	350.4903	2776.977	.720	.978
IR Procedure 5	350.5136	2771.477	.733	.978
IR Procedure 6	350.5370	2773.945	.735	.978
IR Procedure 7	350.4591	2773.015	.728	.978
Copyright Awareness 1	349.7704	2824.865	.446	.978
Copyright Awareness 2	349.7743	2824.355	.442	.978
Copyright Awareness 3	349.7276	2824.113	.453	.978
Copyright Awareness 4	350.0156	2808.140	.534	.978
Copyright Awareness 5	349.3424	2856.093	.208	.979
Copyright Awareness 6	349.5681	2843.285	.318	.979
Copyright Awareness 7	349.9883	2829.160	.333	.979
Copyright Awareness 8	350.1245	2806.297	.520	.978
Copyright Awareness 9	350.1128	2807.725	.510	.978
IR Performance 1	349.5875	2804.017	.644	.978
IR Performance 2	349.6148	2801.597	.655	.978
IR Performance 3	349.6109	2803.981	.641	.978
IR Performance 4	349.8482	2786.856	.690	.978
IR Performance 5	349.6809	2802.710	.644	.978
IR Performance 6	349.7004	2802.664	.638	.978
IR Performance 7	349.7160	2794.181	.672	.978
IR Performance 8	349.6887	2795.348	.659	.978
IR Performance 9	349.7471	2790.127	.630	.978
IR Performance 10	349.7043	2803.568	.619	.978
IR Performance 11	349.7315	2797.135	.666	.978
IR Performance 12	349.6459	2800.433	.665	.978

Cronbach's alpha	**0.978**
Number of Items	67

4.5 Perception on Success Factors of Institutional Repositories (IR) and Institutional Repositories (IR) Performance

This section presents and discusses the results of data analysis on the perceptions of respondents with regards to the various elements of success factors of Institutional Repositories and Institutional Repositories performance. The perceptions of respondents are measured on a Likert Scale from 1 to 7: (1) Strongly disagree, (2) Disagree, (3) Moderately Disagree, (4) Quite Agree, (5) Moderately Agree, (6) Agree and (7) Strongly Agree.

Besides, this section provides answer to Research Question 1: What are the perceptions of academicians on the success factors of institutional repositories (knowledge sharing, self-archiving, IR Usage, IR Policy, IR Procedure and Copyright Awareness) and its IR performance in Malaysian academic libraries?

The descriptive analysis reports the respondents' perceptions on six IR success factors dimensions and IR performance. All the scores were then arranged according to the ranking order with the highest mean which was considered as the most preferred response. Result shows the highest mean score for independent variables were knowledge sharing (5.80), followed by Copyright awareness (5.66), IR usage (5.12), IR policy (4.97), IR procedure (4.90) and Self-archiving (4.82) as depicted in Table 4.12. The mean score for dependent variable was IR performance (5.67), Thus, knowledge sharing was regarded as the most preferred response among other dimensions.

Table 4.12
Ranking of the Level of Perception

No	Dimension	Mean Score	Standard Deviation
	Independent variables		
1	Knowledge Sharing	5.80	0.929
2	Copyright Awareness	5.66	0.930
3	Institutional Repositories Usage	5.12	1.097
4	Institutional Repositories Policy	4.97	1.203
5	Institutional Repositories Procedure	4.90	1.260
6	Self-Archiving	4.82	1.196
	Dependent variable		
	Institutional Repositories Performance	5.67	1.006

*The higher the mean score, the more positive is the perception

4.6 Perceptions on Knowledge Sharing

Table 4.13 shows the mean score and standard deviation (SD) of perception on knowledge sharing statements. On the average, the respondents moderately agreed towards their knowledge sharing attitude. This is indicated by the overall mean score of 5.80. In particular, they agreed that knowledge sharing through institutional repositories increases communication of research output (mean = 5.89), agreed that knowledge sharing through IR increases readership (mean = 5.85) and agreed that IR as publishing of research findings among researchers (mean = 5.83). They also admitted that knowledge sharing through IR increases total citation (mean = 5.83), increases author's level metric H-Index (mean = 5.79) and increases collaboration among researchers with other universities (mean = 5.74). In the context of their profession as a lecturer scheme, they also agreed that knowledge sharing through IR brings more prestige for academicians. The mean scores of the seven individual items are quite similar, ranging from 5.69 to 5.89, hence, also indicating a moderate positive perception towards their knowledge sharing activities.

Table 4.13
Results of Mean Score by Knowledge Sharing

No	I …	Mean Score	Standard Deviation
1	… agree knowledge sharing through IR increases communication research output	5.89	1.013
2	… agree knowledge sharing through IR increases readership	5.85	1.007
3	… agree on IR as publishing of research findings among researchers	5.83	0.960
4	… agree knowledge sharing through IR increases total citation	5.83	1.089
5	… agree knowledge sharing through IR increases author level metric (H-Index)	5.79	1.137
6	… agree knowledge sharing through IR increases collaboration among researcher with other universities	5.74	1.124
7	… agree knowledge sharing through IR bring more prestige for academicians	5.69	1.190
	Overall	5.80	0.929

4.7 Perceptions on Self-Archiving

Table 4.14 shows the overall mean score and standard deviation (SD) of perception on self-archiving statements (mean = 4.82). On the average, the respondents moderately agreed with the perception on self-archiving. The mean scores of the seven individual items are quite similar, ranging from 4.42 to 4.92. The respondents perceived that their library promotes a cultural environment within the organisation that supports a high number of resources to the IR (mean = 5.11). They also agreed that the library encourages staff to deposit their publications in IR (mean = 5.02), deposit copies of conference papers presented (mean = 4.92) and proceeding papers (mean = 4.92) to institutional repositories. The library also convinced authors to self-archive their publications in IR (mean = 4.88). They perceived that library mandates to deposit copies of all university published journal articles to IR (mean = 4.72), mandates to deposit research reports (mean = 4.72) and course contents to IR (mean = 4.66). They also admitted that library gives incentives to authors that deposited the research outputs to IR (mean = 4.42).

Table 4.14
Results of Mean Score by Self-Archiving

No	My library …	Mean Score	Standard Deviation
1	… promotes a cultural environment within the organisation that supports a high number of resources in the IR	5.11	1.218
2	… encourages staff to deposit their publications in IR	5.02	1.317
3	… encouraged deposit copies of conference papers presented to IR	4.92	1.300
4	… that have been encourages to deposit copies of proceeding papers to IR	4.92	1.350
5	… convinces authors to self-archive their publication in IR	4.88	1.328
6	… mandates to deposit copies of all university published journal articles to IR	4.72	1.476
7	… mandates to deposit research reports to IR	4.72	1.445
8	… mandates to deposit course contents to IR	4.66	1.465
9	… gives incentives to authors that deposited the research output to IR	4.42	1.726
	Overall	4.82	1.196

4.8 Perceptions on Institutional Repositories Usage

Table 4.15 presents the mean score and standard deviation (SD) of the perception score on IR usage statements. The result shows the overall mean score of the perceptions on IR usage by respondents (mean = 5.12). The components reflecting this perception received mean score ranged from 5.00 (*Institutional Repositories (IR) of my university systems make available the number of downloads of full-text files*) to 5.26 (*Institutional Repositories (IR) of my university provides a user-friendly interface*). Further, they perceived that institutional repositories platform provides a user-friendly interface (mean = 5.26), has suggestions on feature for the search terms (mean = 5.24) and has a clear search results pages (mean = 5.23). They considered that institutional repositories is an important information source to assist researchers (mean = 5.20). They agreed that institutional repositories systems have fast browsing speed to encourage people to use it more (mean = 5.11) and the institutional repositories systems make available the number of views of full-text files (mean = 5.09). The respondents agreed that institutional repositories provides literature for their research works (mean = 5.08), learning to self-archive is quite an easy task for them (mean = 5.04) and the systems make available the number of downloads of full-text files (mean = 5.00). On the average, the respondents strongly agreed with the perception on usage of institutional repositories. However, one statement that *Institutional Repositories (IR) of university systems share information about usage statistics* (4.91) was perceived as moderately positive.

Table 4.15
Results of Mean Score by Institutional Repositories Usage

No	Institutional Repositories (IR) of my university …	Mean Score	Standard Deviation
1	… provides a user-friendly interface	5.26	1.255
2	… has suggestions for the search terms	5.24	1.279
3	… has clear search results pages	5.23	1.223
4	… is an important information source to assist researchers	5.20	1.227
5	… systems have fast browsing speed to encourage people to use it more	5.11	1.312
6	… systems make available the number of views of full-text files	5.09	1.244
7	… provides literature for my research works	5.08	1.260
8	… learning to self-archive is quite an easy task for me	5.04	1.334
9	… systems make available the number of downloads of full-text files	5.00	1.345

10	… systems share information about usage statistics	4.91	1.369
	Overall	5.12	1.097

4.9 Perceptions on Institutional Repositories Policy

Table 4.16 presents the mean score and standard deviation (SD) of the perception score on IR policy statement. This is indicated by the overall mean score of 4.97. They agreed that their institution established IR policy to make scholarly material available for the future (mean = 5.06), established IR policy to provide access to digital resources (mean = 5.05) and develop policy to guide the collection of university contents (mean = 5.00). They agreed that university has appropriate institutional repositories advocacy policy (mean = 4.98), workable policies on IR in the university (mean = 4.97) and establishes IR policy as a system for publishing (mean = 4.97). They also agreed that the institution had established IR policy for free access of full-text document (mean = 4.93) and that the institution has a strategic master plan for digital preservation with IR and establishes IR policy as scholarly communications system (mean = 4.88 respectively).

Table 4.16
Results of Mean Score by Institutional Repositories Policy

No	My institution …	Mean Score	Standard Deviation
1	… establishes IR policy to make scholarly materials available for the future	5.06	1.330
2	… establishes IR policy to provide access to digital resources	5.05	1.274
3	… develops a policy to guide the collection of university contents	5.00	1.276
4	… has an appropriate IR advocacy policy	4.98	1.281
5	… has workable policies on IR in the university	4.97	1.274
6	… establishes IR policy as a system for publishing	4.97	1.373
7	… establishes IR policy for free access of full-text document	4.93	1.297
8	… has a strategic master plan for digital preservation with IR	4.88	1.349
9	… establishes IR policy as scholarly communications system	4.88	1.354
	Overall	4.97	1.203

4.10 Perceptions on Institutional Repositories Procedure

Table 4.17 presents the mean score and standard deviation (SD) of the perception score on IR procedure statements. This is indicated by the overall mean score of 4.90. Respondents agreed that the library conducted procedures for successful implementation institutional repositories (mean = 5.00), provided procedures to self-archive their contents in the IR (mean = 4.95) and provided procedure for document version that can be deposited (pre-print, post-print and pdf version publisher (mean = 4.90)). Besides, library provided online manual for self-archive manual available online (mean = 4.89), provided procedure in managing IR content during embargo period (mean = 4.87), provided procedure for authors to check editorial policies before depositing content to IR (mean = 4.84) and provided procedure for metadata format supported by IR system (mean = 4.82).

Table 4.17
Results of Mean Score by Institutional Repositories Procedure

No	The library …	Mean Score	Standard Deviation
1	…conducts procedures for successful implementation of IR	5.00	1.279
2	… provides procedure to self-archive their contents in the IR	4.95	1.339
3	… provides procedure for document version that can be deposited (pre-print, post-print & pdf version)	4.90	1.374
4	… provides self-archive manual that is available online	4.89	1.345
5	… provides procedure in managing IR content during embargo period	4.87	1.337
6	… provides procedure for authors to check editorial policies before depositing content to IR	4.84	1.383
7	… provides procedure for metadata format supported by IR system	4.82	1.349
	Overall	4.90	1.260

4.11 Perceptions on Copyright Awareness

Table 4.18 presents the overall mean score and standard deviation (SD) of the perception score on copyright awareness statement. The mean scores of the five individual items ranged from 5.35 to 5.79 and one statement that is concerned about plagiarism is the highest (mean = 6.02). Respondents agreed that they are concerned about plagiarism (mean = 6.02) and about other publishers owning the copyright of previously published material (mean = 5.79), clearly understand publisher's copyright (5.63), clearly understand the copyright act (5.59) and intellectual property rights (5.58) and are aware of publishers' policies relating to self-archiving research work in the institutional repositories (mean = 5.34).

Table 4.18
Results of Mean Score by Copyright Awareness

No	Dimension	Mean Score	Standard Deviation
1	I am concerned about plagiarism	6.02	1.038
2	I am concerned about other publishers owning the copyright of previously published material	5.79	1.054
3	I clearly understand publishers copyright	5.63	1.139
4	I clearly understand the copyright act	5.59	1.139
5	I clearly understand my own intellectual property rights	5.58	1.159
6	I am aware of publishers' policies relating to self-archiving research work in the IR	5.34	1.247
	Overall	5.66	0.930

4.12 Perceptions on Institutional Repositories Performance

Table 4.19 shows the mean score and standard deviation (SD) of perception on repositories performance statement. The overall mean scores are 5.67 and ranged from 5.51 (*IR helps authors organise their research*) to 5.77 (*IR increases visibility of authors*). The respondents perceived that institutional repositories has increased the authors' visibility (mean = 5.77), gave more exposure of their works (mean = 5.75), increased the research impact of authors (mean = 5.74), allowed harvesting by Google Scholar for world-wide sharing scholarly research (mean = 5.71) and preserved their research outputs in long term (mean = 5.68).

Besides, institutional repositories promoted the global ranking of university (mean = 5.67) and facilitated the dissemination of scholarly research (mean = 5.66). Other than that, institutional repositories gave new mode of scholarly communication (mean = 5.65), assisted in globalisation of Malaysian research findings (mean = 5.64) and gave new mode of scholarly publishing (mean = 5.63). IR also promoted international collaborations among researchers (mean = 5.61) and helped authors to organise their research (mean = 5.51).

Table 4.19
Results of Mean Score by Institutional Repositories Performance

No	Institutional Repositories (IR) …	Mean Score	Standard Deviation
1	… increases visibility of authors	5.77	1.099
2	… gives the work of authors more exposure	5.75	1.105
3	… increases the research impact of authors	5.74	1.116
4	… allows harvesting by Google Scholar for worldwide sharing of scholarly research	5.71	1.116
5	… helps authors preserve their research in long-term	5.68	1.118
6	… promotes the global ranking of university	5.67	1.197
7	… facilitates the dissemination of scholarly research	5.66	1.128
8	… gives new mode of scholarly communication	5.65	1.149
9	… assists in globalisation of Malaysian research findings	5.64	1.190
10	… gives new mode of scholarly publishing	5.63	1.159
11	… helps authors organise their research	5.51	1.260
	Overall	5.67	1.006

4.13 Analysis to Determine Normality Data

After obtaining the mean scores for each component, the researcher needs to show that the distribution of these data does not depart from normality. As stated earlier, one of the measures which reflects the distribution of data is skewness. The measure of skewness between -1.0 to 1.0 indicates the data does not depart from normality. Hence, the parametric statistical analysis can be employed.

Table 4.20
The Measure of Skewness of the Data

Variable in the model	Min	Max	Skewness	Kurtosis
Knowledge Sharing	2.29	7.00	**-0.711**	0.311
Self-Archiving	1.00	7.00	**-0.599**	0.570
IR Usage	1.00	7.00	**-0.584**	0.684
IR Policy	1.00	7.00	**-0.829**	0.875
IR Procedure	1.00	7.00	**-0.601**	0.308
Copyright Awareness	1.17	7.00	**-0.881**	1.776
IR Performance	1.83	7.00	**-0.983**	1.243

Since all measures for the skewness are closer to 0.0 and within the range between -1.0 to 1.0 as shown in Table 4.20, the study concludes that the distribution of data is almost symmetry or bell-shaped. The bell-shaped distribution indicates the data is normally distributed. Hence, the data obtained in the study meets the required assumption for employing the parametric statistical analysis that data comes from a normal distribution. Among the parametric statistical analyses that can be employed are Independent-Samples *t*-test, One-Way Analysis of Variance (ANOVA) and Pearson's Correlation Coefficient test depending on the hypotheses test as proposed for the study.

4.14 Differences on Success Factors of Institutional Repositories Dimensions Between Gender and Education Level

This section provides answer to Research Question ii: Are there differences on the success factors of IR between gender and education level?

The value of perceptions score was normally distributed in all IR success factors dimensions. Therefore, the parametric statistical test which is the appropriate statistics to use in this analysis is independent-samples *t*-test as it involved two groups of respondents (gender and education level).

4.14.1 Differences of Perception on Success Factors of Institutional Repositories between Gender

The parametric statistical test used in this analysis was the independent samples *t*-test as it involved two groups (male and female) of respondents. Table 4.21 presents the independent-samples t-test analysis to compare the perception on gender between IR success factors dimensions. The *p*-value for all the dimensions was not significant at 5% level ($p > 0.05$).

Table 4.21
Results of Independent Samples *t*-Test Analysis of IR Success Factors Dimensions by Gender

No	Variable	Mean		*t*	Df	*p* value
1	Knowledge Sharing	Male	5.7212	-1.388	255	0.166
		Female	5.8818			
2	Self-Archiving	Male	4.8136	-0.051	255	0.960
		Female	4.8212			
3	IR Usage	Male	5.1323	0.230	255	0.819
		Female	5.1008			
4	IR Policy	Male	5.0009	0.428	255	0.669
		Female	4.9365			
5	IR Procedure	Male	4.9366	0.504	255	0.614
		Female	4.8571			
6	Copyright Awareness	Male	5.6411	-0.284	255	0.776
		Female	5.6742			
7	IR Performance	Male	5.6149	-0.820	255	0.413
		Female	5.7180			

*The test is significant at the 0.05 level.

4.14.2 Differences of Perception on Success Factors of Institutional Repositories between Education Level

The parametric statistical test used in this analysis was the independent-samples *t*-test as it involved two groups (male and female) of respondents. Table 4.22 presents the independent samples t-test analysis to compare the perception on education level between IR success factors dimensions. The *p*-value for all the dimensions was not significant at 5% level ($p > 0.05$). It was concluded that there was no adequate evidence to prove significant differences in the mean scores of dimensions measured between respondents who hold Master and PhD qualifications.

Table 4.22
Result of Independent-Samples *t*-Test Analysis of CSF Dimensions by Education Level

No	Variable	Mean		t	Df	*p* value
1	Knowledge Sharing	Master	5.8304	0.169	255	0.866
		PhD	5.8006			
2	Self-Archiving	Master	4.8264	0.045	255	0.964
		PhD	4.8163			
3	IR Usage	Master	5.2781	0.893	255	0.373
		PhD	5.0929			
4	IR Policy	Master	5.0590	0.459	255	0.647
		PhD	4.9546			
5	IR Procedure	Master	5.1607	1.273	255	0.204
		PhD	4.8578			
6	Copyright Awareness	Master	5.4427	-1.404	255	0.162
		PhD	5.6889			
7	IR Performance	Master	5.4271	-1.452	255	0.148
		PhD	5.7026			

*The test is significant at the 0.05 level.

4.15 Differences on Success Factors of Institutional Repositories Dimensions in terms of Age Group, Grade, Duration Served in the Organisation (Years), Institution Name and Field of Studies

This section provides answer to Research Question ii: Are there differences on the success factors of IR in terms of age, grade, duration served in the organisation (years), institution name and field of studies?

The value of perceptions score was normally distributed in all IR success factors dimensions. Therefore, the parametric statistical test which is the appropriate statistics to use in this analysis is the One-Way Analysis of Variance (ANOVA) test as it involves more than two groups of respondents (age, grade, duration served in the organisation (years), institution name and field of studies).

4.15.1 Comparison of Perception on IR Success Factors among Age Group

Table 4.23 shows the results of One-Way Analysis of Variance (ANOVA) test analysis involving all IR success factors dimensions to determine whether the perceptions on these dimensions differ among respondents' age group. From the results, the *p*-value for self-archiving ($p = 0.063$), IR policy ($p = 0.600$), IR procedure ($p = 0.513$) and IR performance ($p = 0.231$) were not significant at 5% level ($p < 0.05$). However, the *p*-value for knowledge sharing ($p = 0.045$), IR usage ($p = 0.016$) and

copyright awareness (p = 0.030) were significant at 5% level (p > 0.05). The respective dimensions were proceeded for further analysis using Post-Hoc comparison test with Tukey-HSD.

Table 4.23
Result of ANOVA Analysis on IR Success Factors Dimensions among Age Group

		Sum of Squares	**df**	**Mean Square**	**F**	***p* value**
Knowledge Sharing	Between Groups	6.900	3	2.300	2.718	**0.045 ***
	Within Groups	214.077	253	0.846		
	Total	220.977	256			
Self-Archiving	Between Groups	10.401	3	3.467	2.467	0.063
	Within Groups	355.513	253	1.405		
	Total	365.914	256			
IR Usage	Between Groups	12.326	3	4.109	3.513	**0.016 ***
	Within Groups	295.918	253	1.170		
	Total	308.245	256			
IR Policy	Between Groups	2.724	3	0.908	0.624	0.600
	Within Groups	367.957	253	1.454		
	Total	370.680	256			
IR Procedure	Between Groups	3.669	3	1.223	0.767	0.513
	Within Groups	403.279	253	1.594		
	Total	406.948	256			
Copyright Awareness	Between Groups	7.649	3	2.550	3.019	**0.030 ***
	Within Groups	213.694	253	0.845		
	Total	221.343	256			
IR Performance	Between Groups	4.357	3	1.452	1.442	0.231
	Within Groups	254.857	253	1.007		
	Total	259.215	256			

*The test is significant at the 0.05 level.

Once the null hypotheses were supported for knowledge sharing, IR usage and copyright awareness, Post Hoc comparison test with Tukey HSD was used to determine

which grade group showed significant difference in the mean scores as outlined in the respective tables. From the results of Post-Hoc test, there was no significant difference in the mean scores in their perception on age group.

4.15.2 Comparison of Perception on IR Success Factors among Grade Group

Table 4.24 shows the results of One-Way Analysis of Variance (ANOVA) test analysis involving all IR success factors dimensions to determine whether the perceptions on these dimensions differ among respondents' grade group. From the results, the *p*-value for self-archiving ($p = 0.099$), IR usage ($p = 0.113$), IR policy ($p = 0.323$) and IR performance ($p = 0.439$) were not significant at 5% level ($p < 0.05$). However, the *p*-value for knowledge sharing ($p = 0.006$) and copyright awareness were significant at 5% level ($p > 0.05$). The respective dimensions were proceeded for further analysis using Post-Hoc comparison test with Tukey-HSD.

Table 4.24
Result of ANOVA Analysis on IR Success Factors Dimensions among Grade Group

		Sum of Squares	**df**	**Mean Square**	**F**	***p* value**
Knowledge Sharing	Between Groups	10.542	3	3.514	4.225	**0.006***
	Within Groups	210.435	253	0.832		
	Total	220.977	256			
Self-Archiving	Between Groups	8.936	3	2.979	2.111	0.099
	Within Groups	356.978	253	1.411		
	Total	365.914	256			
IR Usage	Between Groups	7.180	3	2.393	2.011	0.113
	Within Groups	301.064	253	1.190		
	Total	308.245	256			
IR Policy	Between Groups	5.063	3	1.688	1.168	0.323
	Within Groups	365.617	253	1.445		
	Total	370.680	256			
IR Procedure	Between Groups	4.248	3	1.416	0.890	0.447
	Within Groups	402.701	253	1.592		

	Total	406.948	256			
Copyright Awareness	Between Groups	7.078	3	2.359	2.786	**0.041***
	Within Groups	214.265	253	0.847		
	Total	221.343	256			
IR Performance	Between Groups	2.754	3	0.918	0.906	0.439
	Within Groups	256.461	253	1.014		
	Total	259.215	256			

*The test is significant at the 0.05 level.

Once the null hypotheses were supported for knowledge sharing and copyright awareness, Post-Hoc comparison test with Tukey HSD would be used to determine which grade group showed significant difference in the mean scores as outlined in the respective tables. For the knowledge sharing dimension, the result showed that the mean scores for those who had a grade VK (Professor) was significantly higher than those of grade DS 45, DS 51/52 and DS 53/54.

Table 4.25
Result of Post-Hoc Tukey HSD Analysis on Knowledge Sharing among Grade Group

Dependent Variable	**(I) Grade**	**(J) Grade**	**Mean Difference (I-J)**	**Sig**
Knowledge Sharing	DS 45	DS 51/52	.29796	.747
		DS 53/54	-.02004	1.000
		VK	-.48095	.607
	DS 51/52	DS 45	-.29796	.747
		DS 53/54	-.31800	.077
		VK	**-.77891***	.024
	DS 53/54	DS 45	.02004	1.000
		DS 51/52	.31800	.077
		VK	-.46091	.374
	VK	DS 45	.48095	.607
		DS 51/52	**.77891***	.024
		DS 53/54	.46091	.374

*The mean difference is significant at the 0.05 level.

4.15.3 Comparison of Perception on IR Success Factors among Institution Group

Table 4.26 shows the results of One-Way Analysis of Variance (ANOVA) test analysis involving all IR success factors dimensions to determine whether the perceptions on these dimensions differ among respondents' institution group. From the

results, none of the test was significant at 5% level ($p > 0.05$). It was concluded that there was no evidence of institution group difference in their perception on all IR success factor dimensions.

Table 4.26
Result of ANOVA Analysis on IR Success Factors Dimensions among Institution Group

		Sum of Squares	df	Mean Square	F	*p* value
Knowledge Sharing	Between Groups	6.593	4	1.648	1.937	0.105
	Within Groups	214.384	252	0.851		
	Total	220.977	256			
Self-Archiving	Between Groups	8.996	4	2.249	1.588	0.178
	Within Groups	356.918	252	1.416		
	Total	365.914	256			
IR Usage	Between Groups	4.844	4	1.211	1.006	0.405
	Within Groups	303.401	252	1.204		
	Total	308.245	256			
IR Policy	Between Groups	8.487	4	2.122	1.476	0.210
	Within Groups	362.193	252	1.437		
	Total	370.680	256			
IR Procedure	Between Groups	12.421	4	3.105	1.983	0.098
	Within Groups	394.528	252	1.566		
	Total	406.948	256			
Copyright Awareness	Between Groups	2.081	4	0.520	0.598	0.664
	Within Groups	219.262	252	0.870		
	Total	221.343	256			
IR Performanc	Between Groups	4.037	4	1.009	0.997	0.410

e	Within Groups	255.178	252	1.013		
	Total	259.215	256			

*The test is significant at the 0.05 level.

4.15.4 Comparison of perception on IR success factors among field of study group

Table 4.27 shows the results of One-Way Analysis of Variance (ANOVA) test analysis involving all IR success factors dimensions to determine whether the perceptions on these dimensions differ among respondents' field of success factors group. From the results, IR procedure was significant at 5% level ($p > 0.05$). It was concluded that, IR procedure ($p = 0.050$) is the only one dimension that was significant at 5% level ($p > 0.05$). The respective dimension was proceeded for further analysis using Post-Hoc comparison test which is Tukey-HSD.

Table 4.27
Result of ANOVA Analysis on IR Success Factors Dimensions among Field of Study Group

		Sum of Squares	df	Mean Square	F	Sig.
Knowledge Sharing	Between Groups	2.865	4	0.716	0.828	0.509
	Within Groups	218.112	252	0.866		
	Total	220.977	256			
Self-Archiving	Between Groups	8.992	4	2.248	1.587	0.178
	Within Groups	356.922	252	1.416		
	Total	365.914	256			
IR Usage	Between Groups	7.571	4	1.893	1.586	0.178
	Within Groups	300.674	252	1.193		
	Total	308.245	256			
IR Policy	Between Groups	8.480	4	2.120	1.475	0.210
	Within Groups	362.200	252	1.437		
	Total	370.680	256			

IR Procedure	Between Groups	14.942	4	3.736	2.401	**0.050***
	Within Groups	392.006	252	1.556		
	Total	406.948	256			
Copyright Awareness	Between Groups	3.280	4	0.820	0.948	0.437
	Within Groups	218.062	252	0.865		
	Total	221.343	256			
IR Performance	Between Groups	0.691	4	0.173	0.168	0.954
	Within Groups	258.523	252	1.026		
	Total	259.215	256			

Once the null hypotheses for the IR procedure were supported, a Post-Hoc comparison test with Tukey HSD would be used to determine which field of study group showed a significant difference in mean scores, as shown in the respective tables. According to the Post-Hoc test results, there was no significant difference in the mean scores in their perception of the field of study group.

4.16 Relationships between Success Factors of Institutional Repositories Dimensions and Institutional Repositories Performance

This section provides answer to Research Question iii: Are there relationships between success factors of institutional repositories dimensions and institutional repositories performance?

Table 4.28 shows the correlation between the success factors of dimensions (knowledge sharing, self-archiving, IR usage, IR policy, IR procedure, copyright awareness) and institutional repositories performance. The result showed that all the dimensions were correlated with the degree of weak to moderate correlation. The results indicated that knowledge sharing and IR usage was moderately correlated with institutional repositories performance ($p < 0.01$, $r = 0.648$) and IR usage was moderately correlated with institutional repositories performance ($p < 0.01$, $r = 0.547$).

However, the correlation between knowledge sharing and institutional repositories performance ($p < 0.01$, $r = 0.648$), self-archiving and institutional

repositories performance ($p < 0.01$, $r = 0.406$), IR usage and institutional repositories performance ($p < 0.01$, $r = 0.547$), IR policy and institutional repositories performance ($p < 0.01$, $r = 0.484$), IR procedure and institutional repositories performance ($p < 0.01$, $r = 0.444$) and copyright awareness and institutional repositories performance ($p < 0.01$, $r = 0.430$) were identified as having a weak correlation but significant ($p < 0.01$).

Table 4.28
Correlation between IR Success Factors and IR Performance

	KS	SA	IRU	POL	PRO	CA	IRP
Knowledge Sharing (KS)	1						
Self-Archiving (SA)	0.314**	1					
IR Usage (IRU)	0.385**	0.685**	1				
IR Policy (POL)	0.277**	0.689**	0.763**	1			
IR Procedure (PRO)	0.252**	0.707**	0.732**	0.797**	1		
Copyright Awareness (CA)	0.439**	0.229**	0.319**	0.250**	0.230**	1	
IR Performance (IRP)	**0.648****	**0.406****	**0.547****	**0.484****	**0.444****	**0.430****	**1**

**Correlation is significant at the 0.01 level (2-tailed).

4.17 Predictors of Success Factors of Institutional Repositories Dimensions that Measure Institutional Repositories Performance

This section provides answer to Research Question iv: What are the predictors of success factors of IR dimensions that measure institutional repositories performance?

Multiple regression analysis is a statistical technique that allows researchers to predict a variable's score based on the scores of several other variables. Stepwise methods were used in this regression analysis. The most sophisticated of these statistical methods is stepwise. Each variable is entered in turn and its value is calculated. The advantage of using the stepwise method is that it should always produce the most compact model. This could be useful if the researcher wanted to know how many variables would need to measure in order to predict the criterion variable. If adding the

variable contributes to the model's success, it is kept; however, all other variables in the model are re-tested to see if they are still contributing to the model's success. They are removed if they do not make a significant contribution. As a result, this method should ensure that the researcher ends up with the fewest number of predictor variables in the model.

Table 4.29 provides information about the dependent variable and independent variables involved in the regression model. The selection method of independent variables is also reported. In this example, the dependent variable involved in the study is Institutional Repository (IR) Performance whereas the independent variables are Knowledge Sharing, Self-Archiving, IR usage, IR Policy, IR procedure and Copyright Awareness. The selection method of independent variables used in this example is Stepwise. Stepwise method is a combination of forward selection method and backward elimination method. Table 4.29 also shows the criterion used to reject the stated null hypotheses when forward selection method (< = 0.050) or backward elimination (> = 0.100) is used.

Table 4.29
Multiple Regression Analysis: Variables Entered/Removed

Model	Variable Entered	Variable Removed	Method
1	Knowledge Sharing		. Stepwise (Criteria: Probability-of-F-to enter <=.050, Probability-of-F-to remove>=.100).
2	Self-Archiving		. Stepwise (Criteria: Probability-of-F-to enter <=.050, Probability-of-F-to remove>=.100).
3	IR Usage		. Stepwise (Criteria: Probability-of-F-to enter <=.050, Probability-of-F-to remove>=.100).
4	IR Policy		. Stepwise (Criteria: Probability-of-F-to enter <=.050, Probability-of-F-to remove>=.100).
5	IR Procedure		. Stepwise (Criteria: Probability-of-F-to enter <=.050, Probability-of-F-to remove>=.100).

6	Copyright Awareness	. Stepwise (Criteria: Probability-of-F-to enter <=.050, Probability-of-F-to remove>=.100).

a. Dependent Variable: Institutional Repositories Performance

Table 4.30 shows that the magnitude of the Pearson's correlation coefficient (*R*) for the linear relationship between dependent variable and independent variables is 0.742. The *R* value also represents the correlation coefficient for the relationship between the observed value of dependent variable and the estimated value of dependent variable based on the regression model produced. If the value of *R* is squared, another useful statistical value that is, the coefficient of determination (*R* square, *R2*) will be produced. The *R2* value (0.742 = 0.551) can provide information about the amount of variance in the dependent variable that can be explained by the independent variables based on the regression model produced. In this example, the independent variables, Knowledge Sharing, Self-Archiving, IR usage, IR Policy, IR procedure and Copyright Awareness can explain 55.1% of the variance in the dependent variable that is, Institutional Repositories Performance.

The value of Adjusted *R2* provides information about the amount of variance in the dependent variable that can be explained by the independent variable by using another set of data obtained from the same population. The value of Adjusted *R2* is usually equal or less than the actual value of *R2*. In this example, the value of Adjusted *R2* is 0.541 which is less than the actual value of *R2* that is, 0.551. On the other hand, the value of standard error of the estimate (0.68210) is the estimated variance of the dependent variable for each value of the independent variable.

Table 4.30
Multiple Regression Analysis : Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.742[a]	0.551	0.541	0.68210

a. Predictors: (Constant), Copyright_Awareness, Self_Archiving, Knowledge_Sharing, IR_Policy, IR_Usage, IR_Procedure

Table 4.31 shows that the 'Sum of squares of regression' is 142.900 whereas the

'Sum of squares of residual' is 116.314. Thus, the 'Total sum of squares' is 259.215 (142.900 + 116.314). The degrees of freedom for the numerator (4) is the number of parameters not including the constant whereas the degrees of freedom for the denominator (250) is obtained by using the formula (Number of samples - number of parameters not including the constant - 1). The value of the 'Mean squares of regression' is calculated by dividing the 'Sum of squares of regression' by the degrees of freedom for the numerator (142.900 / 6 = 23.817). The value of the 'Mean squares of residual' is calculated by dividing the 'Sum of squares of residual' by the degrees of freedom for the denominator (116.314 / 250 = 0.465). The value for F-ratio is calculated by dividing the value of 'Mean squares of regression' by the value of 'Mean squares of residual' (23.817 / 0.465 = 51.191).

Table 4.31
Multiple Regression Analysis : ANOVAa

Model		Sum of Squre	df	Mean Square	F	Sig.
1	Regression	142.900	6	23.817	51.191	.000b
Residual		116.314	250	.465		
Total		259.215	256			

a. Dependent Variable: Institutional Repositories Performance

b. Predictors: (Constant), Copyright_Awareness, Self_Archiving, Knowledge_Sharing, IR_Policy, IR_Usage, IR_Procedure

The value of the coefficient of determination, *R2* can be obtained by dividing the value of 'Sum of squares of regression' by the value of 'Total sum of squares' (142.900 / 259.215 = 0.551). On the other hand, the variance of dependent variable (IR performance) that cannot be explained by the independent variables can be calculated by dividing the value of 'Sum of squares of residual' by the value of 'Total sum of squares' (116.314 / 259.215 = 0.449) or 1 - 0.551 = 0.449.

Table 4.32 indicates that the value of B (unstandardised coefficients) for the constant, the slope of the independent variable, ‘Knowledge_Sharing’, ‘Self-Archiving’, ‘IR Usage’, ‘IR_Policy’, ‘IR Procedure’ and ‘Copyright_Awareness’ are 0.345, 0.521, -0.058, 0.179, 0.136, 0.058 and 0.124 respectively. For each set of data obtained from different samples in the same population, there will be a set of B value for the constant and the slope of the independent variables. The distribution of the value

of B for the constant and the slope of the independent variables are normal if the assumptions of regression are met. The standard deviation of the mentioned distribution of the value of B is known as the standard error. In this example, the value of the standard error for the constant and the slope of the independent variables are 0.326, 0.054, 0.055, 0.068, 0.066, 0.062 and 0.052 respectively.

Table 4.32
Multiple Regression Analysis : Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	*t*	Sig.
		B	**Std. Error**	**Beta**		
1	(Constant)	.345	.326		1.059	.290
	Knowledge_Sharing	.521	.054	.481	9.710	.000
	Self_Archiving	-.058	.055	-.069	-1.053	.293
	IR_Usage	.179	.068	.195	2.634	.009
	IR_Policy	.136	.066	.162	2.051	.041
	IR_Procedure	.058	.062	.073	.939	.349
	Copyright_Awareness	.124	.052	.114	2.382	.018

a. Dependent Variable: Institutional Repositories Performance

The *t* value is obtained by dividing the B value by its standard error. In this example, the *t* value for the constant is 1.059 (= 0.345 / 0.326) whereas the *t* value for the slope of the independent variable (Knowledge Sharing) is 9.710 (= 0.521 / 0.054). Table 4.32 indicates the summary of the t-Statistic and the significant relationship between variables. The *t* value for the slope of Self-Archiving is -1.053(= -0.058 / 0.055), IR Usage is 2.634 (0.179 / 0.068), IR Policy is 2.051 (0.136 / 0.066), IR Procedure is 0.939 (0.058 / 0.062) and Copyright Awareness is 2.382 (0.124 / 0.052). The *p* value for the constant of these independent variables are less than 0.005. Hence, the null hypotheses were rejected.

Those academicians who have attitudes and interest for knowledge sharing their research publication to institutional repositories platform, for each additional academician with knowledge sharing attitude, the average will increase 0.521% institutional repositories performance. These same factors also apply to the IR_Usage, IR_Policy. IR_Procedure, Copyright_Awareness, the average will increase 0.179% (IR usage), 0.136% (IR policy), 0.124% (Copyright awareness) and 0.058% (IR procedure)

to institutional repositories performance. However, for each additional academician with self-archiving their articles to institutional repositories, it will decrease -0.058% performance to IR.

There exists adequate evidence to conclude that Knowledge Sharing, IR_Usage, IR_Policy and Copyright_Awareness are significant predictors in measuring IR performance.

Table 4.33
Multiple Regression Analysis: Summary of the *t*-Statistic

Variables	t-Statistic	Significant	Relationship
Knowledge_Sharing	9.710	< 0.05	Significant
IR_Usage	2.634	< 0.05	Significant
IR_Policy	2.051	< 0.05	Significant
Copyright_Awareness	2.382	< 0.05	Significant

4.18 Summary of Hypotheses Test

Table 4.34
Summary of Significant Research Hypotheses

Hypotheses No	Research Hypotheses
H3	There is a significant difference regarding knowledge sharing among age group.
H8	There is a significant difference regarding copyright awareness among age group.
H9	There is a significant difference regarding knowledge sharing among grade group.
H14	There is a significant difference regarding copyright awareness among grade group.
H25	There is a significant difference regarding IR procedure among field of study group.
H27	There is a significant relationship between knowledge sharing and IR performance.
H28	There is a significant relationship between self-archiving and IR performance.
H29	There is a significant relationship between IR usage and IR

	performance.
H30	There is a significant relationship between IR policy and IR performance.
H31	There is a significant relationship between IR procedure and IR performance.
H32	There is a significant relationship between copyright awareness and IR performance.
H33	Knowledge sharing is a significant predictor on IR performance
H35	IR usage is a significant predictor on IR performance
H36	IR policy is a significant predictor on IR performance
H38	Copyright awareness is a significant predictor on IR performance

4.19 Conclusion

This chapter described the data analysis and interpretation for all data collected in this study. Essentially, this chapter has presented all components of the main findings and analyses derived from data collection during the research process. Descriptive and inferential statistics were used to answer all the research questions and tested the hypotheses developed for this study. This contributed to the primary goals of this study. This chapter focuses on several findings and discussions that will help to support this research. For this study, a quantitative approach was used. Descriptive statistics, independent-samples *t*-test, one-way analysis of variance (ANOVA), Pearson's coefficient correlation and multiple regression analysis are among the statistical analyses performed.

Based on the findings discussed, this research outcome has supported all the hypotheses proposed during earlier stages of this research. The 38 hypotheses were tested and proven positive outcome with six independent variables that have significant relationships with the librarian service performance. The summary of this chapter is outlined as follows:

1) Response rate: 72% of response rate where 357 questionnaires were distributed and 257 were returned.

2) Reliability analysis: All variables were valid and reliable as measured using Cronbach' Alpha technique.

3) Descriptive analysis: Overall means recorded more than 4.60 for all items in each variable. It reflected that respondents agreed with the developed characteristics to measure variables.

4) Pearson correlation analysis: All hypotheses were accepted and the scores indicated the significant relationships among variables.

5) Multiple regression analysis: All independent variables were related and had been identified as predictors to this research. The R2 value of 0.551 would provide information about the amount of variance in the dependent variable that would be explained by the independent variables based on the regression model produced.

CHAPTER FIVE
DISCUSSIONS AND CONCLUSION

5.1 Introduction

Based on the findings of the data analyses, this chapter provides a summary of the study findings, discussions and recommendations. Success factors of Institutional Repositories (IR) are important, especially for academic libraries in providing high quality library and institutional repositories resources. This study attempts to elucidate the key factors for measuring performance of the institutional repositories services in the Malaysian academic libraries. Specifically, it seeks to gauge several factors such as knowledge sharing attitude, self-archiving activities, usage, policy, procedure related to IR and copyright awareness among academicians. Libraries are the most important functional department in universities. Institutional repositories have an impact on the performance of library services in supporting the research, teaching and learning activities. At the end of this chapter, the researcher gives some ideas and suggestions for the next research to enhance the quantity and quality outputs related to measuring the institutional repositories performance in the context of Malaysia academic libraries.

5.2 Summary of the Study

The objectives of this quantitative research were to get the respondents' opinion and understanding on their perceptions towards success factors of institutional repositories and its performance especially in the Malaysian academic libraries' context. A set of questionnaire was used to collect data from respondents, which was then quantitatively analysed using the Statistical Package for Social Sciences (SPSS) version 22.

The conclusions are discussed based on the four questions which are:

a) What are the perceptions of academicians on the success factors of IR (knowledge sharing, self-archiving, IR usage, IR policy, IR procedure and copyright awareness) and its IR performance in Malaysian academic libraries?

b) Are there differences on the success factors of IR in terms of age, gender, grade, education level, service, institution and field of study?

c) Are there relationships between the success factors of IR (knowledge sharing, self-archiving, IR usage, IR policy, IR procedure and copyright awareness) and its IR performance?

d) What are the predictors of success factors that measure IR performance?

The purpose of this research is to look into the factors that contribute to the success of institutional repositories in Malaysian academic libraries. The study's other purpose was to review and synthesise literature relevant to the framework and findings of previous research. The researcher discovered no previous research on a similar topic that was being conducted. Although there have been a few studies on the success factors of institutional repositories, the studies have been focused on the development and implementation of institutional repositories (Lagzian et al., 2013; Lagzian et al., 2015a; Lagzian et al., 2015b; Singeh et al., 2013; Singeh et al., 2020) and mostly their respondents were librarians and repository manager. Their findings were from the perceptions of repository managers and repository librarians that managed all the process and services related to institutional repositories.

In the context of the institutional repositories platform, there have been no studies on the measuring performance of institutional repositories especially in academic libraries. Through library search, most articles either subscriptions or open access retrieved, discussed more on strategies, planning, implementation and development of institutional repositories system or platform compared to measuring the performance of repository itself. Shearer (2003) argued that the concept of institutional repositories were designed as an institutional-based compared to those disciplinary repositories like online databases. The normal criteria for measuring the system performance may or may not be different between the two types of repositories whereby the indicators for measuring system performance such as hit access, usage, country, user satisfactions, system interface and others.

A comprehensive research design was used to gather the information needed to answer the above-mentioned research questions and test the 38 hypotheses in the study. The quantitative method was used to collect data, with a questionnaire serving as the instrument. Respondents for this study were academicians from five Malaysian research universities. The research universities were Universiti Malaya (UM), Universiti Sains Malaysia (USM), Universiti Teknologi Malaysia (UTM), Universiti Putra Malaysia

(UPM) and Universiti Kebangsaan Malaysia (UKM).

The questionnaires used in the quantitative approach were designed to measure all variables while also taking reliability and validity into account to improve its quality. The questionnaires were piloted before being distributed to a sample of 357 (n = 357) academicians based on the Random Number Generator's selection. Academicians with grades ranging from DS45 to VK (Professor) were selected as respondents. With 257 replies (n = 357), the response rate was 72 percent. The questionnaires that were returned were all used and analysed. SPSS version 22 was used to analyse the data statistically.

To reduce the data to a more manageable set, factor analysis techniques were used. Descriptive statistics were used to generate frequency distributions for all variables in the qualitative data set of the respondents' profiles. To obtain the highest ranking of variables, mean ranking was used. The independent-samples t-test was the appropriate statistical test to use in this analysis because it involved two groups of respondents (gender and education level). A one-way analysis of variance (ANOVA) was used to compare mean differences among age, gender, duration served in the organisation (years), institution names and field of study, followed by a post-hoc test using Tukey-HSD. Pearson's correlation coefficient tests were used to determine and quantify the strength of relationships between independent and dependent variables. Finally, multiple regression was used to determine which dimensions were the best predictors of the dependent variable.

The quantitative data analysis and its findings were discussed in Chapter Four. It began with a description of the results of the reliability test and factor analysis in the quantitative approach. The results of the respondent profiles were reported. This chapter also described statistical techniques and significance testing, as well as analysed and interpreted the study data. The results of a one-way analysis of variance (ANOVA) and independent-samples t-test were analysed, interpreted and reported in the findings. Finally, this chapter presented the findings of a statistical correlation between institutional repository success factors and institutional repository performance.

The summary of the entire study was presented in Chapter Five. The chapter included discussions on the findings, the study's implications, suggestions based on the findings, contribution of the study, research limitations, recommendation for future research and, finally, the conclusion.

5.3 Discussion of Findings

The study achieved on overall response rate of 72 %. The sample comprises academicians' grade DS 45, DS 51/52, DS 53/54 and grade VK (Professor) for five research universities that consists of Universiti Malaya (UM), Universiti Sains Malaysia (USM), Universiti Teknologi Malaysia (UTM), Universiti Putra Malaysia (UPM) and Universiti Kebangsaan Malaysia (UKM). The sample also consists of various fields such as social science, science and technology, business and administration, art and humanities and others from academicians who have served the universities from the first year until more than 30 years.

5.3.1 Perceptions on Success Factors of Institutional Repositories (IR) and Institutional Repositories Performance

The descriptive analysis reports the respondents' perceptions on the six institutional repositories success factors dimensions and institutional repositories performance. The scores were arranged in descending order, with the highest mean indicating the most preferred response. Knowledge sharing received the highest mean score (5.80), followed by IR performance (5.67), Copyright awareness (5.66), IR usage (5.12), IR policy (4.97), IR procedure (4.90) and Self-archiving (4.90). (4.82). Thus, among the other dimensions, knowledge sharing was regarded as the most preferred response. It showed that, knowledge sharing attitude is an important element of success factors criteria in measuring the institutional repositories performance.

5.3.1.1 Perceptions on Knowledge Sharing

Libraries may performe better in managing and sharing research output than most other industries. To share the research publication that was conducted by university communities, it is not impossible through institutional repositories. Resources in institutional repositories will connect users through Internet to the worldwide access. The present study indicated on average score on the knowledge sharing dimension where the respondents moderately agreed towards their knowledge sharing attitude. The mean scores for the seven individual items ranged from 5.69 (I agree that knowledge sharing through IR increases academicians' prestige) to 5.89 (I

agree that knowledge sharing through IR increases communication research output), indicating a moderately positive perception of their knowledge sharing activities. The findings also revealed that the majority of respondents agreed that sharing research output via IR will increase communication research output, readership and total citation.

Similarly, Abrizah et al. (2015) found that many academicians in their study agreed on the authoritative advantage. Respondents believed that sharing contents in open access repositories enhance the author's prospect and credibility. Library Information Science (LIS) academicians admitted that through knowledge sharing repositories contents between institutions will make well known authors and earned the prestigious academic career in information management field. Indirectly, it will give good reputation and it can promote institutions for example, UiTM to achieve the research university status and make the library information science profession and researchers great and scholarly. Cage and Higgins (2000) as well as Rieh (2002) found the same findings based on the following issues such as well known, scholarly, credible and expertise in their field of research.

IR platform is also significant to be considered as a platform for publishing the research articles. Farida et al. (2015) strongly agreed that with cultivating the knowledge sharing activities, it will give more benefit to the scholars and nation, not only at national level, but also at the international level. Abrizah et al. (2015) also found in their research on resource sharing through inter-institutional repositories that the respondents among academics from three schools of Library Information Science (LIS) in Malaysia tend to agree on their interest to deposit research resources to the institution's repositories. However, a small number of respondents disagree to share their resources through institutional repositories because of time consuming. The motivational statements indicated a pleasant response from all LIS respondents.

Kim (2011) found that academicians were motivated to share their research articles through institutional repositories because of their belief that the contents in the repositories were easy to access by others anytime and anywhere. The platform itself provides the advantages to the content contributors in terms of increased readership and communication research output at national and international levels (Farida et al., 2015). Similarly, respondents were generally satisfied with the services offered by institutional repositories that will increase many aspects such as readership, communication research output, citations, author level metric index (H-index), collaboration of researchers among universities and bring more prestige among academicians. The findings for this

study found that respondents believe that knowledge sharing in institutional repositories are able to increase their communication research output (mean = 5.89) and readership (mean = 5.85). Both mean scores were among top two highest scores in knowledge sharing dimension.

The mean scores of the seven individual items in knowledge sharing dimensions are ranged from 5.69 to 5.89, hence, also indicating a moderate positive perception towards their knowledge sharing activities. When every researcher contributes their articles to university's IR, it is representing the universities corporate memory and at the same time providing a good knowledge sharing network among university communities, Malaysian universities and foreign universities scholars (Farida, Tjakraatmadja, Firma & Basuki, 2015).

Besides that, the findings were aligned with Venkatesh et al. (2003) who mentioned that among the motivating factors for researchers and academic faculties sharing their research outputs to institutional repositories were related to the enhancing of their personal H index performance and key performance indicator (KPI) for their academic profession. Concurrently, institutional repositories help academicians and researchers in enhancing their total publication citations, research performance via dissemination of research articles and opportunity in collaboration with other researchers from various universities and field of interest. According to Farida et al. (2015), institutional repositories that have been implemented have a high potential to be knowledge resources that must be properly coordinated in order to facilitate access and knowledge sharing.

5.3.1.2 Perceptions on Self-Archiving

Self-archiving is an action taken by the academicians in depositing their research articles to the institutional repositories. Based on the research conducted by Majunatha and Thandavamoorty (2011) as well as Abrizah et al. (2015) they found that academicians and researchers were interested and highly motivated to deposit their research findings to the university's institutional repository and other university's repositories. Through this study, mean scores for seven items related to self-archiving dimension are ranged from 4.42 to 4.92. However, two individual items were indicated moderate positive perception; *My library promotes a cultural environment within the organisation that supports a high number of resources in the IR* (5.11) and *My library*

encourages staff to deposit their publications in IR (5.02). These findings are aligned with Joo et al. (2019) who stated that academic libraries need to be more actively promoting the benefit of sharing their research output and encouraging their researchers and university members to self-archiving to universities' IR. Libraries have important roles to increase the content development of the IR through educating researchers about the open access and its benefits to be visible worldwide (Bonilla-Calero, 2014).

Through their research on understanding institutional repositories in higher learning institutions, Asadi et al. (2019b) discovered that self-archiving to institutional repositories was regarded as a second important factor and reason for universities to deposit their research outputs after dissemination of digital content through institutional repositories. This finding is consistent with the findings of Singeh, Abrizah and Karim (2013), who discovered that 65 % of academic researchers agreed to deposit their final research output to the university's institutional repositories for wider benefits.The following factors are reputations impact, collect, organise and preservation of digital contents that are considered as factors that academician considered to commit to university's institutional repositories.

The academicians highly expected that through their commitment in self-archiving to institutional repositories platform they can get more advantages and benefits especially for their personal research performance and at the same time bring their name and research more prestige in academic landscape (Abrizah et al., 2015; Venkatesh et al., 2003). Lawal (2002) found that through self-archiving and sharing to institutional repositories, academicians noted that their research outputs were visible and exposed to the scholarly world-wide communities. Pelizzari (2005) found that academicians from social science background had positive perceptions to deposit their open access articles only to institutional repositories. Through self-deposit and sharing contents in the institutional repositories, it will protect modification by other researchers to their articles deposited.

5.3.1.3 Perceptions on Institutional Repositories Usage

The performance of institutional repositories can be seen through the way institutional repositories have been designed. Institutional repositories must have features like user friendly interface, keyword suggestions, clear results searching and important information source to assist researchers. Ukwoma and Okafor (2017) found

that Dspace software for institutional repositories system provides a simple system interface and friendly to the library users in the context of viewing and accessing to Dspace contents and retrieving repository collections. The Dspace system designed and organised their structure of the system properly by community level, sub-community level and aggregation level. In a simple explanation, the structure of Dspace system was organised according to the faculty (community level), department (sub-community level) and type of content (aggregation level).

In this study, the academician's perceptions on the institutional repositories of university that provides a user-friendly interface obtained the highest mean (5.26) in the dimension of institutional repositories usage. The finding is also consistent when it points out that IR system must be simple and make it easy to ensure library users are interested in using it. The finding is aligned with the findings of Manjunatha and Thandavamoorthy (2011) whereby IR systems has suggestion keyword for the search term that was entered by institutional repositories users with mean score (5.24) and for clear search results pages (5.23). This finding revealed that IR university is an important platform in providing literature sources to assist other researchers in conducting a new research.

The previous study by Makori et al. (2015) affirmed that the key success factors of institutional repositories usage were the quality of content itself. With the high-quality sources that was collected and provided by the library, the perceptions of academicians are highly positive and motivated in using their university's IR as a source of references in their research activities. Davis and Connolly (2007) in their research on perceptions of faculty members toward Cornell's Dspace usage found that the usage was limited and underpopulated among faculties members. The scenarios happen because of insufficient knowledge in the Cornell' Dspace institutional repository to support their faculty members need in the research activities.

Manjunatha and Thandavamoorty (2011) mentioned that simplicity and ease of use are significant factors to attract the institutional repositories users to utilise this repository technology. Through the powerful repository technology that was adopted, it will reduce the users time in searching and retrieving the full text. The effective software and technology will highly attract to the usage of institutional repositories. Academicians viewed that institutional repositories system mirrored the concept of online database subscribed by the academic libraries (Cullen & Chawner, 2010).

The findings revealed that academicians' perception on *Institutional*

repositories of my university systems have fast browsing speed to encourage people to use it more is moderately positive (mean = 5.11). It is supported by Joo et al. (2019) as well as Macha and Jager (2011) who highlighted that repository manager should take into consideration in adopting search engine platform to ensure that institutional repositories contents provide fast indexed by search engine optimisation (SEQ). SEQ technique will help improve the performance of institutional repositories portal to increase the visibility of contents when library users search through other search engines such as Google, Yahoo, Bing and others (Onaifo & Rasmussen, 2013; Arlitsch et al. 2013; Arlitsh & O'Brien, 2012; Macha & Jager, 2011).

Besides that, institutional repositories platforms must be equipped with reporting statistics and dashboard in terms of hit access, location, time, view article and download the full text (Serrano-vicente et al., 2018). This kind of data is significant in monitoring the performance of repository contents and researchers themselves. This implies that the library and university are dependent on usage statistics in decision-making especially in convincing the top management in getting approval for university grants, research area, subscription online database, purchasing e-books and other digital contents to support the core business of university in teaching, learning and research agenda.

5.3.1.4 Perceptions on Institutional Repositories Policy

Policy development process has begun before the selected and development of the IR platform or system (Riddle, 2015). Institutional repositories policy is a significant documentation in development and implementation of repository platform for a university. The institutional repository policy is considered as a documentation to guide repository managers in the development and implementation of a repository to achieve the university's vision and mission. All elements that are related to the institutional repositories such as types of repository's content to accept or reject, copyright management, rules and procedures for self-archiving and content deposit, access right to the institutional repositories contents and others are comprehensively documented (Asamoah-Hassan, 2010).

The significance of institutional repositories policy is to ensure that each process in the repository system works as configured. The institutional repository system will operate as per stipulated by the top management of the university in the

documented policy. The respondent' perception with the statement 'My institution establishes IR policy to make scholarly materials available for the future' has the highest mean score (5.06) in the IR policy dimension and followed by the statement 'My institution establishes IR policy to provide access to digital resources' (mean = 5.05) and 'My institution develops a policy to guide the collection of university contents' (mean = 5.00). These findings are aligned with Joo et al. (2019) that mentioned libraries are responsible in developing policy on the access management and ownership to each content uploaded into the university's institutional repositories. With the proper and complete policy, it simplifies librarians' task in monitoring the status of the content uploaded whether it is open access status or under copyright (Serrano-Vicente et al., 2018).

Cayabyab (2015) highlighted that policy imposition played a significant role in the implementation of institutional repositories project. Most of the previous research especially on the adoption, expansion and implementation of electronic thesis and dissertation repositories found the gap in implementation of the policy initiatives. Most of them reported the absence in providing the comprehensive policies in managing the institutional repositories and electronic theses and dissertations repository (Corletey, 2011; Sengupta, 2014; Baro, Godfrey & Eze, 2014; Baro & Otiode, 2014).

Salau, Oyedum, Abifarin, Udoudoh and Alhassan (2020) found that based on previous literature review, it was highlighted that the success or failure of institutional repositories project in several countries and in the context of higher institution is normally lacking and inadequate of mandatory submission policy. This is aligned with Ashikuzzaman (2018) and Jain (2011) who mentioned that without a clear institutional repositories policy, there will be a constraint in the development and implementation of the institutional repositories. It reflected to the content development, self-archiving activities, access to the digital contents, copyright management, preservation strategies and even measurement performance itself. Universities need to endorse and implement institutional repositories policies to assure the increase in the development of open access contents. This is one of the basic strategies to improve and enhance open access approach among scholarly communities (Singeh et al., 2013). Harnad, Brody, Vallières, Carr, Hitchcock, Gingras, Oppenheim, Stamerjohanns and Hilf (2004) stressed that through self-archiving policies, it also boosts to enhance the open access full-text available in the institutional repositories.

Gadd, Oppenheim and Probets (2003) noticed that Loughborough University

(UK) has developed one project known as RoMEO or Rights Metadata for Open Archiving in order to analyse the details of copyright transfer agreement content between authors and publisher. Nottingham University (UK) upgraded the existing version to the latest version and known as SHERPA/RoMEO. The upgraded version project was funded by JISC to develop a SHERPA/RoMEO portal with additional features in order to verify the status of articles and journals based on classified four types of colour. The four types of colours were highlighted with different meaning and status (Hernández, 2006). For examples, green colour means author got permission to deposit the pre-print and post print version files to institutional repositories, blue colour means author has gained permission to deposit the post print version file, yellow colour means author has gained permission to deposit the pre-print version file and white colour means author has gained no permission to deposit their article (pre-print or post print) to institutional repositories.

Kim (2006) discovered that grant funders as well as university or research departmental actions can influence scholars' decisions to support open access initiatives at the university, national and international levels. Swan and Brown (2005), Miller (2006), Kim (2006) and Sale (2006) emphasised the importance of institutional repositories policy and mandating self-archiving in increasing the statistic of institutional repositories contents recruitment and usage. At the same time, the policy will allow academicians and researchers to deposit their own research materials in the institutional repository of their university.

In the context of preservation of institutional repositories content, universities and libraries must have a master plan for digital preservation in line with institutional repositories policy. The academicians quite agreed to the digital preservation strategies to make sure that their research outputs are made visible and easy to access for future users and for a long time. Genoni (2004) highlighted that library has accepted and documented their roles and responsibility in the context of conservation and preservation of library materials in collection development policies. Therefore, this requires a good library management and practices, because previously some libraries had exercised collection assessment to draw out their collections for certain reasons. However in the digital repository the world libraries will now take the responsibility to make visible their collections for a long period of time.

5.3.1.5 Perceptions on Institutional Repositories Procedure

Institutional repositories procedure is a rule and detailed process that is required at the operational level to ensure all the activities are in line with the institutional repositories policy. A procedure is divided into two types of categories whether the operational practices are formal or informal specifically for the library or throughout the university. Basically, the statement in the policy is related to "what" the institution does operationally, then in the procedure is to state "how", it means to implement the operational policy statement.

Institutional repositories procedure is a comprehensive documentation that contains detailed information such as content development guidelines, type of repository content, metadata schema and copyright guideline to ensure that all rules and regulations are tied to the content of institutional repository and can be managed properly and utilised without any contradiction with a copyright issues (Makori et al., 2015).

The academicians perception on ‘the library conducts procedures for successful implementation institutional repositories’ has the highest mean score (5.00) and followed by the statement ‘the library provides procedure to self-archiving their content in the IR has the second highest mean score (4.95). Based on both findings above, IR’ procedure is considered as a significant element in order to ensure that repository system is operated properly (Serrano-Vicente et al., 2018). Through the IR procedure dimensions, it will help library users and depositors to contribute their research output with systematic guidelines.

Joo et al. (2019) agreed that with standardised guideline and procedure for depositing their research outputs to the university institutional repositories, authors will understand more about their rights and limitations as per mentioned in the copyright agreement between authors and publishers, authors and libraries and other scholarly platforms like ResearchGate, LinkedIn, Google Scholars and others. Through comprehensive institutional repositories procedure, library users clearly understood the rules in utilisation of institutional repositories contents. Concurrently, academicians also understood their roles as content contributor to the repository and their requirements in the depositing process like metadata to be provided, content type and format file as well as other issues related to copyright (Makori et al., 2015).

5.3.1.6 Perceptions on Copyright Awareness

Copyright and intellectual property are important elements that library manager needs to think carefully when it comes to implementation of institutional repositories platform and managing the universities research outputs. According to John-Okeke (2008), understanding copyright issues is critical to building institutional repositories. If this issue is not handled properly, it can be an obstacle for the success of IR implementations. Institutional repositories were proposed as a solution to scholarly communication platform in academia environment. In managing institutional repositories contents, library had to take responsibility as advisory in obtaining the accessing rights from university communities such as academicians, researchers and university's publisher to promote, organise and disseminate their outputs locally or internationally through open access concept (Vassilakaki & Moniarou-Papaconstantinou, 2015; Singeh et al., 2013).

Academicians and researchers are concerned with the issues of copyright and intellectual properties. Based on the findings, mean score on the plagiarism concern is the highest (mean = 6.02) in the copyright awareness dimension and followed by the understanding with other publishers has authority in owning the copyright (mean = 5.79). The findings were aligned with Vassilakaki and Moniarou-Papaconstantinou (2015) who suggested that librarians had to take on roles as copyright advisors to the library users especially to new researchers and faculty members. In the context of research university environment, libraries and librarians have been seen significant as an owner and specialised in institutional repositories system.

This finding is different from the view of Hammad (2016) who said that once articles had been submitted to publishers, the copyright was under publisher and if uploaded to IR platform it will violate publisher's agreement. Libraries as owner of institutional repositories system should discover better approaches to understand and explain to their communities on the advantages and limitations of copyright to the author. Based on that, repository administrators should discover better approaches to reconcile with publishers (Singeh et al., 2013).

With the awareness programme and initiatives provided by the libraries, academicians will get the big picture clearly in their actions on what they can do and do not with their research articles. Vassilakaki and Moniarou-Papaconstantinou (2015) also agreed that librarians had to take this responsibility as copyright librarian or

copyright advisors in advising their faculty members on all issues that were related to copyright and intellectual properties. Most researchers do not understand clearly about copyright issues, although publishers allow author to deposit publisher version to personal website and university's IR (Singeh et al., 2013). Nevertheless, Simons and Richardson (2012) mentioned that managing copyright is an obvious skill for the repository staff but through engagement between libraries and publishers in online databases subscription, all the information and issues that are related to copyright infringement rules are easy to handle and share among academicians and researchers in proper manner.

5.3.1.7 Perceptions on Institutional Repositories Performance

The institutional repository platform is able to give an impact on researchers such as increase their visibility, more exposure on research impact of authors world-wide sharing and concurrently help authors to organise and preserve their research outputs in a long term. The findings are consistent with Asadi et al. (2019b) that implemented institutional repositories by the academic libraries had several purposes. One of them is to archive the research scholar outputs produced by its community members and researchers. Through self-archiving and uploading the research findings to the institutional repositories, universities will get more benefits and advantages to the research performance, especially visible for research collaborations with other researchers from different fields and universities. This is consistent with the findings by Cullen and Chawner (2011), Li (2011), Kim (2007) as well as Foster and Gibbons (2005) whereby the respondents believed that the visibility and recognition for their works can be reached through sharing resources online.

Aligned with Abrizah et al. (2015) they found that through their conducted study, library information science academicians agreed that sharing their research output resources through institutional repositories had highly-brought reputation for academicians' career especially in the aspect of research and expertise. They are very confident with the value and benefits of institutional repositories for themselves. With the concept of institutional repositories for dissemination purpose, their sharing resources are easy to share and access world-wide through the Internet. Concurrently, there is an increase in readership, communication of the research findings, research collaborations among locals and international universities, more research grants and

citations.

Findings also suggest that social influence, defined in this current work as the extent to which authors are influenced to share knowledge by peers or fellow researchers and universities, as well as the extent to which authors can influence peers to share their research knowledge, motivate the sharing of profiles and intellectual resources in institutional repositories platforms (Abrizah et al., 2015; Venkatesh et al., 2003).

Besides that, institutional repositories have exposed the university's productivity to the outside community members. This repositories platform also gives impacts and advantages to the universities especially in the context of university ranking platform for new mode of scholarly communication, new mode of scholarly publishing and dissemination platform for scholarly research (Asadi et al., 2019b). Other than that, institutional repositories assist in globalisation of Malaysian research outputs and open for international collaborations among researchers to the world-wide. These findings are consistent with Ukwoma and Dike (2017) who highlighted that IR helps academic institutions to distribute research results to the global research community, enhance community development and open up new situations for collaboration in research at the national and international levels.

Okumu (2015) mentioned that institutional repositories are able to enhance the influence on research productivity, transform in the academic publishing paradigm and increase internal relationships and collaboration researchers within academic institution world-wide. Moreover, Nagra (2012) pointed out that via institutional repositories, it allowed archiving all the academic research grant and institutional studies, which make it possible for universities to discover and provide existing and previous research project findings in a centralised system and also known as one-stop centre in maintaining university research repository.

Institutional repositories are able to improve the quality, value, or extent of scholarships through research collaboration and sharing. Basically, institutional repositories is an essential platform for the dissemination, teaching and sharing of research findings in higher education institution as a new knowledge. In addition, by using this platform, the academic libraries are able to disseminate the idea and knowledge that has been conducted through scientific studies. This new scholarly communication platform formed as a new culture and environment for research partnership and concurrently promote community outreach at domestic and

international levels (Okumu, 2015).

Anunobi and Okoye (2008) considered that institutional repositories are alternative solution and method to reduce the cost of published articles and concurrently increase the visibility of academic research in open access platform. Christian (2009) revealed that most researchers write and publish article with the aims for promotion, teamwork in writing group, trying to index by prestige journal, interested to find something in details and other aspects. Based on the highlighted aims, institutional repositories can be applied for the various purposes including for publishing scientific research work, providing latest information and knowledge, uploading and downloading digital resources based on the scholar's interest via web application provided by academic libraries.

Bonilla-Calero (2014) agreed with the statement that institutional repositories promote the global ranking of universities. Institutional repositories can be considered as one of the tools in evaluating the university research performance and at the same time can also be used to evaluate the university ranking. Research highlighted the benefits of institutional repositories in order to evaluate universities in different aspects such as (1) platform for centralisation and preservation of university research findings in different format, (2) increase in knowledge sharing and dissemination of research findings world-wide through Internet services, (3) connect with various format files and documents such as video, graphics, sound and text and (4) added value to the institutional repository services. The institutional repositories platforms were embedded with the statistical access and citation information features. It is significant in measuring the quantity, quality, visibility, citations, research collaboration, disciplines and researchers, (5) capable of determining and detecting scientific connections, (6) enable repository managers and policymakers to identify and evaluate more types of documents such as monographs, theses, conference papers and others when compared to traditional services relying solely on journal outputs this, in turn, means that subject areas such as engineering, social sciences and humanities, which have traditionally been underserved by services such as the Web of Science and (7) using an IR, people can evaluate scholarly outputs from various perspectives, using multidimensional approaches that combine various factors rather than simple journal article counts and citation counts.

5.3.2 Differences in Perceptions between Sub-samples

5.3.2.1 Independent-Samples t-Test on Success Factors of Institutional Repositories Dimensions between Gender and Education Level

After performing the independent-samples *t*-test on the success factors of IR dimensions (knowledge sharing, self-archiving, IR usage, IR policy, IR procedure and copyright awareness) between gender (male and female) and education level, it was found that all the dimensions on gender and education level was not significant at the 5% level ($p > 0.05$). This is also evident in the study conducted by Masor and Kassim (2020) that there was no evidence of gender and education level differences in the academicians' perception on knowledge sharing. This implied that academicians who hold Master and PhD qualifications have the same perceptions and understanding on success factors of IR dimensions.

5.3.2.2 ANOVA Analysis on Success Factors Dimensions among Age Group, Grade, Duration Served in the Organisations (Years), Institution Name and Field of Studies

The result from one-way analysis of variance (ANOVA) showed that there was no statistically significant difference on self-archiving ($p = 0.063$), IR policy ($p = 0.600$), IR procedure ($p = 0.513$) and IR performance ($p = 0.231$) dimensions among age group. However, knowledge sharing ($p = 0.045$), IR usage ($p = 0.016$) and copyright awareness ($p = 0.030$) were significant at 5% level ($p < 0.05$). It can be concluded that there was evidence of age group difference in their perception on three success factors' dimensions (knowledge sharing, IR usage and copyright awareness).

In terms of success factors among grade group, self-archiving, IR usage, IR policy and IR performance were not significant. Knowledge sharing ($p = 0.006$) and copyright awareness ($p = 0.041$) were signified that all the academicians with different level of grade group have different perceptions on all of the success factors dimensions. It was implied that for those who had a grade VK (Professor) they are very highly motivated in sharing their research outputs to be visible in the university's IR compared to senior and junior lecturers. Most of VK (Professor) levels are not worried about the copyright issues, they are more concerned about the results of utilisation.

In the context of respondents' institution, none of the test is significant at 5% level ($p > 0.05$). It can be concluded that there was no evidence of difference on institution and field of study's group in their perception on IR success factors dimensions. Besides, IR procedure ($p = 0.050$) is the only one dimension that was significant in the field of the study group and then proceeded to further analysis using Tukey HSD.

5.3.3 Analysis on Relationship

In this analysis, six dimensions of IR success factors which were the products of factor analysis were correlated with the IR Performance dimension to examine the degree of relationship. The six success factors dimensions were: *knowledge sharing, self-archiving, IR usage, IR policy, IR procedure* and *copyright awar*eness. Based on the findings, all dimensions were correlated with the degree of weak to moderate correlation.

Knowledge sharing ($p < 0.01$, $r = 0.648$) and IR usage ($p < 0.01$, $r = 0.547$) were moderately correlated with IR performance. It shows a good signal and positive impact among university academicians on familiarity and being committed with sharing and using IR contents. Majority of them are from science, technology, art and medicine faculties and have positive attitude towards open access for their research outputs (Manjunatha & Thandavarmoorthy, 2011).

The other dimensions of success factors which are self-archiving ($p < 0.01$, $r = 0.406$), IR policy ($p < 0.01$, $r = 0.484$), IR procedure ($p < 0.01$, $r = 0.444$) and copyright awareness ($p < 0.01$, $r = 0.430$) were identified as weak correlations but still significant ($p < 0.01$) to IR performance dimension.

5.3.4 Analysis on Multiple Regression Analysis

In this analysis, success factors of institutional repositories dimensions were found to be the significant predictor on measuring institutional repositories performance. The results of stepwise regression analysis for the prediction of the institutional repositories performance through the success factors of institutional repositories dimensions indicated that knowledge sharing, institutional repositories usage, institutional repositories policy and copyright awareness were found to be the

strong predictors for the institutional repositories performance and played a considerable role in predicting it. The independent variables, *Knowledge Sharing, Self-Archiving, IR usage, IR Policy, IR procedure and Copyright Awareness* can explain 55.1% of the variance in the dependent variable that is librarians' service performance. This implied that the remaining 44.9% of the dependent variable might be explained by other variables and not included in the study. For example, if more factors or variables are added to the model that is useful to explain dependent variable (institutional repositories performance), then more variation can be explained and a better model for predicting the dependent variable can be produced. The positive and significant relationship between success factors and institutional repositories performance improvement measure supports the findings by Kumar and Khairuddin (2006) as well as Selden (1998).

5.4 Implications of the Study

5.4.1 Theoretical Implication

The implementation of institutional repositories in the Malaysian academic libraries started around 2008, however institutional repositories research is still limited. The highest categories of research are deployment and implementation of institutional repositories. followed by benefits and challenges, content development and policy of institutional repositories, user behaviour, conceptual and research framework and lastly institutional repositories integration. Most previous studies used IR managers and librarians as respondents, whereas this study used academicians as respondents to obtain the real situation and perceptions of institutional repositories performance. It is significant because they are the authors of the research outputs compared to the librarians and IR managers' perceptions who are responsible for management of institutional repositories process. Thus far, no studies on measuring performance of institutional repositories either in Malaysia or outside Malaysia have been conducted since the idea of IR was introduced.

It can be concluded that the conceptual and theoretical frameworks are limited and focussed on the deployment, implementation and adoption of institutional repositories in the higher learning institutions. This study is significant and will contribute a clear picture on the future directions of institutional repositories and

simultaneously set out better understanding regarding the concept of measuring the IR performance implemented in most Malaysian academic libraries. The aspiration of this research will contribute some criteria and guidelines in measuring the institutional repositories implemented by academic libraries in Malaysia.

The study also attempts to contribute and strengthen the related frameworks in measuring the performance of institutional repositories. Prior to this study, empirical evidence in institutional repositories practices among academicians is still insufficient despite the consistent emphasis on its importance by researchers and practitioners. The empirical based framework that depicts the common institutional repositories practices among academicians in Malaysian academic libraries is unavailable until the establishment of the framework used in the study. The framework, which is mostly derived from the findings of previous studies has successfully supported the context of this study.

In this study, the success factors of institutional repositories were measured in terms of knowledge sharing, self-archiving, institutional repositories usage, institutional repositories policy, institutional repositories procedure and copyright awareness towards the institutional repositories performance. The study showed that knowledge sharing attitude and institutional repositories usage showed moderate relationship with institutional repositories performance. Besides that, knowledge sharing, institutional repositories usage, institutional repositories policy and copyright awareness were found to be the strong predictors for the institutional repositories performance and played a considerable role in predicting the factors.

In the Industrial Revolution 4.0 (IR 4.0), the roles and services of academic libraries have been upgraded to infomediaries whereby libraries are responsible to lead the knowledge management strategies in universities and empower the content of corporate memory for future use and references. Libraries served as repositories of information and librarians played their significant roles as gatekeepers to the information and knowledge in the higher education institution.

As a conclusion, the theoretical implication of this study is to help in creating the awareness of the existence of the institutional repositories platform and services which can be practised and measured within academic libraries or other libraries in Malaysia. The study also strengthens the previous studies and develops the foundation for future research that are related to institutional repositories performance. Specifically, this research has introduced the conceptual framework in enhancing the

institutional repositories services and performance as a scholarly communication platform in Malaysian research universities.

5.4.2 Practical Implication

IR platform should be implemented in the library context, not only for academic libraries, but also other libraries like special library, public library and national library as a support to the mission and vision of Malaysian Open Science Platform which was launched by the Ministry of Science, Technology and Innovation (MOSTI) on 7 November 2019. Through the Academy of Sciences Malaysia (ASM), international principles had made research data informative, accessible, operable and reusable (FAIR). It will not only democratise knowledge, but also strengthen research and open scientific integrity, enable better research management and promote open innovation, citizen science and even data intensive research. Combining diverse data streams and large databases across various disciplines offers unprecedented insights and solutions to local, regional and global complex challenges. The Pilot Initiative with five Research Universities (RU) is a two-year project (2020-2021) funded by MOSTI, pioneered by the Malaysian Open Science Alliance and implemented by the Malaysian Academy of Sciences (ASM). The three focus areas that will be explored in this project are policy and guideline, capacity building and awareness and infrastructure.

The current revolutionary technology trend known as the Industry Revolution 4.0, has influenced many services in this globalisation era. Likewise, IR 4.0 has a significant impact on library services. Attempts have been made to draw attention to the various challenges that libraries and librarians face in this information age. Several solutions have been offered to library professionals in order to overcome this technology and improve their services to the fullest satisfaction of their customers (Hussain, 2019). Librarian are forced to work hard and well prepared in order to upgrade their skills, knowledge and professional level. They should be able to think critically in order to generate new ideas in line with the advancement technologies, applying their valuable past experiences and knowledge to improve the quality of library services to the contemporary library user's need who expect library applications to be accessible at their fingertips.

The implementation of institutional repositories showed many benefits to the entire university, not only for authors and other contents contributors. The highly

content development and usage of institutional repositories are able to boost the higher education institution reputation and icon, vision and mission of university, university ranking locally and globally, look like a prestige university and public value, supporting teaching and learning activities with various types of contents from different subjects and fields and lastly empowered the platform functionality. In order to ensure the success of an institutional repository, the important things are to identify, understand and address all issues and problems related to the operation of an institutional repository. Abrizah et al. (2015) highlighted that institutional repositories platform in Malaysian academic libraries can be a benefit and an advantage to the teaching and learning activities, scholarships and research grants, research collaboration and publishing platforms for research articles if all the resistance are addressed and managed properly.

5.5 Suggestions from the Findings

Based on the research findings, several recommendations for academic libraries, institutional repository managers, repository librarians, IT supports and technical teams that are involved in the development and implementation of institutional repositories. Besides that, these recommendations are also significant for those who plan to implement the institutional repositories platform in the future. The recommendations are:

5.5.1 Institutional repositories policy

Libraries should implement an institutional repositories project in academic universities with comprehensive policy and benefits for researchers and universities. According to the study, one of the barriers to the development and implementation of institutional repositories in Malaysian research universities is the lack of academic support. The findings were consistent with the implementation of institutional repositories at Thai research universities (Hall, 2014). Furthermore, despite the significant benefits associated with the principles of sharing, institutional repositories in Asian countries have not been as successful as expected (Abrizah et al., 2015).

Even though institutional repositories have been developed and operated in Malaysian universities for more than 10 years, the current study found that institutional

repositories that had been implemented were not successful, particularly in terms of academicians' commitment and cooperation in depositing and sharing their research results to institutional repositories. Academicians in this study agreed that institutional repositories policies would make their research publications visible and accessible for future access and use. The institutional repository policy expresses actions as a strategic master plan for scholarly communications systems to guide university content collection and long-term digital content preservation strategies. In addition, academicians in this study believed that universities have appropriate institutional repositories advocacy policies and workable policies in place as a publishing system.

According to Ammarukleart (2017), open access and self-archiving should be clearly stated in institutional repositories policies as evidence for academicians and researchers to accept their responsibility while also being concerned about the value of their research findings for the purpose of sharing and visibility. According to her research on the factors influencing faculty acceptance and use of institutional repositories in Thailand, academicians' motivation to share and self-deposit their research articles to university institutional repositories decreases when open access and self-archiving are not explicitly mentioned in the university institutional repositories policy. Furthermore, libraries and repository managers should take the proactive step of providing additional incentives and rewards to those who actively contribute their research outputs to university institutional repositories. The incentives do not stop with giving acknowledgement, credit and extra points for evaluation of promotions.

Institutional repositories system has succeeded in attracting the interest of academic library management to provide library materials with an open access concept for the contents that were produced by university researchers. Thus, library managers need to develop a structured and comprehensive policy to ensure effectiveness and clear rights which are related to ownership and management of rights to assist university researchers and library users to upload materials to repositories for reference and wider use of the findings.

5.5.2 Institutional repositories procedure

Institutional repositories procedure is necessary to ensure that the repository process runs smoothly and is easy to manage from both the researcher's perspective as a content depositor and the repository manager's perspective. In order to achieve this

objective, library management should ensure the compatibility between repository standards, repository features, open access implementation within institution and compliance with intellectual property rights.

Academicians believed that an appropriate institutional repositories advocacy policy and a clear university procedure in self-archiving mandates can assist the increase of faculty members participation to contribute their research outputs. They believed that libraries should conduct the best institutional repositories procedures to assist them with simple manual available through online. The manual will guide in choosing version of files to deposit either for open access automatically or embargo for a certain period. The comprehensive metadata for repositories are able to encourage and get involved for the successful implementation of institutional repositories.

Academic librarians, repository managers and repository department staff should serve as facilitators in order to improve communication between libraries and academic members. Libraries should provide comprehensive procedures that facilitate academicians and researchers to clearly understand which file format and type that are supposed to be deposited to the institutional repositories. Besides, the institutional repositories procedures must comply with embargo management system in order to manage the institutional repositories contents under copyright. Through collaborative and conducive environments, this encourages academic members to be actively involved in contributing their research findings and academic outputs to the institutional repositories (Rogers, 2003). Ammarukleart (2017) found that through a good formulation and a clear policy related to the benefits that can be obtained by faculty members, if they deposit their research results into the institutional repository, it will attract their interest and commitment to contribute materials to the repositories.

Institutional repositories manager should offer specialised workshops to raise awareness of the platform's importance and to provide clear guidelines and procedures for using these institutional repositories. Furthermore, the repository manager must provide relevant manuals to help researchers understand the benefits of depositing the results of their studies while also reducing any feelings of concern and worry, which are primarily related to copyright issues, after submitting and depositing their articles in this platform.

5.5.3 System and Copyright Librarians

The findings may serve as a signal for academic libraries and librarians serving as IR managers to learn managerial skills in order to be successful in the implementation, maintenance and promotion of the university's IR. It is strongly advised in order to ensure effective and efficient delivery services, particularly when it comes to providing scholarly digital contents for library searching. The finding is aligned with previous studies suggesting that the successfulness of the implementation of institutional repositories is quite related to the changing of the new role of librarians in managing and preserving the institutional repositories platform (Foster & Gibbons 2005; Palmer, Teffeau & Newton, 2008; Ammarukleart, 2017).

As a result, library management should hire librarians who are knowledgeable and skilful in the development of systems and information technology. Through the experience and technical expertise available to the librarians, it can help and further facilitate the development and maintenance of library systems, especially related to institutional repositories. Furthermore, academic libraries are now faced with a limited budget situation and could be considered to adopt an open source-based system for the needs of institutional repository platforms. This can save time for system development and at the same time can save expenses for the development of the platform internally and will start from scratch. These proposed matters can be considered to address the issue of human resource constraints more broadly as well as address some of the challenges that have been identified through this study as well as previous studies related to the development of this institutional repository.

Skills like managerial copyright issues, technical system, research data management and reference skills must be acquired and additional competencies for library professions. In the era of IR 4.0, information system, databases, data mining and programming are required among the librarian profession. Librarians should be aware of the significance of promoting new managerial skills and roles in order to improve their job performance as well as IR and university performance in the research context.

Repository manager must collaborate closely with IT departments to provide large-scale institutional repository sizes to accommodate the needs of institutional repositories materials to manage, maintain and preserve university research articles in institutional repositories system for future access and reference of data. In order to store large amounts of data, system administrator should consider using high end storage

space or cloud services. It is necessary for the security of data management, access and digital preservation. As research repositories data become more complex and larger, the demand for qualified system librarian and IT specialists in libraries are significant in managing this scholarly platforms and services.

Basically, to improve the communication of scholarly research, publishers and academic librarians must collaborate more effectively. New ways of thinking about relationships and the identification of solutions may be required. The implication is that open access provisions should be included in content acquisition agreements so that each party is recognised for their role in validating research and increasing visibility. It may also necessitate collaboration in the development of content accessibility, combining activities to promote published versions with versions stored in repositories via taxonomy, metadata and a combination of impact measures.

The findings could be an indicator for academic librarians, as institutional repository manager should learn managerial skills explicitly to be successful in their career. It is strongly recommended that in order to ensure the efficiency of repositories librarians at work that provides high impact of repository services and valuable institutional repositories content, repository managerial skills must be acquired and improved. Moreover, librarians should be aware of the importance of promoting the managerial skills and their roles in increasing job performance and at the same time institutional repositories performance.

5.5.4 Library and Information Management Curriculum

The Faculty of Information Management (FIM) should offer the latest curriculum and education modules that are related to the current library practices and technological needs. With the appropriate curriculum and practical trainings to library and information management programmes, it will prepare them with the competentcy in their professions and to be a good leader in the future. Hence, by revising the curriculum, it will support the emerging role of librarians in Information and Communication Technologies (ICTs) strategic planning and change management in organisations and institutions.

The faculty should offer sufficient management education to future manager of library and information services. They should provide appropriate education and trainings to Library and Information Management students in order to make them

competent in their profession and to prepare them to be a good leader or repository manager. Indeed, faculty members are aware of the urgent need for their students and have improved their curricula as well as creating new programmes, specialisation and continuing programmes in recent years. Faculty should offer strategically designed continuing education in specific areas of management. Managerial skills are identified as one of the most important skills for library professions. Moreover, faculty need to pay attention to the additional competency in interpersonal and communication skills as well as in developing managerial skills. In doing so, it will support the librarian's emerging role in strategic planning and managing changes in organisations and institutions.

5.5.5 Organisational Culture for Knowledge Sharing

With the positive attitude in sharing their research article to university' repositories, it will motivate and encourage other university members to create an organisational culture with positivity for sharing the knowledge of their valuable research information research outputs. With the ability of libraries to change their mentality and mindset towards knowledge sharing and knowledge transfer, it will give high impact on the IR performance for visibility of the university's researchers, university's niche area, research performance and enrolling new students to the university. Library management should provide an incentive for those who have contributed their research articles as a strategy in the content development of IR. This is one of the approaches in saving database subscription costs that have been increasing from year to year and the publications made by the university's academicians and researchers are definitely in line with the needs of teaching and learning.

5.5.6 National and University Open Access Policy

The National and Universities Open Access Policies should be developed before the selection system and implementation of IR project as a scholarly platform for sharing their research articles and outputs. The suggestion is in line with the idea from Riddle (2015) that academic libraries should form a committee to look at IR policy and IR procedure in order to be enforced at university's environment. With the development of Open Access Policy, it gives a clear picture of the focus and direction of a university

and the aspirations at the national level. During the conduct of this research, the researcher found that most academic libraries in Malaysia had implemented IR platform without developing the IR policy and procedure at the early stage.

A government policy generally encourages research projects by providing research grants to universities. Normally, the government does not provide a specific approach for sharing and disseminating the research findings. Besides, university promotes the creation of repository platforms, whether institutional or research repositories, as well as open access solutions. Unfortunately, this policy does not specify clearly where researchers and academics should publish their research findings and where they should deposit their findings for widely access and utilise as much as possible. Through the adoption of a national repository policy, it will force universities and publishers to reconsider and rebalance their respective roles in empowering digital content for research, teaching and learning activities.

However, policy development around open access, as well as a preference for green routes over gold routes by some governments and universities suggests that repositories will remain a part of the research communications landscape. The integration of research information systems and repositories will increase repository participation even more. Furthermore, universities and repository owners will continue to share best practices and find solutions to challenges in managing their services. As a result, publishers must recognise the potential growing importance of repositories in the sharing, communication and advancement of scientific research.

5.5.7 Developing a National Repositories Model

Developing a national repositories model is essential. The results of this study can form the basis for national repositories model. It is suggested that the Ministry of Higher Education and universities jointly work for various scholarly contents to realise the next generation's scholarly content infrastructure. The suggestion is similar to the implementation of a project at Japan under the National Institute of Informatics (NII) known as Institutional Repository Database (Japan) – IRDB. This project serves as a centralised platform for collecting and distributing metadata for a diverse range of materials in Japanese academic repositories, including theses, journal articles, books, conference papers, research reports, software and others.

5.6 Contribution of the Study

5.6.1 Final Conceptual Framework

The study's main contribution is the development of an empirical framework that comprised seven variables: knowledge sharing, self-archiving, IR usage, IR policy, IR procedure, copyright awareness and IR performance. This study creates an empirical framework for assessing IR performance. The framework includes all of the critical success factors for librarians to measure implementation and performance in the context of academicians' perceptions. Institutional repositories that had been implemented especially in the Malaysian academic libraries need to assess its performance and usability at the university and national level. This study had focussed on five Malaysian research universities that had provided the institutional repositories platform to their community members inside and outside of the university. It had focused on six success factors namely knowledge sharing, self-archiving, institutional repositories usage, institutional repositories policy, institutional repositories procedure and copyright awareness as the independent variables to measure its institutional repositories performance as the dependent variable in the contexts of individual and university (Figure 5.1).

In the context of individual or author level, this study focusses on the visibility of the repository outputs, the exposure of authors work, increases impact to authors, harvesting by other search engine such as Google Scholar, helps authors in organising and preserving their research outputs that can be accessed and utilised by future researchers. Even though the study did not focus on the needs of academic members regarding institutional repositories services, the results of this study had provided some insights into the needs of academic members and the universities' top management towards the institutional repositories services. Most of institutional repositories in the Malaysian academic libraries were implemented more than 10 years that needs the assessment on its performance for the future researchers' needs and platform services improvement.

Kim and Kim (2008) highlighted few elements that should be considered in the assessment of institutional repositories such as user satisfaction, system support, usefulness and effectiveness. Majority of researchers had suggested that institutional repositories assessment should include all the elements that were related to self-

archiving and searching systems (Betz & Hall, 2015; Zhang, Maron & Charles, 2013; Qing & Ruhua, 2008). Ammarukleart (2017) proposed that librarians and institutional repositories managers should include the issues on the self-archiving process, system interface and system browsing functions in the institutional repositories evaluation framework. Based on that, librarians and institutional repositories managers can identify the system function performance and its collection.

Prior to the conduct of this study, there was no empirical-based framework that could be used to measure IR performance and practices. The majority of previous studies have concentrated on the implementation of IR and strategies for IR selection systems. The framework should be of interest to researchers working on this topic. It can be used to conduct research on measuring IR performance not only among academic libraries and academicians in Malaysia, but also in other countries. Furthermore, other researchers may be interested in validating the framework in the context of a non-academic librarian and in different settings.

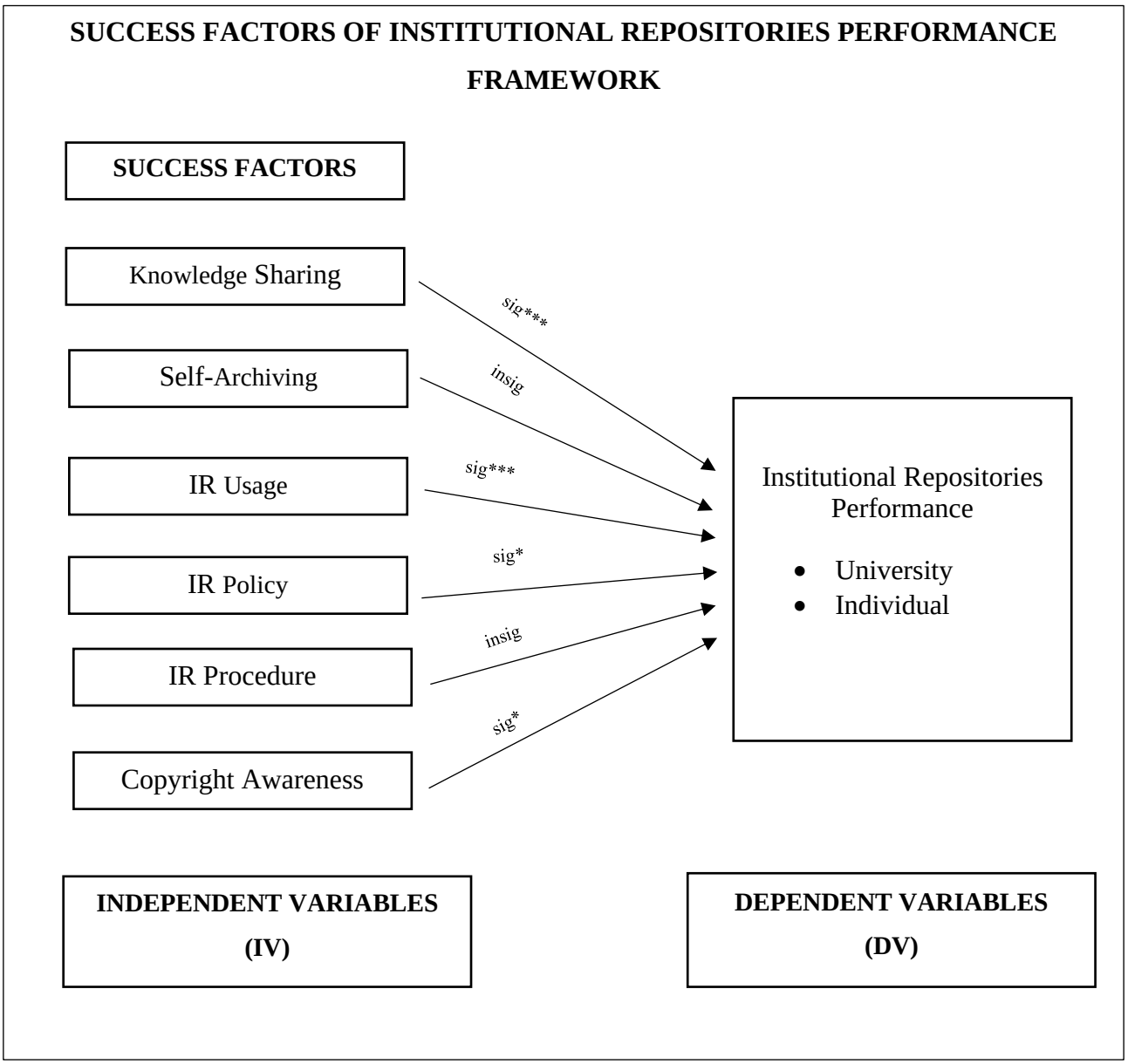

Figure 5.1 Final Conceptual Framework of Success Factors of Institutional Repositories Performance in Malaysian Academic Libraries

5.6.2 Practical Contribution

The findings will be very helpful to academic libraries that had implemented and offered IR as management and dissemination of digital content that had been created by university' communities like academicians, undergraduates and postgraduate students, researchers, faculties and other departments. The IR platform will provide university members and the public with online access to more digital information

resources. In supporting teaching and learning activities, faculty members will have the comprehensive and latest information as references to the students. More research can be done with relevant resources and may finally help the universities in accomplishing their mission in becoming research universities.

The yearly allocation of budget given by the local government for academic libraries to subscribe online databases related with university programmes will be saved with the existence of institutional repositories. The users might have much broader library collections and the library could build new subject disciplines. The success factors as found in the framework must be emphasised in library collection development policy as it will contribute to the return on investment.

The findings help library in terms of qualities needed by repository manager to move up the skills in designing and implementing the institutional repositories in the context of higher education that is made possible by the organisations' succession planning, which seek to develop librarians with multi-skill and creative mindset. For the librarians, their competency levels with regard to their managerial skills were identified in this study which include how they actively acquire knowledge and skills through their managing experiences, relevant training and development programme initiatives. Managerial skills could be used as a guideline for planning, designing, developing relevant training and development programmes in order to upgrade the competency level of their librarians. The findings of this study give the idea for library management to set the priority in selecting, developing and evaluating librarians since these repository managerial skills could lead to a successful performance in an organisation.

5.6.3 Contribution to Body of Knowledge

This study contributes to a better understanding of the concept of IR performance success factors in Malaysian academic libraries. Those working in libraries may be able to use the findings and recommendations to conduct additional research. It is hoped that this research will contribute in some way to raising awareness of the issues and problems associated with the implementation and maintenance of IR in Malaysian academic libraries. The findings of this study could contribute to the body of knowledge regarding effective IR services.

This study also provides more concrete empirical evidence in academicians'

success factors in IR. Despite the consistent emphasis on its importance by researchers and practitioners, prior empirical evidence from early research on IR implementation and practices among librarians is insufficient. Similarly, empirical evidence linking IR success factors and IR performance is still difficult to come by. As a result, the research adds to the body of knowledge about IR practises and measuring IR performance.

It is noted that, institutional repositories performance literature pertaining to the repository services is generally scarce. As such, this study contributes substantially to the body of indigenous knowledge on measuring repositories performance in the context of academic libraries and universities. The study expands the empirical evidence on the implementation and existence of institutional repositories among academic libraries and universities all over the world. The study contributes to the literature and knowledge in the field of institutional repositories services, specifically adding the existing literature on the subject. This study enables society to appreciate the function of academic libraries as custodian of knowledge and heritage. Moreover, the study benefits researchers by expanding the scope for future research on the development of institutional repositories performance theories.

5.6.4 Development of Questionnaire

This study created a comprehensive questionnaire about the university and academic library environment. This study is also based on a thorough and extensive literature review. After the questionnaire was developed, it was tested for pre-testing, pilot testing, reliability and validity. A questionnaire is a pre-written set of questions to which respondents record their responses. It is known as efficient material in obtaining data due to its nature that could be easily distributed and measured. The items of the instrument were adapted and modified from previous study. The questionnaire in this study was nine pages long and divided into three sections. There were six dimensions of institutional repositories success factors (knowledge sharing, self-archiving, IR usage, IR policy, IR procedure and copyright awareness) and their institutional repositories performance in Malaysian academic libraries. The questionnaire commenced with a definition of institutional repositories, success factors and institutional repositories performance. In terms of measurement, seventy-one items questionnaire were designed on a 1 (strongly disagree) through 7 (strongly agree) Likert Scale.

Based on the framework, this study had developed a questionnaire which has undergone various stages of assessment such as pre-test, validity test, pilot test and reliability measurement. Furthermore, the developed instruments can be used by academics and librarians to evaluate the performance of institutional repositories, assess the common practices of institutional repositories content development and library's return on investment in open access project.

5.6.5 Methodology Contribution

The research's contribution in terms of methodology can be seen in the research design and data collection method used in developing the current study's conceptual framework. This is considered a new discovery because previous studies did not empirically investigate the conceptual framework of this study. As a result, this can indirectly provide some guidance for future research in selecting a suitable method for expanding existing conceptual framework. Furthermore, the justification for the selection of methods and instruments for the current study has been described in detail and can be used to achieve the stated objectives. Furthermore, the current study clearly demonstrated the relationship and differences between variables while also assisting in the development of hypothesis statements to explain the relationship and differences. The current study's validity and reliability were designed not only to ensure the quality of the results, but also to produce quality contributions.

5.7 Research Limitation

This is a perception study, the shortcoming of self-report data is that the respondents may choose to respond in a socially desirable way. Here, the respondents may conceal their actual responses for ones they are considered more desirable or acceptable by the society. Under socially desired behaviour, the respondents may avoid extreme options on the rating scales. Potentially, such behaviour contaminates the scales and distorts the mean values for variables, thus it leads to inaccurate results. In the current study, data for all the measures have been sought from the same environment, that is the 'public universities, so any inefficiency in that source may pollute all the measures and give rise to imprecise results. Scale format of questions setting based on this study may yield more statistically significant results.

This study reported self-perceptions and self-assessments of academicians from research universities in Malaysia. This study had its limitation in which it had focused on five research universities in Malaysia: Universiti Malaya (UM), Universiti Sains Malaysia (USM), Universiti Teknologi Malaysia (UTM), Universiti Putra Malaysia (UPM) and Universiti Kebangsaan Malaysia (UKM). In this study, the researcher used only one main data collection method that is survey methods or distribution of questionnaire as a tool in data collection and the questionnaire has its limitations.

The level of significance can be increased with extensive sampling such as other studies, generalisability of the results might be limited and might not be generalised to other academic libraries as well as other types of libraries like the national, public and special libraries in Malaysia. As such, researchers should consider this limitation in their future studies to replicate the similar research using different samples of population. The population of the academicians were not from all the public universities in Malaysia. It only focused on the five selected universities with a sample size of 357 (n = 357), mainly from grade DS45 until grade VK (Professor).

People's attitudes tend to be the limitations of the study. Malaysians are very familiar with the characteristics of collectivism. The academicians may respond to the questionnaire items even when they do not clearly understand and ensure all questions are answered before returning to the researcher. This leads to unreliable data for the research which may be taken to extreme findings.

Collectivism is a characteristic of the Malaysian culture, so the attitudes of the people in such a culture may be a possible limitation of the study. The academicians may respond to the questionnaire items even when they do not understand them. This leads to imprecise data for the research, which may be taken to the extremes. The measures used for the study may possess their own limitations. Therefore, replicating the study with a larger sample size in a similar setting (public libraries, special and schools libraries) may provide additional statistical significance, which in turn might permit the ability to generalise the results.

Although there are limitations, this study has one implication for understanding knowledge sharing and self-archiving attitude among research universities' academicians related to institutional repositories. Academicians have control and create the resources, but academic libraries in Malaysia research universities expected that those research output that had been conducted by university academic communities are able to be share and used for the benefit of the scholarly community's platform.

Academicians and researchers will share their resources because of personal and professional benefits, not for the academic libraries' requirement and services for the purpose of university's community.

Based on the prediction factors in the contribution of contents into the institutional repositories, repository administrators are able to strategise in order to get the active participation in resource sharing among academic communities. Knowledge of what makes academicians more likely to self-archive into the institutional repositories and will pave the way for greater commitments. This will ultimately make institutional repositories and self-archiving a success in research universities in Malaysia. In addition, knowing whether the academicians consider for self-archiving as mandatory, it will help academic libraries formulate a comprehensive policy and procedures related to institutional repositories and effectively address each of these barriers.

5.8 Recommendation for Future Research

This study is the first one to address the success factors of institutional repositories (IR) performance in Malaysia academic libraries context. This research employed quantitative approach and chose academicians as the respondents had allowed the researcher to realise and clarify the success factors of institutional repositories that affect measuring the performance of the platform in better ways and details. The success factors identified through this study can assist academic librarians and libraries in managing their repository platform properly and strategically offered a higher impact on the universities and repositories ranking. Besides that, the findings and suggestions from this study is very useful and meaningful for IR developer and repository staff to strategise the performance of institutional repositories in future.

The findings of this research were based on the perceptions of the academicians from five research universities in Malaysia namely Universiti Malaya (UM), Universiti Sains Malaysia (USM), Universiti Teknologi MARA (UiTM), Universiti Kebangsaan Malaysia (UKM) and Universiti Putra Malaysia (UPM) that have implemented the institutional repositories since 2008. These platforms were equipped with digital contents for the needs of university communities and supporting the function of libraries and universities in providing digital information resources of institutions.

Based on the findings, several possible recommendations for future research are

identified. They are:

i. The population of the study can be expanded to all public universities in Malaysia. Larger scale of sample size will provide more significant findings and results.
ii. Sampling of study could be the academic librarian with some modification on questionnaire in order to get academic librarian's perspective in managing institutional repositories platform.
iii. A study can be conducted to private universities in Malaysia to look for the similarities and differences of the findings.
iv. Revising the questionnaire should be made particularly on the success factors dimensions to libraries and universities environments.
v. Library evidence-based study using institutional repositories statistics could be further explored.
vi. The institutional repositories performance dimension can be modified to look at the librarian' perceptions in practising institutional repositories services.

It is suggested to study the readiness of academic librarians in Malaysia to function successfully in implementation and development of IR system. This is to support the roles of librarians in global environment.

5.9 Conclusion

In conclusion, this study was conducted to assist librarians and academic libraries to improve their institutional repositories services for user needs and IR performance measurement in library services. Libraries have to deal with the rapid development of technology and systems today to ensure that all services offered to the university community are in line with the development of technology outside and the library services offered are up-to-date and not outdated. Henceforth, the technology for information dissemination is changing as a result of the advancement of Internet.

Institutional repositories are the many effective tools that help engage university communities with valuable resources easily, and quickly expose and provide them with a variety of reliable knowledge and information through various digital resources and platforms accessible at any time and from any location. Nowadays, knowledge repositories such as institutional repositories, subject repositories, arxiv.org (open

access archive), online databases and open journal systems serve as a scholarly platform for academicians to collect, maintain and preserve their research outputs for a long period of time. Furthermore, institutional repositories practices aided in the advancement of all aspects of experience-based processes. It is critical to identify the factors that are critical to the success of institutional repositories in the context of the development and visibility of university research outputs and research areas to global access and citation. In this study, the researcher proposed a few success factors (knowledge sharing, self-archiving, institutional repositories usage, institutional repositories policy, institutional repositories procedure and copyright awareness) that institutional repository administrators should pay attention to and consider when measuring the performance of their institutional repositories.

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APPENDICES

APPENDIX 1

QUESTIONNAIRE

SUCCESS FACTORS OF INSTITUTIONAL REPOSITORIES (IR) PERFORMANCE IN MALAYSIAN ACADEMIC LIBRARIES

INTRODUCTION

Institutional Repositories (IR) - "an electronic system that captures, preserves and provides access to the digital work products of a community" (Foster & Gibbons, 2005).

Success Factor – "The limited number of areas in which results, if they are satisfactory, will ensure successful competitive performance for the organisation" and he reinforced that the areas of activity "should receive constant and careful attention from management" (Rockart, 1978: p.85).

Institutional Repositories (IR) Performance – Performance measurement represents the yardsticks to assess how well people or facilities perform (Riratanaphong, 2015).

The main objective of this study is to capture the success factors of Institutional Repositories elements namely *knowledge sharing, content development, IR Usage, IR Policy, IR Procedure, Copyright Awareness* and IR performance among academicians in Malaysia academic library.

The following is a list of institutional repositories related to this study:

Institution	Name	Address
UM	UM Research Repositories at	http://eprints.um.edu.my/
UTM	Universiti Teknologi Malaysia Institutional Repository	http://eprints.utm.my
USM	Repository @ USM	http://eprints.usm.my/
UKM	UKM Institutional Repository	https://smk.ukm.my/erep/
UPM	Universiti Putra Malaysia Institutional Repository	http://psasir.upm.edu.my/

This questionnaire enables you to think about your perceptions to the study. Please respond to each of the items in the questionnaire. For each item, determine the degree to which you strongly disagree or strongly agree with your statements. Please answer **ALL** questions. There is no *right* or *wrong* answer.

DEMOGRAPHIC PROFILE

	Please tick one box only
1. Age (Years)	□< 29 □30-39 □40-49 □>50
2. Gender	□Male □Female
3. Grade	□DS45 □DS51/52 □DS53/54 □VK Others, please specify:
4. Education level	□Master □ PhD Others, please specify:
5. Duration served in the organisation (years)	□1-5 □6-10 □11-15 □16-20 □21-25 □26-30 □>31
6. Institution name	□UM □UPM □USM □UKM □UTM
7. Faculty name (please specify)	
8. Field of Study	□Social Science □Science & Technology □Business & Administration □Art & Humanities □Others

	A. Success Factors of Institutional Repositories **1) KNOWLEDGE SHARING** I …	In a scale of (1) strongly disagree to (7) strongly agree, please indicate your opinions regarding the statements by circling the number below; **Strongly Disagree** **Strongly Agree**
1	… understand the importance of sharing research output to IR	1 2 3 4 5 6 7
2	… understand the importance of sharing IR content to institution	1 2 3 4 5 6 7
3	… voluntarily share my research outputs to IR	1 2 3 4 5 6 7
4	… agree on IR as sharing platform for research findings	1 2 3 4 5 6 7
5	… agree on IR as publishing of research findings among researchers	1 2 3 4 5 6 7
6	… agree knowledge sharing through IR increases	1 2 3 4 5 6 7

	readership	
7	… agree knowledge sharing through IR increases communication research output	1 2 3 4 5 6 7
8	… agree knowledge sharing through IR increases collaboration among researcher with other universities	1 2 3 4 5 6 7
9	… agree knowledge sharing through IR bring more prestige for academicians	1 2 3 4 5 6 7
10	… agree knowledge sharing through IR increases total citation	1 2 3 4 5 6 7
11	… agree knowledge sharing through IR increases author level metric (H-Index)	1 2 3 4 5 6 7

	A. Success Factors of Institutional Repositories **2) <u>SELF-ARCHIVING</u>** My library …	In a scale of (1) strongly disagree to (7) strongly agree, please indicate your opinions regarding the statements by circling the number below; **Strongly Disagree** **Strongly Agree**
1	… convinces authors to self-archive their publication in IR	1 2 3 4 5 6 7
2	… encourages staff to deposit their publications in IR	1 2 3 4 5 6 7
3	… promotes a cultural environment within the organisation that supports a high number of resources in the IR	1 2 3 4 5 6 7

4	… gives incentives to authors deposited the research output to IR	1 2 3 4 5 6 7
5	… mandates to deposit copies of all university published journal articles to IR	1 2 3 4 5 6 7
6	… mandates to deposit research reports to IR	1 2 3 4 5 6 7
7	… mandates to deposit course contents to IR	1 2 3 4 5 6 7
8	… that have been encourages deposit copies of conference papers presented to IR	1 2 3 4 5 6 7
9	… encourages to deposit copies of proceeding papers to IR	1 2 3 4 5 6 7

	A. Success Factors of Institutional Repositories **3) <u>IR USAGE</u>** Institutional Repositories (IR) of my university …	In a scale of (1) strongly disagree to (7) strongly agree, please indicate your opinions regarding the statements by circling the number below; **Strongly Disagree** **Strongly Agree**
1	… provides a user-friendly interface	1 2 3 4 5 6 7
2	… has suggestions for the search terms	1 2 3 4 5 6 7
3	… has clear search results pages	1 2 3 4 5 6 7
4	… provides literature for my research works	1 2 3 4 5 6 7
5	… is an important information source to assist	1 2 3 4 5 6 7

	researchers	
6	… systems make available the number of views of full-text files	1 2 3 4 5 6 7
7	… systems make available the number of downloads of full-text files	1 2 3 4 5 6 7
8	… systems have fast browsing speed to encourage people to use it more	1 2 3 4 5 6 7
9	… systems share information about usage statistics	1 2 3 4 5 6 7
10	… learning to self-archive is quite an easy task for me	1 2 3 4 5 6 7

	A. Success Factors of Institutional Repositories **4) <u>IR POLICY</u>** My institution …	In a scale of (1) strongly disagree to (7) strongly agree, please indicate your opinions regarding the statements by circling the number below; **Strongly Disagree** **Strongly Agree**
1	… has an appropriate IR advocacy policy	1 2 3 4 5 6 7
2	… has workable policies on IR in the university	1 2 3 4 5 6 7
3	… develops a policy to guide the collection of university contents	1 2 3 4 5 6 7
4	… establishes IR policy for free access of full-text document	1 2 3 4 5 6 7
5	… establishes IR policy to provide access to digital resources	1 2 3 4 5 6 7

6	… establishes IR policy to make scholarly materials available for the future	1 2 3 4 5 6 7
7	… has a strategic master plan for digital preservation with IR	1 2 3 4 5 6 7
8	… establishes IR policy as scholarly communications system	1 2 3 4 5 6 7
9	… establishes IR policy as a system for publishing	1 2 3 4 5 6 7

	A. Success Factors of Institutional Repositories **5) <u>IR PROCEDURE</u>** The library …	In a scale of (1) strongly disagree to (7) strongly agree, please indicate your opinions regarding the statements by circling the number below; **Strongly Disagree** **Strongly Agree**
1	…conducts procedures for successful implementation of IR	1 2 3 4 5 6 7
2	… provides procedure to self-archive their contents in the IR	1 2 3 4 5 6 7
3	… provides self-archive manual that is available online	1 2 3 4 5 6 7
4	… provides procedure in managing IR content during embargo period	1 2 3 4 5 6 7
5	… provides procedure for authors to check editorial policies before depositing content to IR	1 2 3 4 5 6 7

6	… provides procedure for metadata format supported by IR system	1 2 3 4 5 6 7
7	… provides procedure for document version that can be deposited (pre-prints, post-print & pdf version)	1 2 3 4 5 6 7

	A. Success Factors of Institutional Repositories **6) <u>COPYRIGHT AWARENESS</u>**	In a scale of (1) strongly disagree to (7) strongly agree, please indicate your opinions regarding the statements by circling the number below; **Strongly Disagree** **Strongly Agree**
1	I clearly understand the copyright act	1 2 3 4 5 6 7
2	I clearly understand my own intellectual property rights	1 2 3 4 5 6 7
3	I clearly understand publishers copyright	1 2 3 4 5 6 7
4	I am aware of publishers' policies relating to self-archiving research work in the IR	1 2 3 4 5 6 7
5	I am concerned about plagiarism	1 2 3 4 5 6 7
6	I am concerned about other publishers owning the copyright of previously published material	1 2 3 4 5 6 7
7	I am concerned that if I deposit my work in the University Institutional Repository, I may not be able to publish it elsewhere later	1 2 3 4 5 6 7
8	I am aware that my library provides advice to communities of the University about copyright for material which I would like to deposit	1 2 3 4 5 6 7

9	I am aware that my library provides advice to members of the University about journal embargo policies for material which I would like to deposit	1 2 3 4 5 6 7

	B. Institutional Repositories (IR) Performance Institutional Repositories (IR) …	In a scale of (1) strongly disagree to (7) strongly agree, please indicate your opinions regarding the statements by circling the number below; **Strongly Disagree** **Strongly Agree**
1	… increases visibility of authors	1 2 3 4 5 6 7
2	… increases the research impact of authors	1 2 3 4 5 6 7
3	… gives the work of authors more exposure	1 2 3 4 5 6 7
4	… helps authors organise their research	1 2 3 4 5 6 7
5	… helps authors preserve their research in long-term	1 2 3 4 5 6 7
6	… facilitates the dissemination of scholarly research	1 2 3 4 5 6 7
7	… assists in globalisation of Malaysian research findings	1 2 3 4 5 6 7
8	… promotes the global ranking of university	1 2 3 4 5 6 7
9	… promotes international collaborations among researchers	1 2 3 4 5 6 7
10	… gives new mode of scholarly communication	1 2 3 4 5 6 7

11	… gives new mode of scholarly publishing	1	2	3	4	5	6	7
12	… allows harvesting by Google Scholar for worldwide sharing scholarly research	1	2	3	4	5	6	7

END OF THE QUESTIONNAIRE

Thank you for answering this questionnaire. The researcher is very grateful for your help.

APPENDIX 2

Surat Kami : 600-FPM(HEA.5/2/1)
Tarikh : 4 April 2019

(SEPERTI SENARAI EDARAN)

Y.Bhg. Prof.,

MEMOHON KEBENARAN UNTUK MENJALANKAN PENYELIDIKAN

Dengan segala hormatnya, perkara diatas adalah dirujuk.

2. Adalah dimaklumkan pelajar berkenaan adalah dari Program Doktor Falsafah Pengurusan Maklumat (IM950), Fakulti Pengurusan Maklumat, UiTM Kampus Puncak Perdana, Shah Alam ingin memohon kebenaran untuk menjalankan penyelidikan di organisasi tuan/puan.

3. Bersama-sama ini disenaraikan nama pelajar terlibat:

Nama	Nombor Pelajar UiTM	Nombor Telefon
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4. Pelajar ini dikehendaki membuat kajian bagi tajuk penyelidikan beliau dengan mengedarkan borang soal selidik kepada para pensyarah di fakulti Y.Bhg. Prof. Mohon kerjasama pihak Y.Bhg. Prof. dapat membenarkan dan mencadangkan beberapa pensyarah fakulti gred (DS 45/51/52/53/53/JUSA atau setaraf dengannya) yang aktif di dalam penulisan artikel bagi membantu menjawab borang soal yang dilampirkan bersama. Borang kaji selidik yang telah dilengkapkan boleh dikembalikan selewat-lewatnya pada 25 April 2019 kepada pelajar ini di alamat:

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Kerjasama dan sokongan yang diberikan oleh pihak Y.Bhg. Prof. di dalam perkara ini amatlah dihargai dan didahului dengan ucapan terima kasih.

Saya yang menjalankan amanah,

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