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Exploring Researchers' Attitude toward the Using of Institutional Repositories at University Putra Malaysia

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Abstract

One of the recent resources used at university libraries is institutional repositories (IRs) which have been considered one of the disseminating and preserving ways for academic research publications. IRs have received considerable attention from researchers across disciplines and around the globe. While that have potentially increased public value, ranking, prestige and visibility of researchers and relevant universities. In this regard, the main aim of this paper is to determine researchers' attitude concerning the utilization of institutional repositories via a modified Technology Acceptance Model at the University Putra Malaysia (UPM). A structured questionnaire was designed, and a survey was taken using a sample of 90 researchers. The results showed that researchers were aware of the institutional repository and had an attitude an interest of presenting their research to their university repository. They were under the impression that by presenting their research to the institutional repository, their university ranking will increase in addition to the citation impact of their research work.

Keywords: Institutional Repository, IR, Factors, Attitude, Technology Acceptance Model, TAM.

Introduction

Institutional Repositories (IRs) are extensively gaining popularity and becoming a vital part of academic institutions. Considerable attention has been paid from scholars from various disciplines worldwide. IRs are currently defined as digital collections for the capture and maintain of the intellectual output of a single or multi-university community (Bangani, 2018). IRs have gained eminence in developed and third world countries since they provide a solution for content management in universities (Ukwoma and Dike, 2017). Anenene et al. (2017) defined an IR as a series of services offered by a university to its members with the aim of managing, organizing and diffusing digital work produced by these members. Therefore, an IR can be considered a digital archive that presents a platform for universities to archive relevant intellectual output. IRs may consist of learning

objects, administrative documents, conference proceedings, seminar papers, course notes, projects, dissertations, these and various other types of grey literature.

Ngure et al. (2015) mentioned that IRs was embraced by institutions worldwide in order to accumulate, showcase and conserve their scholarly and intellectual output. IRs consists of original research and various other types of intellectual products stemming from a university's population from diverse knowledge fields (Scholastica et al., 2017). The progression of IRs distribution is fairly new in Malaysia. Wirba et al. (2013) stated that only a few Malaysian research universities were using IRs to increase visibility. Moreover, Ukwoma and Dike (2017) mentioned that researcher's inclination to implement IRs as a means to archive their research products and to cooperate with co-workers are required for IR sustainability.

Researchers' attitude regarding content's submission to their IRs can be positive or negative, which is dependent on the mechanism approved by university management (Ukwoma and Dike, 2017). Positive attitudes are highly dependent on perception and acceptance by academics. This issue was analysed by Fred Davis in the form of an acceptance model, a theory on technology acceptance and employment by users. Based on Davis's theory, user attitude toward a system determines if the individual implements or rejects the system. User attitude, in turn, is impacted by user's perception of the system's convenience and ease of use (Fred D Davis, 1989). Researchers' attitudes concerning IRs implementation in Malaysian universities needed to be explored because researchers are a vital factor for the success of IRs. Additionally, analysing factors that affect researchers' acceptance and the utilization of IRs can provide intuition for effective approaches to progress, implement and enhance IRs within universities. Thus, this paper aims to reveal knowledge concerning IRs acceptance and implementation by individuals via the application of the theoretical model and to define the factors impacting researchers' attitudes in utilizing IRs.

Literature Review

The following subsections briefly show the literature review section of the paper.

Technology Acceptance Model

Technology acceptance has been a topic of research over the past years to measure technology attitude or behavioral patterns of accepting technology (Malik, Suresh and Sharma, 2017). Researchers have gained more motivation to investigate the variables and factors that estimate the acceptance of modern technologies by users (Yadegaridehkordi et al. 2015). The Technology Acceptance Model (TAM) (Davis, 1989) is regarded as a dominating theory to conceptualize Information Systems (IS) utilization behavior and has been implemented influentially across a wide scope of information technologies and their relevant user populations (Razmak and Belanger, 2018; Bertrand and Bouchard, 2008). Upon examining 88 research papers via a meta-analysis method, King and He (2006) deduced that the TAM is a prosperous highly viable model. Thus, concerning the paper context, the TAM was applied to investigate researchers' attitude towards IRs usage acceptance for academic objectives.

TAM consists of two main components, which are Perceived Ease of Use (PEOU) and Perceived Usefulness (PU). Perceived Usefulness (PU) is described as "the degree to which a person believes that using a particular system would enhance his or her job performance" (Ajzen and Fishbein, 1980). Perceived Ease of Use (PEOU) is described as "the degree to which a person

believes that using a particular system would be free of effort” (Davis, 1989). TAM suggests links of the mentioned central constructs with two other constructs, which are “behavioral intention to use the technology” (BI) and “attitude towards the technology” (ATT). ATT is described as “an individual’s positive or negative feeling about performing the target behavior” (Fishbein and Ajzen, 1975). BI is described as “the degree to which a person has to formulate conscious plans to perform or not to perform some specified future behavior” (Warshaw and Davis, 1985). Figure 1 presents the TAM, showing that the impact of external variables was theorized to be mediated via PU and PEOU (Venkatesh and Bala, 2008).

Research Model and Hypotheses Development

The proposed research model is presented in Figure 1 with the exclusion of the actual behavior construct. This is because Behavioral Intention is regarded as an appropriate proxy and prominent predictor of actual behavior (Ajzen and Fishbein, 1980). PEOU and PU are the most vital factors of the technology acceptance model (Chen et al., 2003). Additionally, regarding the main links provided by TAM, numerous researchers have addressed external variables impacting PU and PEOU (Leong et al., 2018; Razmak and Belanger, 2018; Wang et al., 2018; Abdullah and Ward, 2016) to enhance TAM prediction power. Thus, external factors (also named antecedents of PEOU and PU) have a key role in describing technology adoption behavior (Abdullah and Ward, 2016). Venkatesh and Davis (1996) stated that “in order to be able to explain user acceptance and use, it is important to understand the antecedents of key TAM constructs, perceived ease of use and usefulness.” Moreover, Mathieson (1991) stated that a TAM excluding external factors only provides vast information on user opinion regarding a system but does not provide “specific information that can better guide system development.” In this regard, researchers have modified TAM with the addition of two external factors particularly Facilitating Conditions (FC) and Subjective Norm (SN) to base IRs use or acceptance.

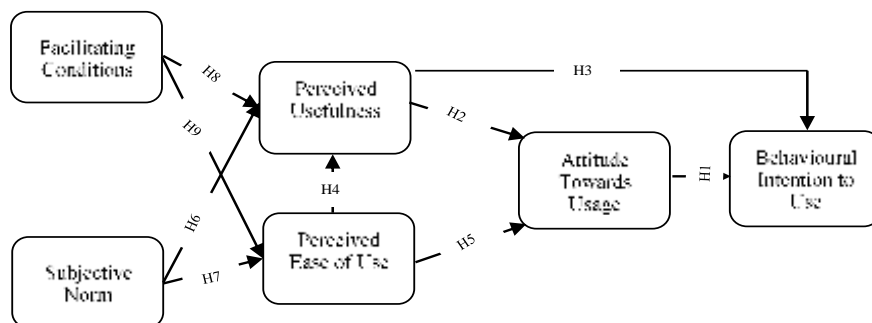


Figure 1. The technology acceptance model (Adapted from (Davis, 1989))

With the TAM, PEOU and PU are positioned to exhibit significant impact on ATT, which then effects the BI (Abdullah and Warn, 2016; Ching-Ter, Hajiyevev, and Su, 2017; Razmak and Belanger, 2018; Teo, 2010). PU is a theoretical factor of TAM that has a considerable impact on technology. PU

has an emphasis on the task accomplishment and determines the user's tendency to participate in technology usage as a result of the earned external reward (Septiani et al., 2017). Additionally, PEOU has proven to be of significant influence on PU (Leong et al., 2018; Teo 2010) based on the fact that whenever users consider a technology to be user-friendly, they are likely to consider it useful too. According to the discussions above, the following hypotheses are derived:

H1: Attitude toward use will have a significant influence on Researcher's intention to use IRs.

H2: Perceived usefulness will have a significant influence on attitude toward using IRs.

H3: Perceived usefulness will have a significant influence on behavior intention using IRs.

H4: Perceived ease of use will have a significant influence on perceived usefulness of IRs.

H5: Perceived ease of use will have a significant influence on behavior intention using IRs.

Based on the studies conducted by Abdullah and Ward (2016), SN/SI has been implemented in 32 studies such that in 27 of these studies, its relationship with TAM is proved. Venkatesh et al. (2003) described SN as "the person's perception in that most people who are important to him think he should or should not perform the behavior in question." In this paper, a subjective norm is the extent to which an individual understands the demands of the "important" others on him/her to utilize the IRs. These findings are supported by Marcinkiewicz and Regstad (1996) who conducted studies on the impact of subjective norm on computer usage and concluded that subjective norm was not a predictive factor of computer usage as well as innovativeness, perceived relevance and self-competence. Moreover, previous studies found positive relationship between SN, PU, and PEOU (Abbas, 2016; Venkatesh & Davis, 2000; Lai, 2017). From the discussions above, the hypotheses below are suggested:

H6: Subjective norm will have a significant influence on perceived usefulness of IRs.

H7: Subjective norm will have a significant influence on perceived ease of use of IRs.

A facilitating condition described as "the degree to which a user feels that enough infrastructure is provided to support the use of a system" (Venkatesh et al., 2003). By way of explanation, FC includes factors that exist in the environment and impact an individual's perception of the degree of simplicity or difficulty to execute a task. For example, for technology usage in workplace technology use context, the FC consists of the training availability and support provision. The mentioned variable has been tested within numerous technology acceptances researches and proved to have a significant impact on technology acceptance (Teo, 2009). TAM3 regarded FC's role as PEOU antecedent (Agudo-Peregrina et al., 2014). Groves and Zemel (2000) concluded that FC supports information or materials, skills, training and administrative support and are regarded as vital factors that affect the utilization of instructional teaching technologies. Thus, it was posited that:

H8: Facilitating conditions will have a significant influence on perceived usefulness of IRs.

H9: Facilitating conditions will have a significant influence on perceived ease of use of IRs.

Research Method

The PLS-SEM technique as statistical modelling technique was used for analyzing the measurement and structural model. To verify the model that has been extended, a questionnaire was designed in this research to obtain responses from researchers in University Putra Malaysia that was chosen as a target regarding their perception of IR. Therefore, the research objectives and types of information

required by researchers were the basis of the survey instrument. This questionnaire includes 20 items that focus on all six factors. In order to measure each factor, a five-point Likert scale was utilized. The responses were chosen from (1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree). The data was analyzed via the PLS-SEM method with the addition of SmartPLS 3.0 statistical software. In total 90, respondents were participated in this study. As presented in Table 1, most of the 90 respondents were male (59%), and most of the participants are aged 31-43 years, which constitute (53%) of the respondents. Moreover, most respondents are PhD students (36.67%). In addition, (42.22%) of the respondents had moderate awareness on institutional repositories.

Table 1: Respondents' Demographic Information

Demographic Information	Frequency	Percentage
Gender		
Male	53	59%
Female	37	41%
Age		
<30	27	30%
31-43	48	53.33%
44-55	9	10%
>56	6	6.67%
Occupation		
Professor	8	8.89%
Senior Lecturer	14	15.55%
Lecturer	15	16.68%
Research fellow (Postdoc)	4	4.44%
Research assistant	4	4.44%
PhD student	33	36.67%
Another researcher	12	13.33%
Level of awareness of IR		
Very High	15	16.67%
High	26	28.89%
Moderate	38	42.22%
Low	11	12.22%

The responses from the participants on IR utilization purpose are presented in Figure 2. The researchers showed that IRs are utilized for long term preservation (60) and to detect plagiarism (55). Other intentions included being up to date with recent information (54); it is an avenue to publish academic works (53); and to get information on relevant research areas (51).

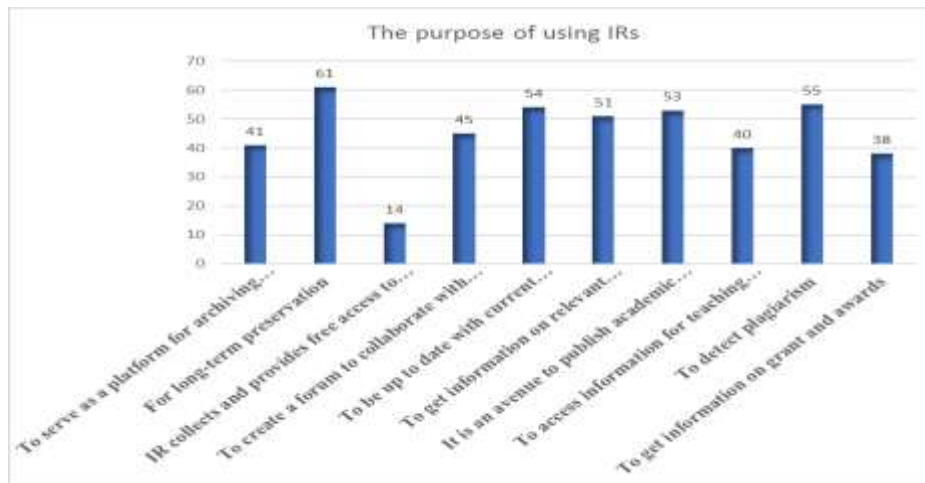


Figure 2. Responses on the purpose of using institutional repositories in UPM

The researchers were asked about the type of materials that they are interested in regarding the contribution to IRs. Figure 3 presents researcher's preferences in IR contribution. It clearly shows that most researchers were interested in the contribution of articles, thesis, journal bulletins, conference papers and books. The types of contributing material least interested in by researchers were exhibition materials and annual reports.

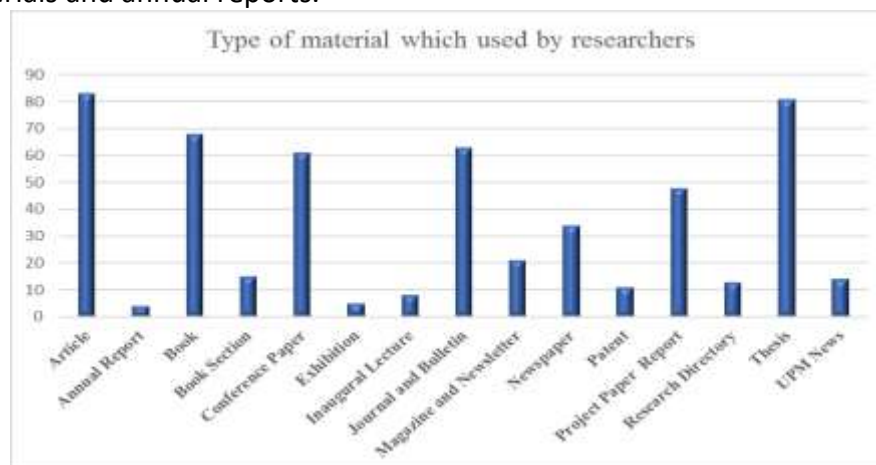


Figure 3. Researchers interest to contribute to IRs

Measurement Validity

For reliability and validity assessment of the questionnaire, several sets of tests have been done. As suggested by Hair et al., (2016), Cronbach's α , composite reliability, internal consistency, and convergent validity and discriminate validity are the initial step in the assessment of the measurement model. Table 2 summarizes the result of these tests. The Partial Least Squares (PLS), a statistical technique, was used to estimate the measurement model of the study to test instrument validity and reliability. The reliability and validity of the constructs in the measurement model are approved via internal consistency, discriminant validity and convergent validity (Barclay et al., 1995; Hair Jr, 2013). The validity and reliability of the measurement model were supported by the following criterion: (a) corresponded constructs' items factor loadings must be greater than 0.7; (b) Average

Variance Extracted (AVE) for all constructs must be greater than 0.5, and the AVE square root for every construct must be greater than correlations with other constructs of the model (Barclay et al., 1995; Fornell and Larcker, 1981; Chin, 1998); (c) Cronbach's alpha and composite reliability for all constructs must be over 0.7. Cronbach's alpha, composite reliability, the AVE and the item's factor loadings are presented in Table 2. Moreover, the correlations between the variables and each variable AVE are presented in Table 3. AVE square root is more than other correlations concerning every variable. Hence, the results support the reliability and validity of the measurement model.

Table 2: Results for the Measurement Model

Construct Items	Indicator	Factor Loading (>0.7) a	Cronbach α (>0.7) a	Composite Reliability (>0.7) a	Average variance extracted (>0.5) a
Attitude Towards Usage (ATT)	ATT1	0.82	0.83	0.88	0.66
	ATT2	0.76			
	ATT3	0.85			
	ATT4	0.872			
Behavioral Intention to Use (BI)	BI1	0.76	0.78	0.87	0.70
	BI2	0.88			
	BI3	0.86			
Facilitating Conditions (FC)	FC1	0.78	0.72	0.84	0.64
	FC2	0.79			
	FC3	0.83			
Perceived Ease of Use (PEOU)	PEOU1	0.81	0.85	0.90	0.69
	PEOU2	0.84			
	PEOU3	0.56			
	PEOU4	0.81			
Perceived Usefulness (PU)	PU1	0.79	0.76	0.86	0.68
	PU2	0.88			
	PU3	0.80			
Subjective Norm (SN)	SN1	0.79	0.84	0.90	0.76
	SN2	0.93			
	SN3	0.89			

Note:^a Indicates an acceptable level of reliability and validity.

All the constructs have AVE values greater than the value of 0.5, which satisfied acceptable values. In addition, Fornel-Larker criterion was applied for the discriminant validity of the constructs. As shown in Table 3, all the amounts of the square roots of the constructs' AVE were greater than its correlation with other constructs. This specified that discriminant validity between the constructs was fulfilled.

Table 3: Discriminant validity for the measurement model.

	ATT	BI	FC	PEOU	PU	SN
ATT	0.81					
BI	0.77	0.84				
FC	0.67	0.64	0.8			
PEOU	0.66	0.59	0.66	0.83		
PU	0.58	0.62	0.51	0.59	0.83	
SN	0.64	0.61	0.66	0.56	0.56	0.87

Hypothesis Testing

The next step after successful assessment of the measurement model is structural model assessment for examining the significance of the relations between constructs in the model. The hypotheses' test was used by testing the path coefficients, p-values and t-statistics analyses (see Table 4). The results of the structural model show that this model to be structurally good ($R^2 = 0.642$). Table 4 summarizes the results for hypothesis testing.

Table 4: Summary of the Structural Model Assessment

Hypothesis	Description	Path coefficient	t-Value	p-Value	Significant Level	Results
H1	ATT→BI	0.619	6.369	0.000	**	Supported
H2	PU→ATT	0.298	2.493	0.013	*	Supported
H3	PU→BI	0.264	2.737	0.006	**	Supported
H4	PEOU→PU	0.31	2.85	0.004	**	Supported
H5	PEOU→ATT	0.481	3.931	0.000	**	Supported
H6	SN→PU	0.398	3.095	0.002	**	Supported
H7	SN→PEOU	0.104	1.069	0.285	*	Not
H8	FC→PU	0.249	1.943	0.052	*	Not
H9	FC→PEOU	0.43	4.088	0.000	**	Supported

The structural model result indicates that there is a significant positive relationship between ATT and BI. The results ($\beta = 0.619$, t-value = 6.369, $P < 0.01$) provided evidence to support this hypothesis. Thus, intention to use IR is significantly influenced by ATT and H1 is supported. This finding is consistent with similar studies in the literature (Ukwoma & Dike, 2017) the similar conclusion of academics had the attitude toward using IR. This study suggested that there is a significant and positive relationship between PU and ATT and PEOU and ATT the results of the hypotheses test ($\beta = 0.298$, t-value = 2.493, $P < 0.05$) and ($\beta = 0.481$, t-value = 3.931, $P < 0.01$) also support this indication. The previous study by (Ukwoma & Dike, 2017) supported this claim and as highlighted in the TAM, ATT is influenced by the PEOU and PU of a system. So, the hypotheses H2 and H5 were supported. The research findings in the study indicate that PU has positive and significant influence on BI ($\beta = 0.264$, t-value = 2.737, $P < 0.01$), H3 was supported. This result is accordance with previous study by (Asadi et al., 2017; Çelik, 2011) that have been conducted on cloud computing and online shopping. The fourth hypothesis (H4) states that PEOU has a positive effect on

PU, this claim also was supported in this study ($\beta = 0.31$, t -value = 2.85, $P < 0.01$). This result is consistent with prior study, which conducted on software adoption behavior (Hsu, Wang, & Chiu, 2009). The hypotheses (H6) indicated that SN has positive significant influence on PU ($\beta = 0.398$, t -value = 3.095, $P < 0.01$), which is consistent with prior studies (Abbas, 2016; Venkatesh et al., 2003). The results of the hypotheses (H7 and H8) indicate that there is not significant relationship between SN and FC ($\beta = 0.104$, t -value = 1.069, $P < 0.05$) and FC and PU ($\beta = 0.249$, t -value = 1.943, $P < 0.05$), so they were rejected in this study. The H9 indicates that FC has positive and significant influence on PEOU ($\beta = 0.43$, t -value = 4.88, $P < 0.01$), H9 is supported. The result of this study is consistent with (Agudo-Peregrina et al., 2014). Among all the constructs, ATT has considered as a most influential factor which had the highest path-coefficient and t -statistics. It reveals that researchers have more attitude toward using and submitting their work on IR. This finding is similar with (Ukwoma & Dike, 2017; Wicaksana, Asandimitra, 2018), who indicated that academics had positive influence towards utilization of institutional repositories.

Conclusions and Future Work

The main aim of this research was to determine researchers' intentions and attitude concerning the utilization of institutional repositories. Accordingly, a model with nine hypotheses was developed through a modified Technology Acceptance Model. The model was evaluated by the data collected from a sample of 90 researchers at the UPM. As proved in the result's section, most researchers are aware of IRs and have a positive attitude in submitting their academic content on the IR to aid in increasing university ranking and citation impact of their work. This study proved that books, thesis, and articles comprise of the most material interested in by researchers for IR contribution. The results of the study indicate that from nine proposed hypotheses, seven were accepted and two of them were rejected. Moreover, the findings from the structural analysis revealed that ATT was considered as a most influential factor that influenced on behaviour intention. Which This finding is consistent with several prior studies that have identified ATT as key determinants of behaviour intention to use technology (Asadi et al., 2017; Khatatneh & Teh, 2018). Results from the representative sample data show that IRs were formed for long term preservation, to detect plagiarism, being up to date with recent information, avenue to publish academic works, and to get information on relevant research areas. The researchers suggest that future research can be carried out to better exploring the researchers' behavioural intention toward using institutional repositories in Malaysian research universities. As mentioned above, the focus of this study is on researchers. Further investigation is needed to test the model among different subjects, such as library staff and IT specialists.

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