

DETERMINANTS THAT INFLUENCE THE ADOPTION  
OF THE OMAN VIRTUAL SCIENCE LIBRARY  
(MASADER) IN HIGHER EDUCATION

BY

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## ABSTRACT

The government of Oman is attempting to bring modern technologies into its academic environment. One of the most important technologies is the virtual library. E-resources are not entirely deemed acceptable to be utilized in Omani higher education institutions according to the statistics that show a dramatic decrease in the use of (Masader) after the high usage at the initial launch of the project. This study aims to identify individual differences (ID) and system quality (SQ) determinants that impact the academics' acceptance of the Oman virtual science library (Masader) in higher education institutions in the Sultanate of Oman. Previous studies indicate that external variables play a crucial role in influencing the intent of the user to use e-sources. Based on this theoretical background, a group of external variables have been identified. Moreover, the study used the Technology Acceptance Model (TAM). A mixed-method was used to collect the data of 450 respondents from higher education institutions who are also members in Oman virtual science library (Masader). A set of non-parametric statistical methods in (SPSS) program were used to analyse the data after it had been ensured that the data follow the non-normal distribution. All the study questions were answered, and all the hypotheses of the study were proven. Briefly, the results revealed that academics have a high level of positive attitude towards the use of Masader, and a high level of intent to use e-resources in general. In addition, the results also revealed that there is a positive relationship between dependent variables and independent variables; and that the usefulness and easiness of Masader are considered to be an essential component, as the results of the linear regression test indicated that the effect of the external variables is stronger on the behavioural intention if it is through the indirect influence on the belief variables. However, the effect of the Individual differences (ID) and system quality (SQ) on the perception of easiness (POE) is greater than the effect on the perceived usefulness (PU). The study contributes as an addition to the body of knowledge and literature, especially in Oman, which was considered the first of its kind that investigates the factors affecting the willingness to use (Masader). Furthermore, the current study presents the evidence that attitudes are among the most important external independent variables and not dependent variables. On the other hand, practically, the study will contribute to the development of a useful road map for the various relevant groups (academics, decision-makers, researchers, information specialists, and librarians).

## خلاصة البحث

تسعى حكومة سلطنة عمان إلى إدخال التقنيات الحديثة في بيئتها الأكاديمية على مختلف المستويات، وتعتبر "المكتبة الافتراضية" من أهم هذه التقنيات. هدفت هذه الدراسة إلى تحديد متغيرات الفروق الفردية وجودة النظام التي تؤثر على قبول الأكاديميين استخدام المكتبة العلمية الافتراضية العمانية (مصادر) في مؤسسات التعليم العالي في سلطنة عمان. تشير الدراسات السابقة إلى أن المتغيرات الخارجية تلعب دورًا مهمًا في التأثير على نية المستخدم في استخدام مصادر المعلومات الإلكترونية. بناءً على هذه الخلفية النظرية، تم تحديد مجموعة من المتغيرات الخارجية الرئيسة ومتغيرات فرعية تدرج تحتها. علاوة على ذلك، ركزت الدراسة أيضاً على الاستفادة من تطبيق نموذج قبول التكنولوجيا (TAM). تم استخدام المنهج المختلط أو المندمج في هذه الدراسة وذلك عن طريق تطوير أداتين لجمع البيانات من 450 أكاديمياً في مؤسسات التعليم العالي الأعضاء في (مصادر). كانت الأداة الأولى عبارة عن استبيان تم تطويره بناءً على مراجعة الدراسات السابقة والخبراء، أما الأداة الثانية فكانت المقابلة المباشرة مع بعض الأكاديميين الذين شملهم الاستبيان. تم استخدام مجموعة من الأساليب الإحصائية الالعملية في برنامج (SPSS) لتحليل البيانات، بعد أن تأكد للباحث من أن البيانات تتبع التوزيع غير الطبيعي. كما تم استخدام تقنية (نموذج الانحدار الخطي) لاقتراح نموذج تنفيذي حول تحسين استخدام مصادر المعلومات الإلكترونية ل (مصادر). تمت الإجابة على جميع أسئلة الدراسة، كما تم إثبات جميع فروض الدراسة. أظهرت النتائج أن الأكاديميين يتمتعون بمستوى عالٍ من الموقف الإيجابي تجاه استخدام "مصادر"، ومستوى عالٍ من النية السلوكية لاستخدام مصادر المعلومات الإلكترونية بشكل عام. كما كشفت النتائج عن وجود علاقة إيجابية بين المتغيرات التابعة والمتغيرات المستقلة. بالإضافة إلى ذلك، أكدت النتائج أن الفائدة والسهولة عند استخدام "مصادر" تعتبر مكوناً أساسياً. حيث دلت نتائج اختبار الانحدار الخطي على أن تأثير المتغيرات الخارجية أقوى على النية السلوكية إذا كان ذلك من خلال التأثير غير المباشر على المتغيرات الاعتقادية (السهولة والفائدة). ومع ذلك، فإن تأثير الفروق الفردية وجودة النظام على تصور السهولة أكبر من التأثير على الفائدة المتصورة. تساهم الدراسة كإضافة إلى الإنتاج الفكري خاصة في سلطنة عمان، حيث تعتبر الدراسة الأولى من نوعها التي تبحث في العوامل المؤثرة في قبول استخدام (مصادر). كما أنها قدمت الدليل على أن مواقف المستفيدين هي من بين المتغيرات الخارجية المستقلة الأكثر أهمية ولا تنتمي إلى المتغيرات التابعة. من الناحية العملية، ستساهم نتائج هذه الدراسة في تطوير خارطة طريق مفيدة لمختلف المجموعات ذات الصلة بمصادر المعلومات الإلكترونية (الأكاديميون، صناع القرار، الباحثون، المتخصصون في المعلومات وأمناء المكتبات).

## **APPROVAL PAGE**

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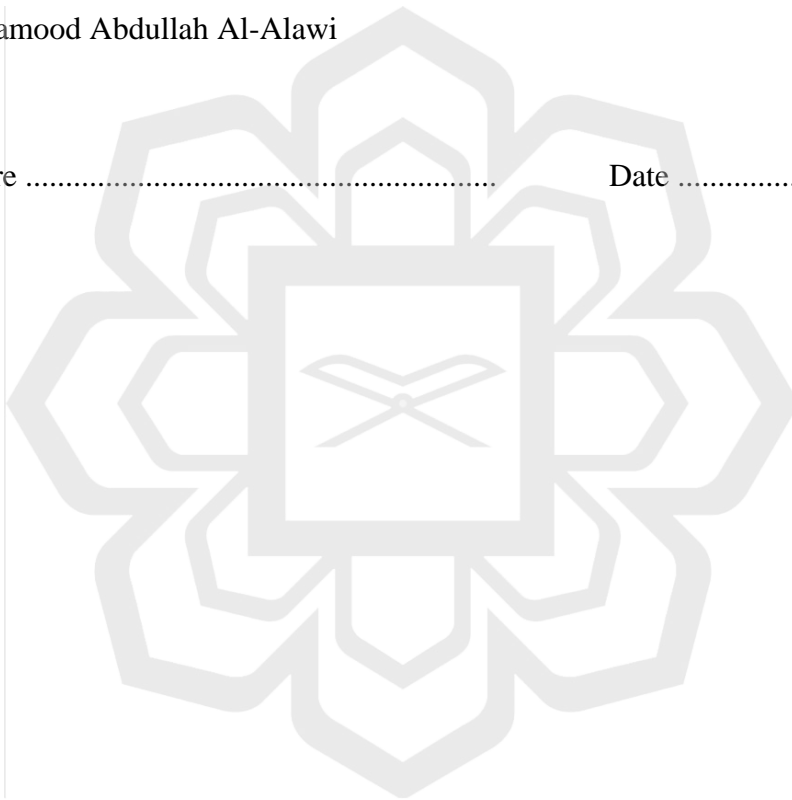
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## LIST OF ABBREVIATION

AA	Academics Attitudes
AC	Accessibility
BI	Behavioural Intention
CAS	College of Applied Sciences
CC	Computer Competency
EC	English Competency
EIR	Electronic Information Resources
HEI	Higher Education Institutions
ICT	Information & Communications Technology
ID	Individual Differences
IUM	International Islamic University Malaysia
IQ	Information Quality
IS	Information Systems
IT	Information Technology
KICT	Kulliyah of Information and Communication Technology
K-S	Kolmogorov-Smirnov Test
MASADER	Oman Virtual Science Library
MOHEIR	Ministry of Higher Education Research and Innovation
OMREN	Oman Research and Education Network
POE	Perception of Easiness
PU	Perceived Usefulness
SD	Standard Deviation
SE	Self-Efficacy
SEM	Structural Equation Model
SPSS	Statistical Package for the Social Sciences
SQ	System Quality
SQU	Sultan Qaboos University
TAM	Technology Acceptance Model
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action

TRC	The Research Council
UTAUT	Unified Theory of Acceptance and Use of Technology
VI	Visibility



# CHAPTER ONE

## INTRODUCTION

### 1.1 BACKGROUND OF THE STUDY

Information is the key for success in the modern age. The authenticity of information and the reliability of resources are required in every field. The information technology (IT) has transformed the old definition of libraries' operations from traditional preservers of books to digital service providers. Bhat and Mudhol (2014) state that now, the Internet is a required infrastructure for any higher education institution. The way data is processed (stored, organized, accessed, retrieved, and consumed) has changed due to the pace development of ICT. The needs of academics and researchers for information have changed and grown. Now, libraries must provide quick and comprehensive access to resources to academics and researchers by using the best possible tools and techniques. The emergence of electronic information resources (EIR) has dramatically changed the handling and management of information in libraries (Abubakar, 2017). E-resources are those resources that consist of electronically accessible records in an online digital environment, which includes various types of Electronic publications; such as e-journals, e-books, e-databases, patents, scholarly resources, etc. (Verma, 2013). In this age of ICT, e-resources are an integral part of teaching, learning, and research activities. E-resources enable innovative teaching, increase timeliness in research, and help in the creation and discovery of a new scope of inquiry (Kumar, 2017).

The importance of e-resources extends in universities and colleges because of users' demands for information for their research and scientific experimentations or their teaching and learning activities (Gautam, 2017). In response to this growing

demand, academic libraries as centres to provide information services in academic institutions need to improve their services in e-resources, for example, electronic databases. The availability of e-resources via the integrated library system enables libraries to provide information services to users 24 hours a day (Adegboro, 2011).

The utilisation of e-resources by academics and researchers shows the significant role of e-resources in research activities. It has become an essential part of resources centres in higher education institutions as it simplifies access to information and data. Sejane (2017) concurs that e-resources enable access to a broad domain of data from anywhere in the world, such as up-to-date scientific papers. It allows educational institutions to share information and to organize the output to a wide range of users with websites. There are international efforts around the world to let access and use of e-resources in academic digital libraries possible/within reach.

However, the willingness of users (general users, academics, and researchers) to use e-resources is still a significant scope of study to discover variables that can lead to the success of e-resources' usage in education and research (Kelson, 2016).

## **1.2 PROBLEM STATEMENT**

The advancement of Information & Communication Technology (ICT) has enabled the increase of electronic publications in various disciplines, and it has also changed some parts of educational activities in higher educational institutions (Uwaifo& Eiriemiokhale, 2013). Publishers saw in e-resources an opportunity for a cost reduction through reduction or elimination of printing and distribution charges (Greenberg 2015). In addition, e-resources allowed publishers to broaden their audience by reaching out to researchers at institutions around the world without restricting physical boundaries and distances (Machimbidza& Mutula, 2017). According to Sejane (2017), academic

libraries that were affected by the ever-increasing costs of print publications quickly welcomed the shift in emphasis from ownership to access. This move reduced costs and broadened the resource base for their users, chiefly academics and students. This rapid change includes the method in which information in the university community is provided, and improving the availability of e-resources in academic societies particularly, such as online databases, disks, electronic journals, commercial or open-sources, electronic books, digital repositories, and other forms of e-resources. Al-Harrasi and AL-Aufi (2012) emphasized the need for cooperation between academic libraries in providing academic and research services. This cooperation should be, especially, at the level of providing information-resources due to the high prices and the constant change of curricula and study plans, which leads to the need to change the sources of information, as well as the increasing demand for information sources in the English language which is caused by the shift in the medium of instruction in most universities and colleges to the English language.

The Sultanate of Oman is not an exception in this regard. With more than 40 universities and colleges across the country, there is an urgent need to establish a central national resource. A centre that can provide all academics, researchers, and students with the research support they need to conduct world-class scientific research is the key pillar in building the knowledge economy (The Research Council, 2014).

Based on the Royal Decree No. 54/2005 which determines terms of reference of The Research Centre, TRC has set up a full-time working group to achieve this goal. The result was a draft of "Oman virtual science library" project called "*Masader*". The initial project proposal was formulated in 2009, with advice from international experts. The Steering Committee of the Scientific Research Council was formed in May 2013, while the first technical experiment was conducted one year later. This was followed by

other experiments during 2015; after which the project budget was approved and the design of the website, search engine, technical resources and content were ready. The project was launched in September 2017 (The Research Council, 2017). Masader is available to universities and colleges as well as to other academic and research institutions belonging to the Oman Research and Education Network (OMREN) which is initiated by (TRC) to introduce such a national network for Oman. OMREN aims to collaborate with research & education institutions by providing world-class e-infrastructure to their practical needs (The Research Council, 2019).

During the initial stage of Masader launch, there was a high usage (downloads and accesses of articles); however, it declined later of that year (Figure 1.1). Therefore, this research aims to resolve this problem and provide solutions to Oman Government as a national blueprint in education and research.

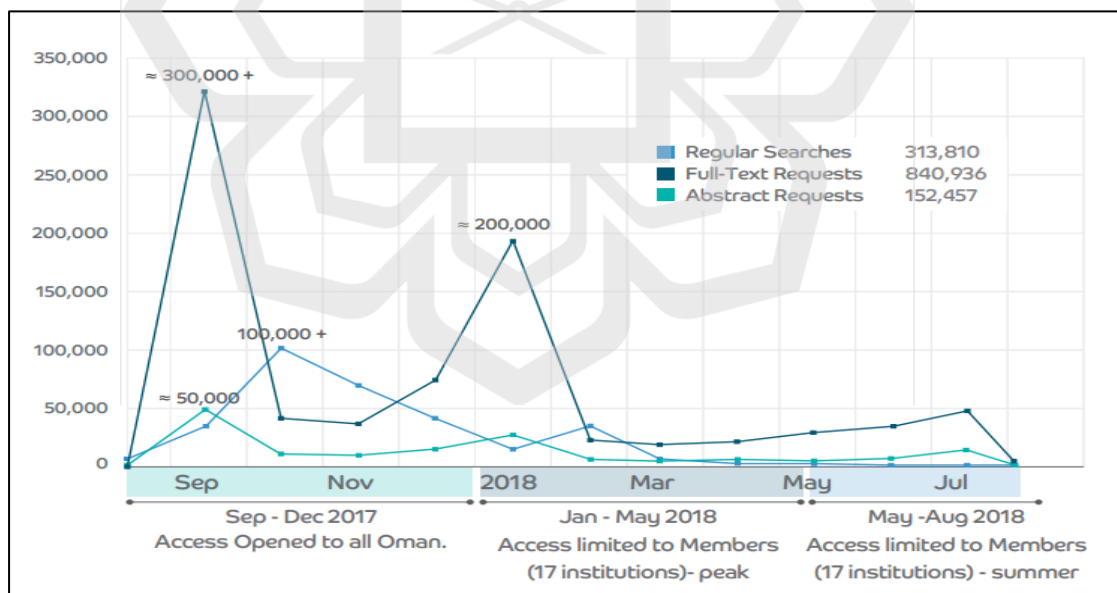


Figure 1.1 (Masader) statistical custom service outcome  
 Note. The figure was produced by EBSCO discovery solution (EDS), 2018

Many studies have tried to answer questions about electronic information sources such as (what?), what do we mean by e-resources? And (how?), How do we

benefit from e-resources? (Adegbore, 2011; Martens, 2012). However, only few studies have tried to answer the question (why?), why the users decide to use the e-resources? What are the determinants and how do these determinants affect the user's behavioural intention to decide to use e-resources to accomplish his scientific and practical tasks? Understanding how users decide to use e-resources by studying the determinants and factors that influence the making of such a decision is highly important. (Tao, 2008).

Studies that have investigated the influencing factors on academic's behaviour towards e-resources focused on the developed countries such as Europe, America, and some parts of Asia (Machimbidza& Mutula, 2017). Some studies examined the impact of some external variables that may impact the intention of selecting e-resources and relating to the systems such as quality factor (Ratnasari & Sensuse, 2017; Lwoga, 2018) and accessibility factor (Marton, 2002). Other studies argued that factors like cost savings of material and learning experiences interactive within higher education (Kelson, 2016). Some studies were also concerned with the factors related to the characteristics of the user of electronic information sources, like individual innovativeness characteristics (Akgün, 2017), and pre-service technology preparedness (Shittu, 2017).

In Oman, several studies have dealt with the academic's literacy about the importance of e-resources, to what extent they use them, and to what extent they meet their information needs; moreover, they have also dealt with the academic libraries' role in advertising their collections of electronic information sources (Hakmani, 2014; Gabri, 2005; Awfi, 2010; Awfi, 2006). But there is a small number of studies that focus on variables and determinants that impact the adoption of this type of information resources. The academics in Oman have not conducted thorough researches in this area; only a few published studies that discuss this issue (Alawi, 2013; Alawi, 2014).

In other words, this problem is realistic on the ground, as the government of the sultanate of Oman has spent large sums of money to launch the Masader project which aims to provide scientifically high-quality information resources and encourage scientific and academic research as well as to reduce costs and broaden the information resource base for the users. But the decline in the usage rate after it had reached its peak at the beginning of the launch of the project was the motive to explore the reasons for this decline and investigate the most important factors affecting the acceptance of the use of Masader by faculty members in higher education institutions.

Accordingly, to resolve this problem and help the government reach solutions, effective theoretical and practical framework, and design a national blueprint for the use of Masader e-resources; this study will investigate whether individual differences (ID) and system quality (SQ) determinants have impacts on the academic's adoption of e-resources of Oman virtual science library (Masader) in higher education institutions.

The external variables were selected based on the researcher's practical experience in a higher education institution through direct observation and communication with users of e-resources. Also, the literature review helped in identifying and building the external variables that are expected to influence the belief and behavioural variables to adopt the use of Masader e-resources as an information system. Moreover, according to Davies (1989) the acceptance of technology is based on:

- Individuals using the system.
- The system used.

### **1.3 RESEARCH AIMS AND OBJECTIVES**

This study aims to identify individual differences (ID) and system quality (SQ) determinants that impact the academics' adoption of e-resources of Oman virtual science library (Masader) in higher education institutions, which will be accomplished through the following objectives:

1. To study the current environment of Masader's usage.
2. To identify the belief variables (perception of easiness and perceived usefulness) that affect the behavioural intention to adopt the use of Masader.
3. To identify the external variables that affect the behavioural intention to adopt the use of Masader.
4. To identify the demographic data (gender, age, and years of academic experience) that affect the academics' behavioural intention to adopt the use of Masader.
5. To propose an implementation model on how to optimize the use of e-resources in Masader.

### **1.4 RESEARCH QUESTIONS**

With a view to achieving those objectives and based on the researcher's practical experience in a higher education institution which was through direct observation and communication with the users of e-resources, in addition to the literature review which helped to identify the gap in the published literature; the following questions were formulated:

1. What is the relationship between perception of easiness and perceived usefulness, and the behavioural intention to adopt the use of Masader?