CHAPTER 1

INTRODUCTION

Major developments in information technology and information systems have resulted in an increasing demand for automated processes that upgrade and modernize activities that were previously handled in traditional, labor intensive, ways.

Information systems of all kinds perform the same roles as were previously undertaken by humans, but with greater accuracy and in a shorter time. Information systems ensure that the relevant data is collected, processed, and forwarded with minimum delay while meeting the expectations of system managers, individuals, groups, and even entire organizations (Abubakar et al., 2017). Among the information systems that manage organizational tasks and perform most of the procedures handled by conventional methods are Student Information Systems (SISs).

SISs are software applications that manage student data in educational institutions. SISs provide the capability of entering the database of the university, checking test results, discipline records, and other assessment scores associated with a student. Such capabilities can enhance communication between lecturers, management and other staff of the university (Inoco and Hernand, 2017). SISs are used to build student schedules, track student attendance at the university and to manage many other student-related data needs, which enhance the efficiency of the management of the whole educational process in the university.

This section describes the importance of SISs in higher education institutions and their primary characteristics. It includes the research background, problem statement, research aim and objectives, research questions, research significance, research scope, and the contribution of the research to knowledge.

1.1 Background of the Study

In the past, the universities created their own traditional student record systems. However, the complexity of business in educational institutions is increasing rapidly, and modern universities have endeavored to implement customizable software and computer systems that provide many of their services online for teachers and students, as well as other beneficiaries of the system.

Many educational institutions in developing countries depend on SISs for managing different services and facilities online. For example, the United Nations International University of Hanoi uses a University Information System called ISIS. ISIS is a customizable solution that provides all the items mentioned and can be adjusted to meet additional needs as they arise. The International University of Luxembourg is using a SIS product called PCR. The American University – Malaysia uses SIS software called Power University, from Pearson, while the American International University – Riyadh uses Skyward; which is a comprehensive system for providing a student information online portal.

Most of these existing SISs are server-based, which means that the application is located on a local server inside the university and accessed by clients inside and outside the university. SISs are vital to universities because they not only keep student records but also assist decision-makers by generating important reports regarding

students, lecturers, departments, faculties, and the curriculum (Bayangan-Cosidon 2016). The implementation and propagation of such information systems are dependent on many factors, such as the information quality and information presentation.

Educational institutions in Malaysia have made rapid progress in adopting SISs to improve their strength at higher educational levels and to maintain a prestigious profile which is realizable by taking full advantage of the SIS and harvesting each opportunity (Nagpal et al. 2016).

After 1996, a few information systems were introduced in Malaysian educational institutions but without great success (Pinho et al. 2018). Then, as part of the Smart University Project, the Ministry of Education introduced the Smart University Management System (SUMS) for smart educational institutions (Government of Malaysia, 1997). This ambitious system aims to provide extensive functions for the administration of educational institutions and the management of student data. However, we have yet to see SUMS implemented in all educational institutions.

1.2 Research Problem

The importance of SISs for universities has received much attention in recent years in parallel with the development of information systems (ISs) (Bayangan-Cosidon, 2016; Moghavvemi et al. 2018; Al-Hawari et al. 2018; Hellmuth, 2015; Truong, 2016). Researchers have established that a SIS can contribute to student learning and improve their academic results in all areas by engaging students with their faculty through interactive communication using SIS online tools (Chrysafiadi and Virvou 2015).

However, many studies have found that users (students) may not use their SIS frequently if the quality of the online services are not of a high level. For example, if the content supplied by the SIS is not complete, if the interface with the system is difficult to use, or if the navigation between pages is complex (AlMulhem, 2020; Salloum and Shaalan 2018; Karjaluoto et al. 2011; Hou, 2018; Hellmuth, 2015). Other studies have indicated that user satisfaction with SIS could also be affected negatively if the system does not possess quality factors such as usability, content, and responsiveness (Atta and Romli 2018; Manal et al. 2015; Hellmuth, 2015).

Moreover, some SIS applications are inflexible and inconvenient, the content of the data does not reflect the actual needs of the users, and if the system responsiveness is slow, users may not wish to use it again. All these factors affect the quality of the system and can reduce willingness to use SISs (Harsasi and Sutawijaya 2018; Al-Salloum and Shaalan 2018; Panggabean et al. 2020; Hou, 2018; Alanazi, 2015; Dreheeb et al. 2016).

According to Atta and Romli (2018) the majority of SIS users have an unfavorable experience after their login to the system, such as the long time it takes to receive a response from the system, or an interface that is very complex which makes navigation between pages a difficult task and reduces the efficiency of the system. These authors show that more than 50% of users have faced some barriers to using SISs and do not want to use the system again. It has been found that the absence of usability, flexibility, data quality, and responsiveness in a SIS will drive users to use traditional procedures to deal with their faculty. For example, to get a service or information, students will attend the service counter at their faculty (Salloum and Shaalan 2018; Moghavvemi et al. 2018; Young et al.2018; Mkinga and Mandari 2020; Atta and Romli 2018).

An interview with the head of the IT department in one higher education institution in Malaysia showed that the SIS implemented by that university lacked certain features in terms of system quality including: a complex user interface, slow response, and the system being frequently down. The interview also revealed that certain functions were not provided by that particular SIS, such as reporting, searching, and online payment. Thus, the satisfaction of the university students towards that SIS was not encouraging. It is evident that certain issues and problems associated with the current system at that university still persist and need further investigation. The IT department staff in support of the departmental head urged developers of information systems to focus on identifying the factors (dimensions) representing system quality, and attempt to measure them in order to enhance SISs with those quality factors.

From the above discussion, it is clear that there is a gap in the literature, particularly research that identifies all possible components that influence user satisfaction. For example, it is evident that the SIS of the university lacks certain quality factors that affect the intention of students to be regular users and rely on SIS for most academic services. This issue is found in other universities in Malaysia and affects the intentions and satisfaction of users. For example, in their study, Mir and Mehmood (2016) used the DeLone and McLean (D&M) IS success model (2003) to consider the constructs: system quality, intention to use, and user satisfaction. Their survey results indicated that the online support system satisfied the majority of the students in terms of technicality and functionality but also indicated that the SIS was lacking in terms of content, usability, and responsiveness. This research investigates three main components in detail: (1) system quality, (2) intention to use, and (3) the user satisfaction and, more importantly, the relationships among them.

According to the literature, many factors affect system quality such as usability, functionality and convenience (Ojo, 2017; Sandoval-Guzman and Petrie 2017; Taat and Francis 2020). Motivated to overcome the weaknesses in the system as highlighted above, this research aims to uncover all the quality factors in a SIS. It has been established in the D&M IS success model (2003) that system quality affects user satisfaction and intention to use. However, the literature survey revealed that only direct relationships have been studied and reported. Specifically, the relationship between system quality and user satisfaction when considering the intention to use has not been studied.

This research aims to study and verify the established relationships, and further investigate the mediation role of the use of Islamic features that previous researchers found to be significant in the overall evaluation of an IS (Hameed, 2009; Mehad et al. 2010). Since Islamic factors are likely to influence the perception of the user, many researchers have considered the use of such factors in information systems such as internet banking, credit/debit cards, and Islamic websites. In the context of this research, Islamic features might influence both the intention to use and user satisfaction. Therefore, this research will investigate the effect of Islamic features on the intention to use a SIS. Furthermore, the research aims to propose a model to explain and extend the whole theory of SIS quality model.

1.3 Research Questions

This research addresses the following research questions:

Q^1. What are the quality factors for a Student Information System?

Q^2. What are the factors that influence satisfaction?

Q^3. What is the relationship between Islamic features and intention to use?

Q^4. How can structural relations be established among the quality factors, intention to use, and user satisfaction?

Q^5. How can a model of satisfaction be validated to use for assessing Student Information System quality?

1.4 Research Objectives

The purpose of this research is to investigate the effect of system quality factors on user satisfaction while considering the mediating effect of intention to use on that relation.

Therefore, the objectives of this research are:

1. To identify the quality factors for a Student Information System.
2. To investigate the factors that influence the satisfaction with a SIS, based on:
   i. the influence of system quality on user satisfaction directly.
   ii. the influence of system quality on the intention to use.
   iii. the influence of intention to use on the user satisfaction.
   iv. the influence of system quality on user satisfaction while mediating the intention to use factor.
3. To investigate the relationship between Islamic features and intention to use.
4. To develop a model of user satisfaction for Student Information System quality using the DeLone and McLean model.
5. To validate the model of user satisfaction for Student Information System quality.

1.5 Research Hypotheses

Based on the developed model, the following hypotheses are tested on the basis of the survey and analyses reported in Chapter Four.

H1: Identify factors affecting the system quality of the SIS.

Following from H1, the following sub-hypotheses will be evaluated:

H1a: There is a statistical relationship between usability and the system quality of the SIS.

H1b: There is a statistical relationship between functionality and the system quality of the SIS.

H1c: There is a statistical relationship between flexibility and the system quality of the SIS.

H1d: There is a statistical relationship between convenience and the system quality of the SIS.

H1e: There is a statistical relationship between data quality and the system quality of the SIS.

H1f: There is a statistical relationship between responsiveness and the system quality of the SIS.

H1g: There is a statistical relationship between accessibility and the system quality of the SIS.

H1h: There is a statistical relationship between timeliness and the system quality of the SIS.

H2: Identify whether there is a statistical relationship between Islamic features and the intention to use the SIS.

H3: Identify whether the system quality of the SIS influences the intention to use the SIS through a causal relationship.

H4: Intention to use SIS influences user satisfaction through a causal relationship.

H5: Intention to use SIS mediates the relationship between the system quality of the SIS and user satisfaction.

1.6 Research Scope and Limitation

This research aims to identify the SIS quality factors and study the relationship of system quality on user satisfaction while considering the mediating role of intention to use. The research was conducted at University Science Islamic Malaysia (USIM) for the following reasons:

1. USIM has an older SIS that has experienced a number of issues and problems. However, the system was upgraded in 2017 and that solved many of the previous issues. This research selected the SIS of USIM as a case study to include the system upgrade and to investigate the issues remaining in the new SIS.
2. The literature review has indicated Islamic features have an effect on the information system user satisfaction. USIM is an Islamic university that includes and employs Islamic features in its SIS. Thus, the SIS at USIM represents a good example to evaluate this claim and to measure its actual significance, if any.

The target population of the research is postgraduate students. The research did not cover the undergraduates or consider the parents' perspectives. The respondents' sample size was selected using a non-probability convenience sampling technique

As listed in H1a to H1g, this research identifies and defines eight SIS quality factors: usability, functionality, flexibility, convenience, data quality, accessibility,

timeliness, and responsiveness. A quantitative approach is adopted for data collection, with SPSS Amos used to analysis the collected data and develop the research model. To analysis the relationship between the research variables, factor analyses is used to test the research hypotheses and develop the structural equation model.

1.7 Research Significance

This research is significant for the following reasons:

1. It uncovers and identifies the main factors that influence the quality of a SIS.
2. It uncovers the main relationships between user satisfaction and the factors that influence it.
3. Theoretically, it uncovers a more comprehensive model that explains the dependencies between the factors that affect the SIS.
4. It will uncover the influence of employing Islamic features in the content or the design of an SIS on the overall user satisfaction.

This research is significant to system users because its main research outputs and recommendations will significantly benefit users as a group. Additionally, the research outputs will be of significant interest to information system developers, and to educational institutions and their management.

Moreover, certain gaps in present knowledge are investigated in this research, so the outcomes will enhance understanding concerning information systems. In particular, the research develops a new perspective, an understanding of how Muslim users are better satisfied when they realize that the information system they are using includes Islamic features in the design of the interface, that the service provided by the system is not contrary to Islamic law, and that the information they receive from the

system is compliant with Sharia. These results will provide a basis of support for future studies in this area.

To summarize, the research provides a comprehensive insight regarding student information systems and the main factors that influence the quality of their performance, especially the satisfaction of Muslim users.

1.8 Research Gaps

The literature showed that SISs have been widely studied around the world. Most of the studies focused on factors that influenced the intention to use and adopt, and the performance of the information systems (Samsudeen and Mohamed 2019), but overlooked technological factors, such as system quality. Mahmud et al. (2017) suggested that, globally, higher education institutions need to consider the essential quality factors that increase the users' intention to use the information system. However, this topic has not been studied extensively in Malaysia. The literature shows that few empirical studies have been conducted on SISs and examined system quality factors. In Malaysia, there is a lack of studies that have addressed quality factors in ISs in the higher education domain. Moreover, no previous studies have been conducted in Malaysia to investigate the effect of the combinations of the eight factors listed in Section 1.6 on the intention to use and satisfaction of SIS users. Most existing studies discussed the variables of the D&M IS success model. However, it is found that the standard or common factors of system quality, one of the three independent variables in the D&M IS success model, has not been examined extensively, particularly as it relates to SISs. Different researchers have used different quality factors (Jalal and Al-Debei 2012; Nordaliela et al. 2013; Sherifi, 2015; Mir and Mehmood 2016; Bayangan-Cosidon, 2016; Inoco and Hernandez 2017; Gürkut and Nat 2017).

The outcomes of this research will fill this gap in the literature by providing empirical evidence related to the impact of the SIS success model based on user satisfaction and intention to use, via the influence of system quality. Furthermore, the review of the literature showed that certain factors associated with the intention to use ISs, utility, advantages of the system and Islamic features, have not been examined with relevance to SISs. This research is an empirical attempt to fill this gap in the literature concerning the effect of these factors on the intention to use SISs, and other ISs. Most studies that focus on Islamic features are related to ISs in banking and e-commerce, as shown in Table 1.1.

Table 1.1: Publication related to IS and SIS showing those containing Islamic features

No.	Authors	IS	SIS	Islamic features	Origin
1	Albashir et al. (2018).	√	×	√	Libya
2	Bayangan-Cosidon (2016).	×	√	×	Philippine
3	Gürkut, (2017).	×	√	×	North Cyprus
4	Haider et al., (2018).	√	×	√	Pakistan
5	Inoco & Hernandez (2017).	×	√	×	Philippine
6	Al-Aaidroos et al. (2017).	√	×	√	**Malaysia**
7	Aziz & Johari (2013).	√	×	√	**Malaysia**
8	Musbahtiti & Muhammad (2013).	√	×	√	KSA
9	Mir & Mehmood (2016).	×	√	×	Pakistan
10	Ramírez-Correa et al. (2018).	×	√	×	Chilean
11	Shome et al. (2018).	√	×	√	UAE
12	Sherifi, (2015).	×	√	×	Albania
13	Kolan et al., (2018)	√	×	√	**Malaysia**
14	Rahim et al. (2018)	√	×	√	**Malaysia**

Studies 2, 3, 5, 9, 10, and 12 examine SIS in higher education institutions but did not consider the effect of Islamic features on user satisfaction. This represents a significant gap in the literature. Studies 1, 4, 6, 7, 8, 11, 13 and 14 examine the application of ISs in the banking and e-commerce sector and focus on Islamic features

and issues in relation to usury, gambling, and fraud (Al-Aaidroos et al. 2017). Study number 12 investigated Islamic features in e-learning. Islamic features have a significant effect on ethics and can prevent the unethical behavior of students. Ethics is significant for developing appropriate Muslim conduct and character as commanded by Allah in the al-Quran. Islam offers a comprehensive ethical guide to individuals, families, and society, in all aspects of modern living (Ebrahimi, 2017).

Table 1.2: Publications Identifying System Quality Factors

AUTHORS	IS		**Measurement of System Quality**	
	Others	**SIS**	**Factors**	**D&M (2003)**
Martins et al. (2019)	√		ease of use, flexibility , reliability, and response times	√
Mkinga & Mandari (2020).		√	performance, usability	√
Arenas-Gaitán et al. (2018)	√		information quality and system quality	√
Aldholay et al. (2018)	√		easy to use, flexible, understandable	√
Daghouri et al. (2018)	√		access, ease of learning, flexibility, reliability and response time	√
Puspitarini, (2018)	√		ease of use, reliability, response time and accessibility,	√
Robo et al. (2018)		√	system quality	√
Ramírez-Correa et al. (2018)		√	system quality	√
Yakubu & Dasuki (2018)	√		usability, responsiveness, adaptability, and reliability	√
Tian and Xu, (2017)	√		ease of use, usefulness	√
Alzahrani et al. (2019)	√		reliability, accessibility, response time, ease of use	√
Zuama et al. (2017)	√		availability, speed of response, flexibility, ease of use, feasibility, consistency	√
Gürkut & Nat (2017)		√	reliability, convenience, ease of use, flexibility	√
Inoco & Hernandez (2017)		√	ease of use, accessibility	√
Bayangan-Cosidon (2016)		√	usability, maintainability, security, usefulness, functionality.	√
Mir & Mehmood (2016)		√	performance, usability	√
Gürkut & Nat (2016).		√	convenience, reliability, flexibility	
Sherifi, (2015)		√	satisfaction, service quality	√

Table 1.2 lists the system factors that were studied by the given researchers to measure the respective qualities of the SIS. On this basis it is proposed to study eight factors to determine the SIS system quality: usability, functionality, flexibility, data quality, responsiveness, accessibility, and timeliness. It is noteworthy that eight of the nine studies used the D&M IS success model (2003) which remains the dominant method for measuring the success of ISs. Table 1.2 is a sub-set of Table 2.10 which shows that 40 of the 45 empirical studies reviewed that used the D&M IS success model were related to banking, e-commerce, sectors, e-learning, e-government, and cloud computing, not SIS.

1.9 Thesis Structure

This thesis is organized into five chapters as follows:

Chapter 1: Introduction - Chapter 1 provides a brief introduction to the research topic and the research background. Moreover, the chapter presents the research problem, aim and objectives, hypotheses, scope, and significance.

Chapter 2: Literature Review - Chapter 2 covers the main definitions, concepts, and theoretical bases discussed in the literature, and highlights the main findings, provides a critical review, and identifies the research gaps.

Chapter 3: Research Methodology - Chapter 3 covers the methodology followed in this research including the research approach, framework, survey population, sample size, and data handling.

Chapter 4: Results and Analysis - Chapter 4 covers the survey, statistics, and the analytical test results together with a discussion of the results.

Chapter 5: Conclusions and Recommendations - Chapter 5 summarizes the research and revisits the aim, objectives and their fulfilment. Moreover, the main research

contributions, findings, conclusions, and recommendations are highlighted and presented.