

2020

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Maryam Almusallam

University of Technology Sydney, maryam_almusallam@outlook.com

Daniel Chandran

University of Technology Sydney, Daniel.Chandran@uts.edu.au

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Recommended Citation

Almusallam, Maryam and Chandran, Daniel, "Individual and Social Perspectives of Business Intelligence Systems: User Intention in Saudi's SMEs" (2020). *ACIS 2020 Proceedings*. 74.

<https://aisel.aisnet.org/acis2020/74>

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Individual and Social Perspectives of Business Intelligence Systems: User Intention in Saudi's SMEs

Research-in-progress

Maryam Almusallam

Faculty of Engineering and Information Technology
University of Technology Sydney
Sydney, Australia
Email: maryam_almusallam@outlook.com

Daniel Chandran

Faculty of Engineering and Information Technology
University of Technology Sydney
Sydney, Australia
Email: daniel.chandran@uts.edu.au

Abstract

Globally, decision makers in companies have been attracted by Business Intelligence Systems (BISs) for their high ability in forecasting the current and future views of the decision process in business operations. Surely, the impacts of BIS will be realized when these systems are used intensively. Based on the literature, more than 70% of BIS projects fail to achieve their expected returns and benefits. Review of literature shows there is dearth of research surrounding BIS acceptance in SMEs especially in developing countries such as Saudi Arabia (SA). This study extends the current literature of users' post-adoption behaviour of BISs by proposing model that integrates individual and social perspective factors as effective factors in BIS user behaviour intention in Saudi's SMEs. BIS and SME characteristics have been considered in the implementation of this model. This study seeks to address the gap in the literature and provide better understanding of BIS post-adopt behaviour in SMEs

Keywords Post-adopt, SMEs, Business Intelligence Systems, BIS, Saudi Arabia

1 Introduction

In late 1990s, introduction BISs in companies was result of advances in information systems and operational technology (Ain et al. 2019). BIS refers to business product that assists higher administrations to make decisions efficiently and timely (Popović et al. 2012).

In today's world, a BIS is an essential tool to help the decision makers' process in companies. In fact, the increase of competition from online and conventional business has made BIS extremely important for companies to enhance their efficiency and services (Ain et al. 2019). Chaudhuri, Dayal and Narasayya (2011) state that, these days, it is difficult to find a successful enterprise that has not embedded a BIS in its business. Therefore, many organizations, including Small and Medium Enterprises SMEs, have leveraged BISs on their work to achieve competitive advantages.

The importance of BISs has significantly increased according to Gartner's chief information officer survey (Gartner 2018). The results of this survey showed that BISs would be the most important area for differentiating businesses from their competitors in 2018 (Gartner 2018). Also, in 2017, the BIS market globally increased by 7.3% with revenues of about \$18.3 billion, with the expectation of reaching \$22.8 billion by the end of 2020 (Gartner 2017). Despite the phenomenal growth of the BIS market worldwide, more than 70% of BIS projects have not achieved their expected returns and benefits (Ain et al. 2019; Tom E et al. 2017). One of the main reasons for failure is the refusal of the end-user to use the BIS (Tom E et al. 2017). Accordingly, understanding how to facilitate the individual post-adoption of BIS is very important.

Thorough research has been done in information system (IS) technology adoption and acceptance on firms and individual levels, there is a dearth of information regarding the adoption of BISs in SMEs in individual levels (Ain et al. 2019; Md Hatta et al. 2015; Yoon et al. 2014). Popović, Hackney, Coelho and Jaklič (2012) state that "different types of ISs require specific success models, and users prefer different success measures depending on the type of system being evaluated". Also as a response to DeLone and McLean call (2003) to consider the nature of systems when researching information system success. BIS has its own specific features that are different from other types of ISs and these features mentioned below have an impact on all dimensions of BIS success, including system use (Grublješić and Jaklič 2015; Popović et al. 2012). These differences are the primary reasons why the field of BIS adoption needs to be examined independently from conventional IS adoption. Additionally, factors affecting BIS adoption process will be outlined accurately. (Puklavec et al. 2018).

With regards to BIS user intention and behaviour there is an existing gap of knowledge concerning developing countries, particularly in the Saudi Arabia (SA) (Ain et al. 2019). Recently, a survey published by the International Institute for Management Development (IMD) found that the business competitiveness in SA improves faster than any other countries (IMD 2019). The SA rose 13 places, jumping to 26th in the world (News 2019). These improvements are more prominent in establishing new business sector according to the World Bank Group (Bank 2020). As a result of increasing numbers of SMEs, there is increase in use of innovation technology such as BIS in SA. Obviously, BIS post-adoption in SA is very crucial to be studied and researched.

Literature review shows that there is shortage in studying BISs adoption and acceptance in SMEs (Ahmad et al. 2020; Almusallam and Chandran 2020). Furthermore, most of the literatures on BISs acceptance in SMEs are focused on firm level and they do not study individual level thoroughly (Almusallam and Chandran 2020). The effects of the individual and social perspective factors on user intention to use BISs in SMEs needs more study (Ain et al. 2019; Almusallam and Chandran 2020). Consequently, this study is an attempt to fill that void by exploring the individual perspective factors (performance perceptions, effort perceptions, personal innovations, user IT knowledge) and social perspective factors (social influence and image) affecting user intention to use BISs in SMEs. This study builds on integrated established theories; mainly unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al. 2003) that include performance perceptions, effort perceptions and social influence. Image from diffusion of innovations DOI developed theory by Moore and Benbasat (1991). Personal innovations and user IT knowledge from Boonsiritomachai et al proposed framework for BI adoption in SMEs (2014). For the purpose of this study, the following research question has been formulated:

RQ: What are the individual and social factors that influence decision-makers/managers' intention to use BIS in Saudi's SMEs?

Based on the literature review of BISs adoption and acceptance in SMEs, this paper aims to explore the factors influence user acceptance of BISs in SMEs. To achieve this, initial proposed model has been implemented that includes individual and social perspective factors as effective factors in BIS user behaviour intention in Saudi's SMEs.

2 BIS Characteristics and Information System (IS)

Despite the similarities that the different types of ISs share, previous researchers have revealed key differences among BISs and other types of ISs (Grublješić and Jaklič 2015; Popovič et al. 2012; Puklavec et al. 2018). To define the BIS acceptance factors, the particular features of BISs compared to operational ISs need to be recognized (Grublješić and Jaklič 2015). There are a number of differences between operational ISs and BISs. The processes and information used in BIS are less structured than processes and information used in ISs, the reason behind that is the use of this information and processes in BIS usually more explorative whereas the use of the processes in ISs is more exploitative (Puklavec et al. 2014). Also, the use of BIS in most cases is voluntary (Grublješić and Jaklič 2015). The importance of voluntariness of using systems have been previously identified by researchers while studying users' behaviour (Venkatesh et al. 2003). Moreover, The most benefits of BIS are more indirect and long-termed and difficult to measure compared to operational IS (Popovič et al. 2012). Additionally, the BIS users are usually decision-makers at higher levels of the organization, while the ISs can be used by any employee at any level of the organization (Puklavec et al. 2018). Also, the BIS users are typically more educated who mostly have great experience and skills regarding the system applications (Grublješić et al. 2019; Luo 2016). Based on the above differences, it is clear that the importance of understanding the determinants of BIS adoption completely is evident, and to achieve this, we must undertake an integrative view that starts with prior IS adoption research and develops it to comply with the nuances of BIS.

3 Factors Relating to BI Adoption in SMEs

Most BIS users in SMEs are the enterprise's managers and decision-makers (Jaklič et al. 2018). Which means, the decision-makers/managers' characteristic factors will have a huge impact on BIS adoption and acceptance. Surprisingly, these factors have been ignored by researchers (Ain et al. 2019). Therefore, in this research, we propose the performance perceptions, effort perceptions and user characteristics, which include personal innovations and user IT knowledge, as individual perspective affecting behavioural intention. Additionally, the social perspective, such as social influence and image, are other factors which have high impact on behavioural intention to use BISs in large companies (Grublješić et al. 2019; Jaklič et al. 2018). These factors need to be examined in the SME field. Although, the SME is not small version of large company, it has differences in term of structure, policy and resources (Boonsiritomachai et al. 2014). Researchers have proven a similarities in some adoption factors (Md Hatta et al. 2015; Popovič et al. 2019). As a result of discussed literature review above initial research model has been proposed (Figure 1), with justifications for each factor.

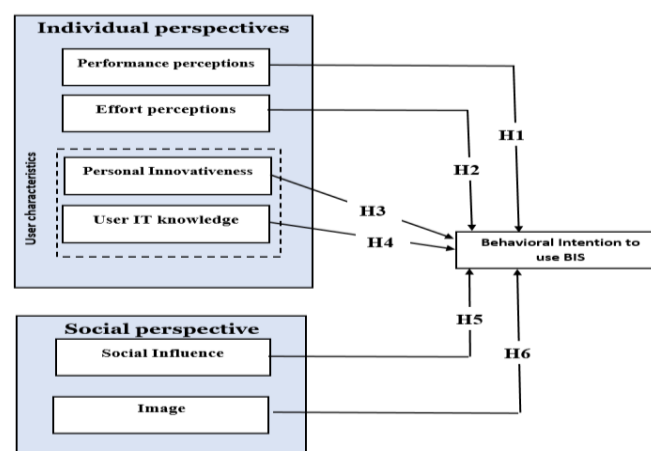


Figure 1: Initial Research Model

3.1 Behavioural Intention to use BIS

Behavioural intention is defined as “The degree to which a person has formulated conscious plans to preform or not perform some specified future behaviour” (Maruping et al. 2017). Behavioural intention is the most prevalent determinant for IS use in individual-level technology adoption studies (Maruping et al. 2017). Behavioural intention has been used by several researchers as a surrogate for IT use (Thong et al. 2002), especially in voluntary use (Kaba and Touré 2014). The voluntariness of use is one of the specific characteristics of using a BIS, while for ISs are generally mandatory or required to carry out the enterprise processes. Ajzen and Fishbein (2005) stated that “when volitional control is high, intentions are good predictors of behaviour”. In recent studies in BIS adoption at an individual-level, when they have considered the business intelligence characteristics in adoption, they have relied on behavioural intention as a surrogate for business intelligent use (Grublješić et al. 2019; Jaklič et al. 2018; Tom E et al. 2017). Therefore, behavioural intention to adopt and use BIS is a dependent variable in this research model.

3.2 Performance Perceptions

Performance perceptions are defined as “the degree to which an individual believes that using the system will help him or her to attain gains in job performance” (Venkatesh et al. 2003). Although, some researches in BIS studies has shown that performance perceptions have a strong impact on behavioural intention and systems implementation (Hou 2014), empirical research in business intelligence adoption studies shows that individual considerations of performance perceptions have no strong effect on behavioural intentions for individual BIS use (Grublješić and Jaklič 2015; Jaklič et al. 2018) especially on the first stage of adopt. Benefits from BISs are more indirect, long-term and difficult to measure compared to operational ISs. As a result, changes in performance are less noticeable and therefore less important drivers of use intentions (Grublješić et al. 2019). Despite the previous research that showed the direct impact of performance perceptions is not significant, for three decades the performance perceptions have proven to be the strongest and most powerful factor of technology acceptance (Venkatesh and Bala 2008; Venkatesh et al. 2003; Venkatesh et al. 2016b). Moreover, such a highly important factor of behavioural intention for system use cannot be ignored without more research and investigation. Hence, performance perception is considered as independent variable in this research model. Therefore, the following hypothesis is proposed:
Hypothesis 1: Performance perception has a positive effect in behavioural intention to use BIS.

3.3 Effort Perceptions

Effort perception is defined as to what extent a person believes that it would be free of effort to use a system (Venkatesh et al. 2003). Generally, there is disagreement about the effect of effort perception in BIS adoption and use. Some researchers found that BISs are very complex, and effort perception has a significant impact on BIS use (Boonsiritomachai et al. 2016; Hou 2014; Md Hatta et al. 2015). Others have proven the weakness of this factor for predicting BIS use (Daradkeh and Al-Dwairi 2017; Hou 2016; Sujitparapitaya et al. 2012), as they found that users are well aware of the complexity of the BISs, and they may be willing to address the inherent complications and challenges (A.Ahmad et al. 2016). Most of the mentioned studies have been applied in large companies, and little research has examined the effect of this factor in BIS use in SMEs (Boonsiritomachai et al. 2016; Md Hatta et al. 2015). Therefore, because of the negotiability of this factor, and due to the dearth of study in the SME field, the effect of effort perception needs further examination. Accordingly, effort perception is considered as an independent variable in this research model. Therefore, it is proposed that:
Hypothesis 2: Effort Perception has a positive effect in behavioural intention to use BIS.

3.4 Personal Innovativeness

Personal Innovativeness refers to a desire to incorporate innovation through creativity and innovative processes aimed at developing new products, services and processes (Zhu et al (2003). Most users of BISs are educated managers or decision-makers at a high level of the organization (Luo, 2016). Therefore, the managers or decision-makers in SME are more likely to have a dual identity in describing the technology adoption which is: the potential sponsors and the actual adopters of the BI system. Managers' innovativeness proved as significant determinant of the individual adoption intention towards ISs (Wang 2014). Furthermore, most of the literature reported that personal innovativeness is associated with innovation adoption behaviour (Tzou and Lu 2009). In BIS adoption there is lack of user perspective in general (Ain et al. 2019). Although personal innovativeness is a crucial factor in user technology adoption, only limited number of researchers have discussed it in BIS field (Popović et al. 2019; Wang 2014). Thus, due to its significant impact on user adoption, and as response to the request for more user perspective studies on BIS concepts, personal innovativeness is

one of the factors included in this research model. Thus, the following hypothesis is proposed:
Hypothesis 3: Personal Innovativeness has a positive effect in behavioural intention to use BIS.

3.5 Knowledge in IT

Most BIS users are educated (Jaklič et al. 2018; Luo 2016). Research on the education level of BIS users measured the education level (PhD, masters, bachelors etc.); however, little research examined the area of study or the knowledge level of IT that the users have (Ain et al. 2019; Md Hatta et al. 2015). In SMEs, the user knowledge of IT is a very important factor in the adoption and continued use of the system (Boonsiritomachai et al. 2016; Md Hatta et al. 2015). This is because large companies have an IT department and IT specialists who deal with BISs. In contrast, in SMEs the BIS users are usually the owners, who may not have the IT knowledge necessary for dealing with the system. Therefore, user IT knowledge is considered as independent variable in this research model. Hence, the following hypothesis is proposed:

Hypothesis 4: Knowledge in IT has a positive effect in behavioural intention to use BIS.

3.6 Social Influence

Social influence is defined as “the degree to which an individual perceives that important others believe he or she should use the new system”(Venkatesh et al. 2003). Social influence is always included as a potential additional predictor of IS adoption and acceptance (Eckhardt et al. 2009). Regarding business intelligence, social influence has been recognized as a significant predictor for use intention (Grublješić et al. 2019; Grublješić and Jaklič 2015; Hou 2014; Jaklič et al. 2018) and has a more significant effect than performance perception and effort perception (Grublješić et al. 2019; Jaklič et al. 2018). The significance of its effect is that business intelligence use is mostly voluntary; therefore, the user is motivated to use business intelligence by the recognition and appreciation of the use of business intelligence by respected others (Grublješić et al. 2019). Also In Arab culture, including SA, people are high collectivism, which means they belong not to the self but the group (Alfaqueh et al. 2019). This makes others opinion could have high impact on BIS adoption and use. Accordingly, the BIS will be implemented and used more if the users perceive that their peers promote its use. Consequently, social influence is used as an independent variable in this research model.

Hypothesis 5: Social influence has a positive effect in behavioural intention to use BIS.

3.7 Image

Image defined as "the degree to which use of an innovation is perceived to enhance one's image or status in one's social system"(Moore and Benbasat 1991). In SME, using innovative technology such as BIS is important to enhance their image to be competitive. In innovation adoption, the image has been found to have a positive effect on user intention (Karahanna et al. 1999; Mohammadi 2015). According to Grublješić and Jaklič (2015) when user perceives benefits regard to his/her image it will be more likely to use BIS intensively. In a social exchange culture, such as Saudi culture, by using innovation, the users are likely to achieve expected gain in reputation and enhance their image which will push them to adopt and use BIS intensively (Shippee and Keengwe 2014). Therefore, image is used as independent variable in this research model.

Hypothesis 6: Image has a positive effect in behavioural intention to use BIS.

4 Research Methodology

It is crucial to set a clear research question and choose the appropriate methodology that leads to a conclusive answer (Venkatesh et al. 2016). This research is deemed as social research as it investigates the influence of individual and social factors affecting decision-makers' intention. This study applies the explanatory sequential mixed method. Creswell (2003) stated that mixed method of both quantitative and qualitative methods provides more in-depth insight than either method alone. Firstly, a qualitative method will be applied, which aims to examine currently proposed hypothesis and explore if any amendments could be made in the primary proposed model. As suggested by Creswell (2003), 10 samples of interviews are enough to investigate issues in mixed-method studies. Therefore the sample size for the interview will be 10 decision-makers or managers of Saudi SMEs. In the second phase, the quantitative method will be applied by conducting a survey based on the qualitative results and final proposed hypothesis. The survey will be online with a structured closed-ended questions questionnaire, the sample size of 200 to 300 participants. Hair et al. (2014) indicate this sample size is adequate for such suggested number of factors. The survey aims to examine the factors and support the qualitative results. Study data will be obtained from Saudi SMEs that have implemented BIS in

their companies. Study targeted population are decision-makers and managers of Saudi SMEs because they are deemed the primary users of BIS (Jaklič et al. 2018).

5 Conclusion

This paper reviews the existing studies in BIS adoption and acceptance in SMEs. Individual and social perspective factors are reviewed and identified as the primary theoretical factors in user acceptance and use of BISs in Saudi's SMEs. Taking into account BISs' and SMEs' characteristics, an integrated model is proposed. The continuous growth of BISs in SMEs shows that user usage behaviour is an important aspect for determining BIS success in the enterprises. This research will contribute to theory and practice because there is a shortage of studies that address the issue of BISs acceptance in SMEs. The outcomes of this research can be used to support implementation of strategies for BIS adoption with the goal of more comprehensive use that will result in higher return on SME investment in SA and other developing countries. Also, it will develop BIS users' intention model that is reliable and valid which can be used by IT companies and SME owners to improve the BIS adopt and use level in the enterprises.

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