Critical Success Factors Relating to the Adoption of XBRL in Saudi Arabia

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ABSTRACT

The aim of this paper is to examine the various normative, attitudinal and control factors influencing the adopters' intention to accept XBRL in Saudi Arabia. Based on the empirical data collected by using a self-administered questionnaire relating to the normative, attitudinal and control variables, this research analysis provides evidence regarding the perceived ease of use, perceived relative advantage, perceived compatibility, social influence, perceived knowledge, and Internet skills to significantly explain the behavioral intentions towards the adoption of XBRL. However, perceived usefulness, perceived complexity and perceived training were found to have no significance in this research. The two-fold significance of this research study is to provide some practical and useful guidelines to the policy makers in the Saudi Stock Exchange (Tadawul) to identify the factors that can influence the intention of the adopters to adopt XBRL in Saudi Arabia. The primary influences identified were perceived relative advantage, perceived compatibility and perceived knowledge, which are the key determinants influencing XBRL adoption. Theoretically, this study has employed a research framework, which is an extension from research models used in the past. With the newly integrated framework, a greater level of comprehension can be achieved regarding the acceptance of XBRL among the Saudi adopters.

INTRODUCTION

Before continuing further, a frequently used term in this study is Extensible Business Reporting Language (XBRL) and a short explanation of it is warranted. The term 'XBRL' is an umbrella for creating business reports, which can be financial or non-financial in nature (Hoffman, 2006). However, the term 'XBRL' has no established definition by itself. It differs between researchers and evolves over time and extends to embrace new supporting technologies (e.g. Semantic Web); in fact the XFMRL of yesteryear is today's 'XBRL'. Given the variations in defining 'XBRL', the researchers, for this research, follows the best definition according to Charlie Hoffman, the father of XBRL, who states: "XBRL is an open-standard which supports information modeling and the expression of semantic meaning commonly required in business reporting."

XBRL, therefore, is an open data standard based on XML for financial reporting. XBRL permits information modeling in business reporting besides the expression of semantic meaning commonly required within it. It is dependent upon the XML syntax and associated XML

technologies (e.g. XML Schema, XPath, XLink, and Namespaces) to create this semantic meaning (Isenmann, Bey, & Welter, 2007).

For the purposes of business reporting, the specifics of technical grammatical rules for taxonomy and instance document creation and the schema of their core building blocks called XBRL specification are essential. The need for the different taxonomies to define the tags for different accounting concepts such as asset and current asset and their relationships (e.g. current asset under asset) are vital, whereas the instance documents contain facts employing the tags defined in the taxonomy used (e.g. total current asset equals $100) (Bovee, Ettredge, Srivastava, & Vasarhelyi, 2002; Bovee, Kogan, Nelson, Srivastava, & Vasarhelyi, 2005). The XBRL architecture has been criticized, for example, for its complexity (Doolin & Troshani, 2007). Bovee et al., (2005) has described the developmental process of the XBRL taxonomy which is difficult at the sector, country and firm levels. Despite these limitations and costs incurred from XBRL implementation, the literature lists many potential benefits of XBRL adoption, one of which is to define and exchange financial information, such as financial statements. The XBRL specification has been developed and published by XBRL International (Rawashdeh, 2013).

New innovations in digital financial reporting are continuously occurring at a rapid pace in information processing (Burnett, Friedman, & Murthy, 2006). The most important phase of transition, which is currently taking place in the digital financial reporting area, is a shift from the traditional standards of "manual processing" to XBRL, in which modeling the data and semantic meaning are converging together. Due to the capabilities of XBRL mentioned above, interactive data technology is expected to play an important role in information processing, an emphasis true for all users who adopted XBRL. As the XBRL supporters consider that the rapid entry and the adoption of XBRL across the world is important to achieve both social and economic goals (Henderson, Sheetz, & Trinkle, 2011; Steenkamp & Nel, 2012), it has set a target to make business reporting most extensible and transparent (Hodge, Kennedy, & Maines, 2004). Around 15 years ago, in April 1998, Charles Hoffman, a CPA investigated the methods in which XML could be used for reporting business and financial information (Müller-Wickop, Schultz, & Nüttgens, 2013). To date, 27 XBRL International jurisdictions in Europe, Asia, the Middle East, North America and Australia have adopted XBRL(XBRL.org, 2013). However, the XBRL conversion process in Saudi Arabia is rather slow. In June 2013, Tadawul requested all listed companies to update their information in the XBRL voluntary program on "IFSAH" (Tadawul, 2013).

Investigation of the prior literature in the area of financial digital reports clarifies that research on the diffusion of XBRL has not yet been done in the developing countries, including its adoption in Saudi Arabia. Instead, most research related to XBRL has focused primarily on the developed countries, with some insights into the determinants of XBRL adoption or the rejection of determinants (Henderson, et al., 2011; Hodge, et al., 2004; Troshani & Doolin, 2005). (Doolin & Troshani, 2007; Henderson, et al., 2011) discuss factors that lead to the adoption in developed countries, a clear focus upon the determinants of adoption or rejection at a micro level between the adopters in Saudi Arabia is still lacking.

A recently conducted study (Troshani & Hill, 2009) highlights the need to understand adoption and diffusion of XBRL, particularly with reference to the environmental, organizational, and innovation-related factors and their application to XBRL adoption.

The limited studies regarding the adoption of XBRL among the adopters in Saudi Arabia has resulted in a deficiency of suitable theoretical or conceptual models, specific to XBRL. As the antecedent studies on adoption had determined, the process of building a conceptual model specific to the XBRL diffusion among the XBRL adopters requires review, correspondence and integration of the suitable factors investigated from those studies of the information system. Therefore, this research aims mainly at identifying and determining the various factors significant for the adoption of XBRL in Saudi Arabia, focusing on the following two objectives: (1) Identification of the factors that lead to the XBRL adoption in Saudi Arabia; and (2) Determination of the factors influencing either the adoption or rejection of XBRL in Saudi Arabia.

To test the conceptual model for the XBRL diffusion the following steps were taken, delineating the boundaries of the topics under discussion in Section 2.1. Section 2.2 includes a review of the antecedent works linked with XBRL adoption. Section 2.3 discusses a review of the theoretical models of the technology of diffusion and adoption. Section 3 provides a framework to guide the XBRL diffusion research and justifies the assumptions by presenting theoretical explanations, past empirical outcomes and practical examples. Section 4 provides a thorough research methodology for this study. Section 5 analyses the survey data. Finally, Sections 6, 7 and 8 include the concluding contributions, implications, limitations and directions for future research on this subject.

LITERATURE REVIEW

Boundary and Definitions

In attempting to study the diffusion of any new technology, many participants from different areas need to be included. As the focus of this research is limited to the XBRL adopters from Saudi Arabia, the proposed conceptual model will only account for factors pertinent to them. The focus of this research has thus been limited for the following reasons. First, little attention has been paid thus far to the investigation of the XBRL adopters in Saudi Arabia; second, the potential adopters are resistant to accept this technology. At this stage it is best to clarify what it entails to adopt the XBRL choosing to implement the adoption definition of (Rogers, 1995) as most suitable. Therefore, the conceptual Model of XBRL Adoption (MXA) proposed for this research has included factors pertinent to its adoption.

Adoption Studies

Discussions of the factors that drive the success or slow down the uptake of XBRL deployment have been included. As stated earlier, because research regarding the adopters' perceptions of XBRL adoption in Saudi Arabia is minimal, further research is required. Lin (2003) identified four major characteristics for companies that best explained the high rate of XBRL adoption, which are, company size, information risk, performance and ownership diversification. Further research suggested five success factors responsible for driving the high penetration rate of XBRL among the companies (Premuroso & Bhattacharya, 2008), which include corporate governance, company performance, liquidity, firm size and audit type. Pinsker (2007) examined the users' perspectives of the efficiency and effectiveness of XBRL. This study suggested that usability and the ease of use affect the users' attitudes toward XBRL adoption or acceptance. On examining the XBRL adopters' perspectives of the preferred presentation format, Ghani and Jusoff (2009) suggested that the presentation format and actual performance including accuracy and cognitive

effort are the factors that severely affect the adoption of the presentation format including XBRL.

However, adoption studies on adopters have begun to emerge, including those of (Doolin & Troshani, 2004, 2007), who discussed the different levels of factors affecting the adoption of XBRL by combining the factors from the innovations diffusion theory and the technology acceptance model. These findings suggest that the congruent experiences and opportunities in adopting a new technology affect user attitudes through three extended technology acceptance model factors; namely perceived usefulness, perceived ease of use and perceived resources. Using an online survey, Henderson et al., (2011) investigated the organization level factors affecting the adoption of XBRL, combining factors from two streams of prior research on adoption of complex information systems innovations and information technology standards. This researcher suggests that the environmental, organizational and innovation factors in adopting a new technology affect user attitudes.

Usage, in the study of information systems, is highly pertinent to this research. User surveys that have examined the XBRL users' perspectives compared with that of the PDF and HTML users (Ghani, Mara, Laswad, Tooley, & Jusoff, 2009; Pinsker, 2007) have been employed. The results from these surveys suggest that the presentation format users (Ghani et al., 2008; Pinsker & Wheeler, 2009) express different perspectives when they use the XBRL format (Pinsker et al., 2009; Ghani et al., 2008; Hodge, 2004).

Hodge et al., (2004) stated that although many users do not choose to use the XBRL, the ones who do are better able to acquire and integrate the information in their analyses tools (Hodge, et al., 2004). Compared with the HTML and PDF users, the XBRL users need less time for information processing and surveys conducted on XBRL users also suggest that these users search online more easily using search engines and collect more data on financial reporting and footnotes (Hodge, et al., 2004). Although the studies mentioned above examined the XBRL users, it was found that they lacked theoretical underpinnings, as they were guided by data and are survey oriented in nature. Further, an understanding of the impact of XBRL usage on XBRL adopters is still unsearched in prior studies.

The discussion on XBRL adoption mentioned above suggests that only few efforts had been taken to examine the XBRL diffusion among the XBRL adopters. Furthermore, the studies mentioned above include relatively small numbers of users involved in these studies (Dull , Graham , & Baldwin 2003; Hodge, 2001); also, in most studies students were used as proxies and their investigations were not statistically tested to determine the differences between them and the XBRL users in reality; hence, the findings in these studies lack statistical conclusion validity. Another observation from prior literature analysis suggests that these existing studies explored issues related either to the adoption of XBRL or not. None of them provides a thorough understanding of all three components of XBRL adoption at the micro level (i.e. attitudinal, normative and control) among the XBRL adopters. Therefore, it is the discussions on the above-mentioned research problems as well as the paucity of studies on XBRL adoption, usage and impact which motivated this study.

From the analysis of XBRL adoption given above, the need for a suitable theoretical model to study XBRL adoption among the XBRL adopters in Saudi Arabia became evident. In light of the slow acceptance of XBRL adoption in Saudi Arabia, it was felt that this research would help to identify the areas that need special focus.

Technology Diffusion and Adoption Theories

In the information systems discipline, the study of adoption/acceptance of information technology is considered one of most necessary areas (Benbasat & Zmud, 1999; Venkatesh, Morris, Davis, & Davis, 2003). Over time, several theories and models have been adopted from various disciplines, modified, developed and validated by researchers to better understand and predict technology adoption (Benbasat & Zmud 1999; Venkatesh et al., 2003).

These include the Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975); Theory of Planned Behavior (TPB) (Ajzen & Madden, 1986); Technology Acceptance Model (TAM) (Davis, 1989); Decomposed Theory of Planned Behavior (DTPB) (Taylor & Todd, 1995); Diffusion of Innovation theory (DOI) (Rogers, 1995). These theories and models were further modified, changed, integrated and extended based on the needs and requirements of the information system.

For example, Taylor and Todd (1995), based on the modification, integration and diffusion of TPB, introduced the decomposed TPB. Also, Venkatesh and Morris (2000) modified TAM through the integration of subjective norm and gender factors using the original TAM model, showing the influence of gender and social influence in technology adoption. Venkatesh and Brown (2001) modified the TPB to better understand the adoption of the technology and investigate the drivers of and barriers to the adoption of personal computers. This reveals that selecting a suitable model or theory that meets the needs and requirements of the present research study is highly crucial in this regard, especially in the area of technology adoption. According to Venkatesh et al., (2003) researchers appear to encounter difficulties while selecting the models and theories for their research study and they tend to "pick and choose" a "favored model" largely overlooking the role of alternative models. This resulted in Venkatesh et al., (2003) attempting to modify and integrate the components of eight prominent user acceptance models, leading to the emergence of the Unified Theory of Acceptance and Use of Technology (UTAUT).

Besides, these theories and models of adoption have been widely validated and tested by several researchers from the users' perspective and their application has been confined to investigating the users. Researchers in the area of the information systems have started to investigate the users' adoption, usage and impact of technology issues due to the emergence of information and communication technologies among the users (Choudrie & Dwivedi, 2006; V. Venkatesh & S. Brown, 2001), as the theories, models, and research approaches are now at the fast advancing stage of their growth, testing and validation. The next section discusses the diffusion and adoption models and theories to reveal the weakness and strengths involved, from the adopters' perspectives and viewpoints. Theories and models of technology in this section will be discussed based on the empirical research in related areas. The variety of the models and theories on technology available has motivated the researchers to propose a model of user diffusion of the XBRL technology. The next sections will include a detailed discussion on this issue.

Diffusion of Innovations

Rogers (1995) used the Diffusion of Innovations Theory to study a wide range of phenomena including the technology adoption. He also utilized this theory to investigate several factors assumed to be the determinants of information technology adoption within the users' attributes (Brancheau & Wetherbe, 1990); information sources and channels of communication (Nilikanta & Scammel, 1990); and attributes of innovation (Hoffer & Alexander, 1992). Researchers in

information systems also combined the intentions and innovations theories by integrating concepts from the TRA (Moore & Benbasat, 1991) and the TPB (Chau & Hu, 2001; Taylor & Todd, 1995) with the perceived attributes of innovations (Rogers, 1995). As the attributes of innovations such as relative advantage, compatibility and complexity applied in different situations and simply integrated with the other factors of the models and theories, it is suitable to consider the attributes of useful innovations to investigate the diffusion of XBRL.

Theory of Planned Behavior (TPB)

Although the TPB (Ajzen, 1985, 1988, 1991; Ajzen & Madden, 1986) has a history culled from organizational researches, it is has been adopted and adapted by researchers in information systems to the study of adoption/acceptance, implementation and usage information technology (Benbasat & Zmud, 1999). It was an expanded form of the TRA that was promoted to overcome the TRA's limitations that dealt with incomplete voluntary control (Chau & Hu, 2007; Fishbein & Ajzen, 1975). One of the main factors in TPB reflects the motivational factors, reveals the motivational factors that affect the behavior of the financial manager's intention 'to perform the behavior'. According to TPB and TRA their intentions indicate the degree of readiness and effort invested to achieve the behavior in question. Therefore, the stronger the intention of the financial manager to employ a behavior, the more effectively would it be intelligible (Ajzen, 2005).

TPB stipulates three independent variables which influence the use of a financial manager of a specific information technology who will conceptually define the intentions regarding a particular behavior. These independent variables include (1) attitudes created by the financial manager's beliefs regarding the anticipation of the outcomes related to the usage of information technology; (2) subjective norms created by the financial manager's beliefs in the importance of the anticipated behavior of the financial manager regarding the usage of the information technology; and (3) perceived behavioral control created by the financial manager's beliefs regarding the range across which the financial manager is qualified to actually use the information technology. Within the TRA and TPB attitudes and subjective norms are included two common independent variables, whilst perceived behavioral control is an additional extension to the TPB framework to overcome the limitations of incomplete voluntary control (Ajzen, 2005). Although the process of usage is not described by TPB in a specific context, this theory has experienced a significant degree of predictive validity. Therefore, it can be used to determine the areas of respect for a particular context. According to the information systems literature, the TPB can be used as an effective diagnostic means to investigate information technology adoption or acceptance and usage (Benbasat & Zmud, 1999). Therefore, this research takes into account all the core TPB factors mentioned above (Attitude, Subjective Norms and Perceived Behavioral Control) to develop the proposed conceptual Model of XBRL Adoption (MXA). In order to increase the ability to predict the TPB, Taylor and Todd's (1995) decomposed belief dimensions of attitudes and attributes of the innovations have also been included (Rogers, 1995) as the antecedent dimensions of an attitude factor. This research assumes that the decomposed factor helps to increase the ability to predict, compared with the TPB, and gives a deeper understanding when compared with the TAM. This option of TPB is termed the Decomposed Theory of Planned Behavior (Taylor & Todd 1995). In light of these reasons, the model of XBRL adoption accepted the decomposed structure of attitude, subjective norms and perceived behavioral control factors. However, their sub-factors are not wholly similar to Taylor and Todd's (1995) study as the context and subject of the two studies are very different from each other.

Technology Acceptance Model (TAM)

In fact, TAM provides a high recognition of the system attributes by affecting the "attitude towards behavior" construct. The TAM excludes other factors including social norms. Davis, Bagozzi and Warshaw (1989) stated that the subjective norms did not significantly influence personal intentions, apart from the perceived usefulness and perceived ease of use. Therefore, Davis et al., (1989) omitted the subjective norms from TAM. The main basic TAM model had a substantial empirical confirmation in a diversity of areas of technology involving computer usage, information system, information system implementation, software application and antecedent Internet applications such as e-mail and several web-applications (Al-Gahtani, Hubona, & Wang, 2007; Featherman & Fuller, 2003; Legris, Ingham, & Collerette, 2003; Pendharkar & Young, 2004). Many researchers have tested and extended this model because it involves a variety of specific areas of adoption, which could have important implications for potential XBRL adoption and diffusion among organizations. Perceived usefulness, perceived ease of use, the acceptance and usage aspect of XBRL are primarily connected to the proposed XBRL adoption model. Specifically, Hodge et al.,'s (2004) outcomes indicate that the XBRL-enabled users have more advantages than the non-XBRL users in acquiring and integrating the financial statement information. As mentioned, this model has been tested, well researched and extended. Issues related to these models will be discussed in the following sections of this research paper.

Model of Adoption of XBRL

The model of the Adoption of new innovations in the organizations was applied by Henderson et al., (2011) to investigate the XBRL adoption. According to this model, several factors determine the adoption of the XBRL technology. These include organizational factors such as managerial and personnel resources, the firms' existing technical infrastructure and the financial resources. It also includes innovation factors such as compatibility, complexity and the perceived benefits of use (Henderson et al., 2011). Some of the factors included in this model are also helpful in the study of the XBRL adoption in this research. However, another set of factors provides no insights into the phenomenon of diffusion among XBRL adopters; they only shed light upon the adoption aspect. Furthermore, this model was constructed to study the XBRL adoption only at the macro level, without considering the micro-level factors; therefore, specific factors need to be adjusted for the XBRL adoption among the XBRL adopters. This research, therefore, considered the majority of the DTPB and TAM factors as attitudinal belief dimensions.

CONCEPTUAL MODEL

Proposed Conceptual Model

Taylor and Todd (1995) highlighted two basic criteria for the selection of a successful model. First, a suitable model should be parsimonious, with the ability to provide good predictions and meet expectations. Second, it should contribute towards understanding the occurrence within the investigations, as well as contain suitable predictive ability. Thus, the second criterion is deployed, as XBRL diffusion requires predictive ability and contribution to the point of view of the phenomenon for formulating the conceptual model of the study. At the conceptual level, the formulation of the model of this research will involve factors from the different models in the area of the information system to provide future insights to comprehend and perceive the different stages of XBRL diffusion. Therefore, the less significant factors will be removed after validation of these factors to sustain the parsimony of the explanatory model.

In summary, in the sections above, we discussed the suitable antecedent technology adoption models and included the reasons for incorporating their factors into the proposed Model of XBRL Adoption.

Foundations of the Proposed Model

Although TPB is a generalized theory, it can find use in an extensive range of contexts to predict the different types of adoption of information technology. Its major factors reflect the core variables that have been determined as influential in antecedent usage research and are flexible enough to subsume the situation-specific factors (Benbasat & Zmud, 1999). Therefore, this research considers it as a guiding theory of adoption research. The decomposed belief structure for financial managers in XBRL adoption is adopted from Taylor and Todd (1995). The detailed factors in investigating the XBRL adoption issues are derived directly from Rogers' (1995) innovations attributes and Venkatesh and Brown's (2001) model of adoption of technology among financial managers.

Description of the Proposed Model

The adoption components assume that from the proposed diffusion model, a user's intention of the adoption of XBRL is determined by three main factors.

Figure 1: Proposed Model.
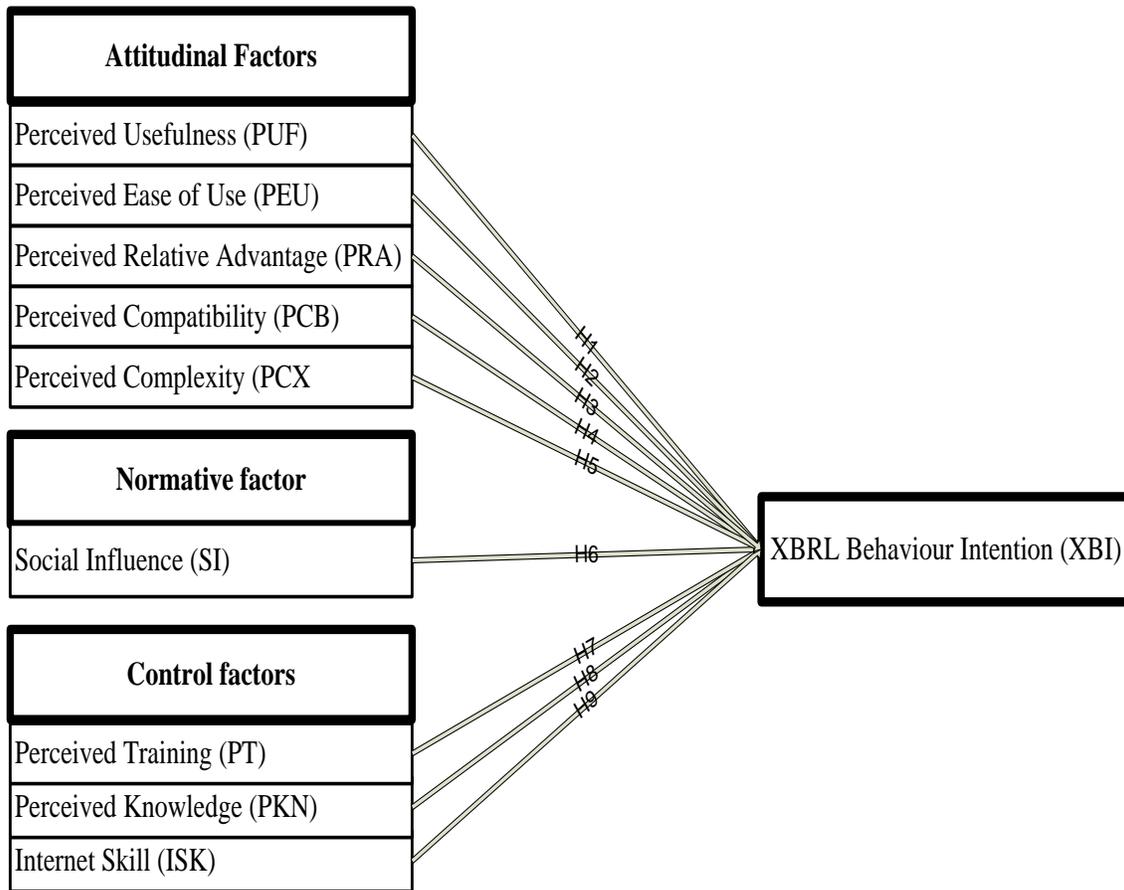
These include: (1) attitude towards behavior, which refers to the perception towards XBRL technologies; (2) subjective norms, which refers to the social influences which may affect the intention to adopt XBRL; (3) perceived behavioral control that refers to beliefs with regard to having the resources and opportunities essential to adopt XBRL among the users (Fig. 1). Accordingly, all three independent variables will help to identify and interpret the intention of the adoption of XBRL, which in turn is expected to help predict the actual adoption of XBRL.

Attitudinal Factors

According to Taylor and Todd (1995) the different magnitudes of attitudinal belief towards the adoption of the personal computer among the XBRL adopters can be measured using three main factors, namely, perceived ease of use, perceived usefulness and compatibility. According to Davis et al., (1989) the same can be measured using two main factors, namely, perceived ease of use and perceived usefulness. While examining the XBRL adoption among the XBRL adopters, this research adopts the perceived ease of use, perceived usefulness (Davis et al.,1989) and relative advantage, compatibility and complexity (Rogers, 1995). Five factors namely, perceived ease of use, perceived usefulness, relative advantage, compatibility and complexity are expected to provide the measures of attitude towards the behavior of XBRL adoption among the XBRL adopters.

Perceived Usefulness

Although perceived usefulness was considered a direct determinant of usage behavior (Davis, et al., 1989; Dishaw & Strong, 1999; Gefen & Straub, 1997; Hendrickson & Collins, 1996; Igbaria, Parasuraman, & Baroudi, 1996; Thompson, Compeau, & Higgins, 2006), significant evidence supported that perceived usefulness was also a direct determinant of behavior intention, such as TAM (Davis 1989), TAM2 (Venkatesh & Davis, 2000) and Augmented TAM or Combined TAM and TPB called C-TAM-TPB (Taylor and Todd, 1995) and perceived usefulness was similar to the relative advantage of the perceived characteristics of Rogers' Innovations Diffusion Theory (Venkatesh et al., 2003). From the evidence available, it is a good rationale to use perceived usefulness as a direct determinant of behavior intention in this research, which leads to the following hypothesis:

> **H1**: Perceived usefulness has a significant influence on the XBRL behavioral intention (XBI).

Perceived Ease of Use

Perceived ease of use was also considered a direct determinant of usage behavior (Adams, Nelson, & Todd, 1992; Davis, et al., 1989; Gefen & Straub, 2003; Igbaria, et al., 1996). Further, significant evidence supported that perceived ease of use was also found to be a direct determinant of behavior intention in several theories and models including various TAM and UTAUT. Perceived ease of use shows similarity to the complexity of perceived characteristics of Rogers' Innovations Diffusion Theory, although in the opposite direction (Venkatesh et al., 2003). Based on several theories/models and prior research, perceived ease of use is justified as an important determinant to attitude towards the behavior of XBRL adoption in this research model, which leads to the following hypothesis:

> **H2**: Perceived ease of use has a significant influence on the XBRL Behavioral Intention (XBI).

Relative Advantage

In his diffusion of innovations theory, Rogers (1995) suggests that the relative advantage of an innovation is positively related to its rate of adoption. Taylor and Todd (1995) discovered that relative advantage is an important factor in determining the adoption of an innovation. Similarly, because XBRL is faster, more accurate and economical, it provides a significant advantage, convenience and satisfaction to the XBRL users compared with those of the traditional standard. In view of the benefits that XBRL offers, it would be expected that those financial managers who perceive XBRL to be advantageous would also be likely to adopt the technology. This leads to the following hypothesis:

H1: The greater the perceived relative advantage of using XBRL over the traditional standard one, the more likely it is that the XBRL will be adopted among the XBRL adopters.

H3: Relative advantage has a significant influence on the XBRL Behavioral Intention (XBI).

Compatibility

In the diffusion of innovations theory, Rogers (1995) suggests that the perceived compatibility of an innovation is positively related to its rate of adoption. Rogers (1995) also found that compatibility is an important factor in determining the adoption of an innovation, even those with a high relative advantage. If the XBRL appears morally irreconcilable, then the XBRL will not be adopted. This leads to the next hypothesis:

H4: Compatibility has a significant influence on the XBRL Behavioral Intention (XBI).

Complexity

In the diffusion of innovations theory, Rogers (1995) suggests that the perceived complexity of an innovation is generally related to its rate of adoption in a negative direction. Rogers (1995) found that some innovations more easily understood by most users in a social system, will be adopted more quickly, whereas others which may be more complicated will be adopted more slowly. This leads to the next hypothesis:

H5: Complexity has a significant influence on the XBRL Behavioral Intention (XBI).

Subjective Norms

Venkatesh and Brown (2001) have assumed the social influence of families, friends, supervisors, and bosses as factors that can be used to measure the subjective variable norms. The outcomes of Venkatesh and Brown's (2001) research consider that social influences are significant determinants of this behavior. Similarly, it is expected that the XBRL adopters of XBRL are likely to influence their relatives, friends and bosses by extolling the advantages offered by XBRL. Therefore, it is suitable to consider social influences as a measure of the subjective norms for XBRL adoption among the XBRL adopters. Hence, the following hypothesis is proposed:

H6: Social influence (family, friends, colleagues and bosses) has a significant effect on the XBRL Behavioral Intention (XBI).

Perceived Behavioral Control

Troshani and Rao (2007) identified and validated five specific barriers that can inhibit the adoption of XBRL in Australia, including the instability of the XBRL specification, limited software tools and support, lack of standardization regarding the way the XBRL instance documents are produced and consumed, lack of awareness about XBRL and its benefits and the complexity of XBRL. Troshani and Rao (2007) identified the cost and training, rapid change in specification, subscription costs, high cost of personal computers, ease and difficulty of use and a prerequisite knowledge of the use of personal computers. As the subscription cost of XBRL access is free and the specification is not changing rapidly now, the lack of standardization in the manner the XBRL instance documents are produced and consumed affect the supply chain level, and the complexity of XBRL was considered a pertinent factor within the attitudinal factors. The limited software tools and support were also considered factors not pertinent for the adoption of XBRL among the users; hence, it has been excluded in this research. This research considered only the factors of training, the lack of knowledge and Internet skills as barriers to the adoption of XBRL.

Requisite Knowledge

The paucity of knowledge regarding an innovation and its benefits affect its adoption rate (Rogers, 1995). The lack of awareness about XBRL and of the benefits of the innovation among the users decreases the likelihood of the innovation being adopted. Troshani and Rao's (2007) research suggests that, in Australia, the users were aware of the benefits and the potentials of XBRL including tagging financial information, essential to satisfy their requirements. The adoption of XBRL is assumed to require a clear understanding of its benefits among all segments of society. Also, if users are not aware of the benefits of adopting a particular innovation, then it is expected that they are more likely to reject the decision to use it due to the lack of the perceived needs. Therefore, the underlying hypothesis is:

> **H7**: XBRL knowledge has a significant influence on the XBRL Behavioral Intention (XBI).

Training

The Australian interviewees' vision recognized a training required for the implementation of the XBRL for the users as one of the most important factors, which resulted in the high rates of adoption (Troshani & Rao, 2007). However, an antecedent exploratory study on the XBRL adoption in the USA suggests that training is the major barrier which is inhibiting the adoption of XBRL among the financial managers (Bartley, Al Chen, & Taylor, 20). Therefore, it is expected that if training is unavailable, then adoption will be slow. Hence, the next hypothesis is:

> **H8**: Training has a significant influence on the XBRL Behavioral Intention (XBI).

Internet Skills

As the use of the XBRL also necessitates having an Internet connection to communicate with the systems, the ease or difficulty of use and the prerequisite knowledge of Internet use are expected to impact XBRL adoption (Daugherty, Gangadharbatla, & Eastin, 2009; Eastin & LaRose, 2000). Therefore, it is expected that XBRL adopters with good Internet skills are more likely to adopt the XBRL. Hence, the hypothesis is:

> **H9**: Internet skills have a significant influence on the XBRL Behavioral Intention (XBI).

RESEARCH METHODOLOGY

Size of the sample and data collection

The best possible framework of this population available today would include certain large-sized companies, including different types of services companies, as well as different sized companies. Once the stakeholders were identified, they were e-mailed and called on the telephone to introduce the researcher, to explain the scope of the research and assure them of utmost confidentiality. For this research, we listed all the business establishments in Saudi Arabia with the corresponding company names under which they were registered with the Capital Market Authority. A total of 157 establishments were initially listed, of which 135 were excluded from the study as they did not use XBRL. The verification process yielded 22 companies on the list, which were used by the researcher as the population in the survey. As the respondents of the survey were targeted as members having prior experience using XBRL in their companies, a random probability sampling technique was suitable for this research, specifically the simple random sampling method. In relation to the sample size, 19 of the 22 companies targeted were selected. Three companies were selected for the pilot study. The study used Rawashdeh's (2011) survey for data collection on the adoption of XBRL. The questionnaires contained fixed alternative questions. The survey was self-administered or sent through mail, according to the respondents' convenience, to the financial manager members of the sample companies. As the questionnaire method was used for the first time in Saudi Arabia, pilot testing was done to ensure that the survey forms included only questions that were applicable and answerable under the given setting. Two survey forms were distributed during the pilot testing stage, which were later excluded from the final sample.

ANALYSIS OF SURVEY DATA

Survey Response

From the 150 questionnaires distributed, 114 questionnaires were returned of which 108 questionnaires were completely filled in, resulting in a 75% return rate.

Analysis of reliability

After data collection the researchers verified the reliability of the factors by calculating the Cronbach's alpha coefficient for multi-item scales. According to Selemat and Rawashdeh's (2010) empirical study of the determinants XBRL adoption, values above 0.7 are acceptable. This analysis suggests a good reliability of the measures selected. All of the alpha values are higher than the value of 0.7 (Table 1).

Table 1: Reliability.

Constructs	N	Number of Items	Cronbach's Alpha (α)
XBRL Behavior Intention	108	3	0.73
Perceived Usefulness	108	5	0.75
Perceived Ease of Use	108	2	0.75
Perceived Relative Advantage	108	5	0.76
Perceived Compatibility	108	3	0.82
Perceived Complexity	108	2	0.77
Social Influence	108	4	0.75
Perceived Training	108	2	0.85
Perceived Knowledge	108	2	0.96
Internet Skill	108	3	0.80

Profile of the respondents and companies

Here the demographic information of the respondents has been described to highlight the important characteristics of the respondents. Demographic information can assist in a better understanding and helps build possible and useful correlations with other survey findings.

Three times as many men as women responded to the questionnaire, a possible indication that the number of men who are accounting professionals in the Saudi companies is higher than that of women. The mean age of respondents is 40 years, with a mean length of service of 15 years (Table 2).

Table 2: Demographic Information of the Survey Respondents.

	Freq.	%		Freq.	%
Age			Gender		
17-24	2	2	Male	82	75.9
25-34	34	31	Female	26	24.1
35-44	37	34	Total	108	100.0
45-54	25	23	Education		
55-64	10	9	Diploma	7	6.5
Total	108	100.0	Degree	92	85.2
Experience			Postgraduate (Ma, Msc)	8	7.4
1 Year	2	2.0	Postgraduate (Phd)	1	.9
2-5 Years	10	9.0	Total	108	100.0
5-10 Years	16	14.8	Position Title		
10-15 Years	20	19.0	Accounting Manager	12	11.1
15-20 Years	28	26.0	Auditor	19	17.6
Above 20 Years	32	29.6	Financial Manager	16	14.8
Total	108	100.0	Team Leader	12	11.1
			Manager	19	17.6
			Senior Accountant	30	27.8
			Total	108	100.0

In terms of gender, 82 (75.9%) were male versus 26 (24.1%) female (Table 2). In terms of education (Table 3) most of the respondents held a Bachelor's degree (85.2%). The researchers also noted that about 0.9% of the accounting professionals held Ph.D. degrees. To contextualize this finding, we noted that, in Saudi Arabia, financial managers with this level of education usually possessed sound professional knowledge in general and good knowledge of the Internet in particular. The researchers thus inferred that they might have been opinion leaders, and as such were likely to be the first to adopt and use XBRL in their companies. In terms of position in the firm, the respondents generally occupied accounting positions (56.5%) such as senior accountants (30), auditors (19) and accounting managers (12).

Hypotheses Testing

In this section, the hypotheses for this research are tested and the results discussed.

Regression Analysis

Regression analysis was performed with behavioral intention as the dependent variable and perceived ease of use, perceived usefulness, relative advantage, compatibility, complexity, social influence, knowledge, training and Internet skills as the predictor variables. A total of 108 cases were analyzed. A significant model emerged ($F_{(9, 108)} = 25.745$, $p < 0.001$) (Table 4) with the adjusted R square being 0.675 (Table 3). The significant variables are shown in Table 5 and include perceived ease of use ($\beta = .257$, $p < .001$), perceived relative advantage ($\beta = .348$, $p < .001$), perceived compatibility ($\beta = .317$, $p < .03$), social influence ($\beta = .187$, $p < .001$), perceived knowledge ($\beta = .276$, $p < .001$) and Internet skills ($\beta = .239$, $p < .001$). The remaining three factors were not considered to be significant predictors in this model. The size of β suggests that the perceived relative advantage factor had the greatest impact in the explanation of the variations in XBRL behavior intention. This was followed by perceived compatibility, perceived knowledge, perceived ease of use, Internet skills and social influence (Table 5).

Table 3: Regression Analysis: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.838[a]	.703	.675	.37517

a. Predictors: (Constant) , Internet Skill, Perceived Training, Perceived Complexity, Perceived Usefulness, Social Influence, Perceived Ease of Use, Perceived Compatibility, Perceived Knowledge, Perceived Relative Advantage

Table 4: Regression Analysis: ANOVA

	Model	Sum of Squares	df	Mean Square	F	Sig.
	Regression	32.614	9	3.624	25.745	.000b
1	Residual	13.794	98	.141		
	Total	46.407	107			

a. Dependent Variable: XBRL Behavior Intention
b. Predictors: (Constant) , Internet Skill, Perceived Training, Perceived Complexity, Perceived Usefulness, Social Influence, Perceived Ease of Use, Perceived Compatibility, Perceived Knowledge, Perceived Relative Advantage

Table 5: Regression Analysis: Coefficients (a)

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.338	.396		.853	.396
Perceived Usefulness	.043	.042	.076	1.030	.306
Perceived Ease of Use	.142	.035	.257	4.101	.000
Perceived Relative Advantage	.187	.052	.348	3.608	.000
Perceived Compatibility	.154	.039	.317	3.933	.000
Perceived Complexity	.037	.030	.073	1.217	.226
Social Influence	.092	.029	.187	3.127	.002
Perceived Training	.033	.021	.089	1.548	.125
Perceived Knowledge	.107	.024	.276	4.458	.000
Internet Skill	.092	.025	.239	3.694	.000

a. Dependent Variable: XBRL Behavior Intention

SUMMARY AND CONCLUSIONS

This study examined the factors affecting the adoption of XBRL among the accounting professionals in Saudi Arabia. Using the simple random sampling method, 20 Saudi companies were selected from the sample frame. A questionnaire was sent to the accounting professionals of each of the Saudi companies selected, between October and November 2012. Within the specified time, 108 usable questionnaires were returned, resulting in a 75% response rate.

Figure 1 shows the validated relationship between the independent variables and XBRL behavior intention to adopt XBRL. The findings of this study suggest that three out five of the attitudinal variables are significant in terms of influencing the XBRL adopters' behavioral intentions to adopt XBRL in Saudi Arabia. Also, the effect of social influence on XBRL behavior intention was found to be significant. This is consistent with the findings from prior studies (Brown & Venkatesh, 2003, 2005; Rawashdeh, Selamat, & Abdullah, 2011). In the control category, only perceived knowledge and Internet skills are found to be significantly related to XBRL behavior intention, which is consistent with the findings of the previous studies (Rawashdeh et al., 2011; Brown &Venkatesh, 2005).

This research examined the factors affecting the adoption of XBRL in Saudi Arabia. The following are the main conclusions drawn from this research, based upon the underlying research assumption made in the third section. A total of nine factors were expected to be correlated with the XBRL behavior intention when adopting XBRL in Saudi Arabia. Out of these nine factors , only six, perceived relative advantage, perceived compatibility, perceived ease of use, and social influence were significantly correlated to the XBRL behavior intention.

In terms of the intensity of the effect of these six factors which contributed significantly to the XBRL behavior intentions, the perceived relative advantage factor had the most impact upon the explanation of the variations of XBRL behavior intention. In order to develop a better understanding, consistent with the DTPB, this research considered the following three factors as barriers to the adoption of XBRL: training, Internet skills and the lack of knowledge regarding

the benefits of XBRL. The empirical evidence from this research provided by the analyses emphasized that the lack of knowledge about XBRL's benefits and paucity of Internet skills were perceived as barriers to XBRL behavior intention. Therefore, it is expected that if the lack of knowledge regarding XBRL's benefits is perceived as high, then the adoption will be slow. This result is consistent with that of Venkatesh and Brown (2001).

As the XBRL software enabled reuse and exchange of data studying the adopters from Saudi Arabia provides a useful starting point for the understanding the adoption of XBRL in the Gulf countries. Thus, this research presents one of the initial efforts towards a good understanding of the XBRL adoption behavior outside the context of the developed countries. The findings are specifically useful for Tadawul and the Saudi policy makers, as specified above. Factors that are reported significant are important and require attention in order to encourage further adoption of XBRL in Saudi Arabia.

RESEARCH CONTRIBUTIONS

This investigation makes the following contributions to a good understanding of the area of XBRL adoption. First, the contributions of this research are so, that they integrate the suitable information systems literature in order to consolidate our knowledge of technology adoption from the user views and provide clear guidance for future research. Second, the findings are also discussed in light of the literature presented in the "Theoretical background" section, which clearly suggest that this study offers incremental and useful contributions to the existing knowledge within the area, particularly from the perspective of a developing country.

The findings of this research generate several issues that may assist both policy makers and Formation of the Saudi Stock Exchange (Tadawul) in Saudi Arabia to acquiring better understanding of the consumers' adoption of XBRL. By utilizing the experience and research findings gained from the developed world, currently, the Saudi policy makers emphasize the need to tackle the issues of lack of knowledge, usefulness and training in order to encourage the growth and diffusion of XBRL. However, the findings of this study suggest that the factors currently responsible for influencing the XBRL diffusion in Saudi Arabia are different from those influencing the widespread adoption of XBRL in the developed world. For example, usefulness, which is an important factor in the issue of XBRL adoption in the developed world, is not important in Saudi Arabia. At present, because only a small number of adopters have some knowledge regarding XBRL in Saudi Arabia, it is perhaps too soon to believe that their influence is an important barrier to adoption. This is evident in the findings as both attitudinal factors (i.e. perceived training and complexity) were found to be insignificant.

Furthermore, perceived knowledge of the advantages offered by XBRL was found to be significant, clearly suggesting that efforts are required from both the policy makers and Tadawul to develop positive attitudes towards XBRL among the adopters by making them more aware about the benefits of XBRL. The Internet skills factor emerged as an important and significant factor in terms of influencing the consumers' behavior intention to adopt XBRL. This also has implications for both Tadawul and the policy makers. For instance, Tadawul have to consider more interactive services so that all the companies that desire to use XBRL are able to do so. This may help to increase the number of companies as well as increase the potential XBRL behavior intention to adopt XBRL.

The social influence factor was also found to be significant while explaining the XBRL behavior intention to adopt XBRL. This too can be considered to have serious implications for the policy

makers. For instance, everyone should be trained on XBRL, and accountants and auditors, in particular, should be encouraged to use XBRL. In such situations, the accountants and auditors may exert a positive influence on companies to use XBRL.

As illustrated in Table 3, perceived ease of use is also an important factor which influences XBRL behavior intention to adopt XBRL. This suggests the dire need to equip potential adopters with the skills necessary to be able to use the XBRL software. When it comes to the Tadawul's role in equipping the potential adopters, it is essential to take a segmental approach to identify and provide relevant skill-oriented courses to those potential adopters who do not enjoy regular opportunities to use XBRL. Such strategies are still lacking in Saudi Arabia and require faster implementation if Saudi Arabia aims to join the list of countries leading XBRL deployment and adoption in Middle East.

Although the findings and implications are specific to the context of Saudi Arabia, lessons learned from this study can also be extrapolated to other countries with similar economic and cultural situations. Considering the economic, technological, social and cultural context, it can be argued that the lessons learned from this study may also be applicable to the other Gulf countries (i.e. Bahrain, Kuwait, Oman, Qatar and United Arab Emirates) as they share similar socio-economic and cultural characteristics.

LIMITATIONS AND FUTURE RESEARCH

One of the limitations of this study was related to the non-availability of a big sample frame because, to date, Saudi Arabia has not yet adopted XBRL. This study provides a snapshot of the XBRL adoption in Saudi Arabia. The findings may change as the XBRL becomes established and the XBRL adopter grows more experienced in its use.

With regards to adoption in the future, this research intends to examine whether the findings obtained from this study are specific only to Saudi companies or whether the same results will be achieved across the other Gulf countries as well. This would call for a cross-cultural approach in understanding the adoption of XBRL.

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