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8-2010

Adoption and Use of Information Technology in Mandatory Settings: Preliminary Insights from Saudi Arabia

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ABSTRACT

Many large Enterprise Systems are adopted in mandatory settings where potential users do not have much choice but to embrace the new technology. The objective of this study is to examine the adoption and use of information technology (IT) in mandatory settings where the option of rejecting the new technology does not exist. Based on a literature review, a framework that explains the adoption and use of information technology in mandatory settings is proposed. This framework highlights that acceptance of a new technology is affected, among other factors, by a system's contribution to organizational transparency. To further this argument, users who directly benefit from organizational transparency are more likely to accept the technology, such as a new Enterprise Systems. The study expands our body of knowledge about the adoption and use of information technology in mandatory settings, and is expected to help business management and system providers during technology implementation projects. Moreover, the proposed framework may benefit Enterprise System providers when formulating their business models and lead them towards financial success.

Keywords

Business models, Enterprise System providers, technology acceptance model, technology implementation, mandatory technology implementation.

INTRODUCTION

Many research studies have attempted to explain the adoption and use of particular technology. None of the existing frameworks, models, and theories fully explains, however, why a particular technology is accepted or rejected. Furthermore, most of the research assumes that the adoption of technology is voluntary and a rejection of the new system is a valid option (Brown, Massey, Montoya-Weiss and Burkman 2002).

In the current business environment, however, many Information Technology (IT) investments are conducted in mandatory settings, where potential users do not have much choice but to comply (Chae and Poole 2005). Understanding factors which lead to positive or negative attitudes towards new IT in mandatory settings is important as it will help management implement new technology with less attrition. In addition, the resulting resistance towards new IT may reduce the overall organizational performance because of the discontented users. Unfortunately, users' acceptance or rejection of IT in mandatory settings is not fully understood. This gap provides motivation for our study. The objective of this study is to construct a framework that focus on users' attitude toward IT adoption and use in mandatory settings.

Adoption and use of IT greatly affect organizations. Frequently, a new IT system leads to changes in business procedures, rearrangement of organizational structures, and shifts in managerial power. In addition, new IT may lead to a higher level of transparency as new technology supports the sharing of data and information.

We hypothesize that transparency, related to implementation IT, is one of the most influential, yet underestimated, factors explaining the process of adoption and use of new technology. In context of this paper, we define transparency based on the definition provided by Bushman, Piotroski and Smith (2004), as the degree of availability of firm information to those outside the firm as well as to all employees. For example, we expect that the process of implementation will be smoother in organizations that foster and encourage transparency of business operations as the necessary information is ready and available. On the contrary, system implementation in less transparent companies will face more obstacles, as information that is necessary for successful design is less accessible and often ambiguous.

The rest of the paper is structured as follows. After a brief description of our methodology, we present the results of our extensive literature review. The literature review serves as a basis for establishing a framework in the following section. Next, the initial validation, practical importance, and potential application of the proposed framework are discussed. The paper concludes with proposing several promising research opportunities.

METHODOLOGY

The main methodology of this research project is an excessive literature review. This methodology of literature review appears very promising, as in this study our objective is to provide a fresh theoretical foundation about IT implementations in mandatory settings and to develop a conceptual framework (Webster and Watson 2002).

We searched different literature databases for papers that seemed to be relevant to our study. Then, based on this literature review, we analyzed the collected papers and developed an initial framework. To develop a conceptual framework, we follow the standard procedure of identifying essential factors related to IT implementations in mandatory settings and then map the relationships between these factors (Sutton and Staw 1995; Whetten 1989).

RESUTLTS OF LITERATURE REVIEW

The technology Acceptance Model (TAM), proposed by Davis (1989), is still one of the most often used frameworks to explain why a particular IT is embraced (or rejected) by the users (Mao and Palvia 2008). This framework postulates that a prospective user of technology weighs potential benefits of using a given technology against challenges in using it, and then adopts or rejects it.

In corporate life, however, the employees, or prospective users, are not able to reject a particular IT because its implementation is mandated by the management. For example, many Enterprise Resource Planning (ERP) systems are implemented as a result of managerial decisions (Al-Jabri and Al-Hadab 2008) to stay competitive (Joshi and Pant 2008) and to satisfy customers, suppliers, and business partners (Irani, Themistocleous and Love 2003). Also in regard to other IT investments decision, many are conducted by the top management itself, which is often under external pressures (Chae and Poole 2005), while the employees who represent major users have less or no say.

Even though many IT investments, such as ERP or Enterprise Systems, are conducted without sufficient involvement of major users, the acceptance of this new technology may vary substantially among the users. TAM model, or extended TAM (Venkatesh and Davis 2000), fails to explain this variation of technology acceptance in such mandatory settings. To address the involuntary setting issue, several extensions of the TAM were proposed. For instance, the model by Abdinnour-Helm et al. (2003) extends the original TAM by adding "expected capability" and "expected value." The results from a survey of ERP users in Saudi Arabia imply, however, that even this extended model is not able to fully explain users' resistance toward a new IT system (Al-Jabri and Al-Hadab 2008). Other explanatory models, such as Task-Technology Fit (Goodhue, Klein and March 2000) and Technology Satisfaction Model (Lee and Park 2008), still need to be validated and possibly further developed for mandatory settings.

At the same time, as the adoption and use of large intra-organizational (Al-Mashari 2003) and inter-organizational systems (Irani et al. 2003; Madlberger and Roztocki 2008, 2009) continue, more and more investments are conducted in a mandatory environment. As a result, there is a need for developing a framework that explains technology acceptance and rejection in settings where the users have little influence on adoption and use. Such a framework may help to explain sources of the true cost of deploying IT (Love, Irani, Ghoneim and Themistocleous 2006) and may help to create more successful system implementations. Furthermore, the framework may provide additional insights about the complex topic of technology diffusion (Bagchi, Kirs and López 2008).

Often, IT adoption and use, especially of large systems such as ERP, substantially affect business procedures, organizational structures, and induce a shift in managerial power. Moreover, an implementation of ERP supports the sharing of data and knowledge (Erat, Desouza, Schäfer-Jugel and Kurzawa 2006). This sharing of data and information leads to a higher level of organizational transparency. Thus, in mandatory settings, the transparency is an important factor in explaining the acceptance and rejection of new technology. It appears that when the employees directly benefit from the increased transparency in their organization, they are more likely to accept the technology, which leads to this transparency.

PROPOSED FRAMEWORK

Our literature review confirms that issues of technology adoption and use, especially in mandatory settings, are complex. Moreover, a number of factors such as perceived easy to use, perceived usefulness, social expectations from the user, and perceived transparency are highly relevant. In addition, these factors are influenced by the external environment (e.g. regulatory, cultural, business, and economic settings). Overall, these factors could be categorized as technology and actor related factors.

Perceived Easy to Use

Perceived easy to use is defined as the level of effort needed for using a particular technology (Davis 1989). The rich body of research confirms that if new technologies, such as Enterprise System, are perceived to be user-friendly, they are more likely to lead to user satisfaction and support.

Perceived Usefulness

Perceived usefulness is defined as the potential of a particular technology to increase individual job performance (Davis 1989). Most of the literature confirms that this capability is directly related to users' satisfaction.

Perceived Change in Transparency

The change in organizational transparency as a direct result of technology implementation was not considered as an important factor in the original TAM (Davis 1989). However, we believe a higher level of transparency, due to sharing of data and information resulting from the implementation of Enterprise System, may lead to satisfaction or dissatisfaction with the new technology. Users who directly benefit from the increased level of organizational transparency are more likely to be satisfied with the new technology. In contrast, users who perceive the increased level organizational transparency as jeopardizing their current position are likely to resist the new technology.

Social Expectations

Social expectations regarding the new technology implementation were also not taken into consideration in the original TAM (Davis 1989). However, social expectations seem to be an important factor. For example, a large, highly competitive company is expected to use the current Enterprise System. Moreover, career oriented programmers and other professionals are expected by their peers to use the most recent technology. These peer pressures are likely to result in the support of new technology.

Satisfaction with the New Information Technology

Our framework assumes that mandatory IT implementation, such as large Enterprise Systems, triggers a reaction. This reaction, based on satisfaction with new technology, leads to support or resistance.

The proposed framework is depicted in Figure 1.

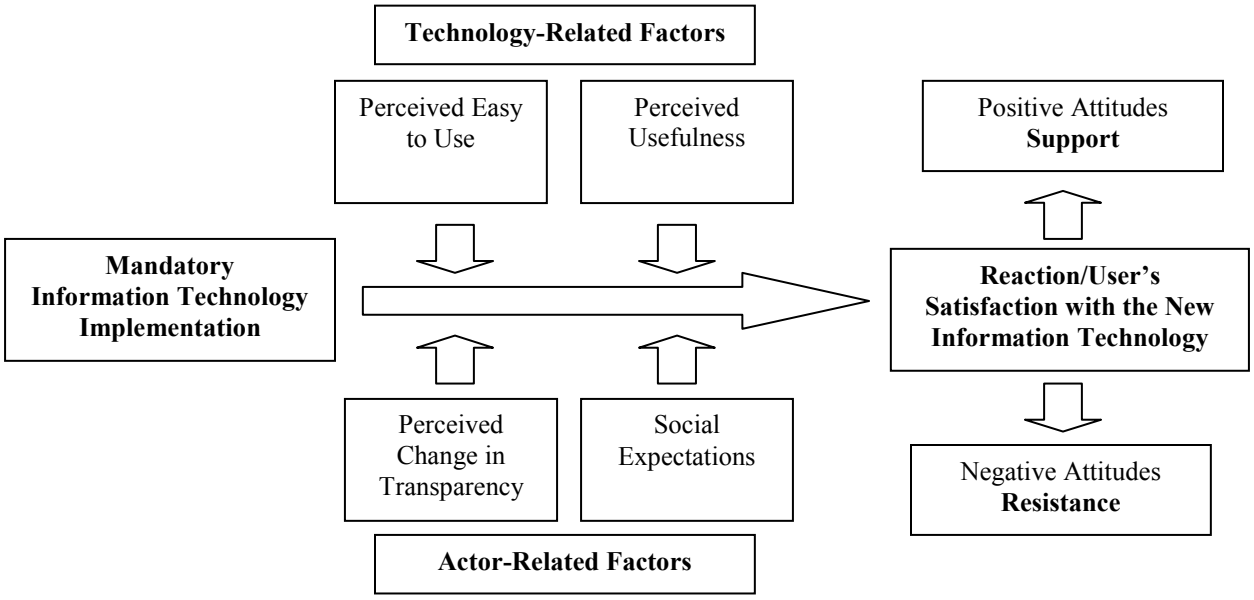

Figure 1. Mandatory Information Technology Implementation Framework

INFORMATION TECHNOLOGY IN SAUDI ARABIA

There are relatively few published reports about the adoption and use of IT in Saudi Arabia (Al-Somali, Gholami and Clegg 2009). Most of them point, however, to some differences as compared to the Western countries. One study suggests that users in Saudi Arabia perceive computer systems as less difficult to use and understand than users in Canada (Al-Khaldi and Wallace 1999). Consequently, the easy to use factor in the original TAM (Davis 1989) seems to have less predictive power about the IT acceptance in Saudi Arabia (Al-Gahtani, Hubona and Wang 2007). Moreover, in contrast to the USA, where younger people are more likely to embrace new computer technology than older people, in Saudi Arabia the age appears to be less predictable for user satisfaction with computers (Al-Gahtani 2004).

In addition, many institutions in Saudi Arabia, for example, banks, seem to promote less new technology, such as online banking, as compared to the institutions in Western countries (Al-Somali et al. 2009). In this context, manufacturing companies in Saudi Arabia that have a foreign partner are more likely to embrace new technology such as material requirements planning (MRP) and computer integrated manufacturing (CIM) (Andijani and Selim 1996).

INITIAL VALIDATION OF THE FRAMEWORK

Experience in working with several companies in Saudi Arabia that implemented a large ERP or Enterprise System seems to support our framework. For example, one of the authors worked in the past with a company in Saudi Arabia that implemented a new ERP from SAP. The new ERP system replaced over 400 individual computer applications. As a result of the ERP system implementation, many departmental databases were replaced by a single database. Data sharing and organizational transparency increased. Users who benefited from this increase in organizational transparency were more likely to voice their support for the new system: for example, they were more likely to provide the necessary information and help in other ways.

APPLICATION OF THE FRAMEWORK

Our framework may serve as a basis for ERP and Enterprise System providers when formulating their business models. In essence, business models contain the basic logic of how value is generated for customers and how various business actors benefit from the proposed solution (Brockmann and Gronau 2009). Building the proposed framework, ERP and Enterprise System providers could expand their attention to actor-related issues.

Our framework could also be applied during the ERP, Enterprise System or other mandatory system implementations. Accordingly, the managers could better focus on social, or actor-related, problems, which account for a large number of implementation problems (Soja 2008; Soja and Paliwoda-Pekosz 2009).

LIMITATIONS AND FUTURE RESEARCH

The proposed conceptual framework is derived from literature review and backed with our own experience with working with companies in Saudi Arabia and other countries. As the next step, we plan to present our framework to executives and project managers who have experience with implementations of large ERP or Enterprise System.

The specific information about the implementations of large ERP or Enterprise System may lead to further validation and possibly refinement of our framework. For example, it may lead to additional, overlooked factors that determine users' satisfaction.

Thus, in addition to the validation of our framework with empirical data, we plan to examine the opportunity of enhancing our framework by integrating it with the existing theories about users' satisfaction. To this extent, the Yield Shift Theory of Satisfaction (YST) proposed by Briggs, Reinig and de Vreede (2008) appears to be highly promising. The YST offers ten various satisfaction effects that are triggered by changes in individual perception about the particular technology. It appears that these effects could be adapted also to mandatory settings.

CONCLUSIONS

In summary, we believe that the proposed framework will make a substantial contribution to the field of IT in emerging economies, known for uniqueness in IT use and adoption (Roztocki and Weistroffer 2008a; Roztocki and Weistroffer 2008b). More specifically, our work investigates how specific conditions (Roztocki and Weistroffer 2009) may influence the technology adoption. In contrast to the original TAM (Davis 1989) that focuses on voluntary adoption of technology and primarily looks at technology-related factors, our framework additionally considers actor-related issues: perceived shift in organizational transparency after system implementation and social expectations from the users.

Unavoidable limitations may serve as ideas for future projects. For example, many of our findings may be limited to the setting of our research, and a future study may expand our research to other countries.

ACKNOWLEDGMENTS

This research was supported by a grant from King Fahd University of Petroleum and Minerals (KFUPM), Dhahran, Saudi Arabia.

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