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Model of post-implementation user participation within ERP advice network

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ABSTRACT

Base on the social network theory, this study attempts to investigate whether the network centrality will affect the user participation in ERP system post-implementation or not. In aspects of network centrality, we used degree, closeness, betweenness and eigenvector as indicators to investigate the relationships between individual network centrality and user participation. Then we further explore the impact of user participation on system use and user satisfaction. We adopted the ERP post-implementation of TSC Company as an example. The sample data has 211 questionnaires. Our empirical results show that network centrality positively affects the three dimensions of user participation; hands-on activity and communication activity positively affect system use; user–IS relationship, hands-on activity, and communication activity positively affect user satisfaction. Through the lens of social network, we argued that ERP user network plays an important role to influence user participation in post-implementation period, which is critical for system use and user satisfaction.

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1. Introduction

Many researchers study the key factors of how to implement enterprise resource planning (ERP) system successfully (Chou & Chang, 2008; Chung, Skibniewski, & Kwak, 2009; Morton & Hu, 2008). These successful factors may broadly be classified as human/organizational, technical, and economic ones (Chen, 2001; Sarker & Lee, 2003). While each set of factors is important, there appears to be a growing consensus among researchers that human factors, more than technical or economic, are critical to the success of ERP projects (Alvarez, 2008; Sarker & Lee, 2003). Sarker and Lee (2003) suggest that empowering the team-members for self-management and communication issues are seen as central to success of an ERP implementation project. Salmeron and Lopez (2010) indicate that encouraging the active participation of all users involved in the process of post-implementation ERP systems is essential in the success of the ERP maintenance. To deal with technical complexity and overambitious demands associated with

ERP systems, user participation is important to mitigate risk (Amrit, van Hillegersberg, & van Diest, 2013). Therefore, user participation is an important factor when implementing the ERP system.

User participation refers to the favorable behaviors and activities that users perform in the systems development process to promote efficient and effective implementation of ERP systems (Bagchi, Kanungo, & Dasgupta, 2003; Barki & Hartwick, 1989; Ives & Olson, 1984; Kawalek & Wood-Harper, 2002). When organizations plan to use an ERP system, a number of user representatives participated in software package configuration and there might have a conceptual gap between developers and users (Barki, Rivard, & Talbot, 2001; Kappelman, 1995; Markus & Ji-Ye, 2004). To close the gap to ensure ERP system implementation success, it's essential for organizations to handle user participation carefully (Dong-Gil, Kirsch, & King, 2005; Markus, Axline, Petrie, & Tanis, 2000). User participation can improve system quality by giving developers the information they need to produce a high-quality design (Barki et al., 2001; Byrd, Cossick, & Zmud, 1992; Markus & Ji-Ye, 2004). Besides, user participation in change management activities such as planning or conducting training is much more likely to affect system acceptance and use outcomes (Kappelman, 1995; McKeen & Guimaraes, 1997; Yetton, Martin, Sharma, & Johnston, 2000). ERP system is an integrated solution in an enterprise, which involves internal workflow within inter-departmental cooperation. The

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communication and coordination in related users are extremely important as well as the communication with consultants. With the efforts in both sides, the implementation can be ensured to correspond to the entire workflow in the enterprise.

The timing issue of user participation over ERP lifecycle is highlighted as an important but ignored dimension recently (Wagner & Newell, 2007). As post-implementation success of ERP is critical for adopting organizations in order to fully benefit from system's potential, user participation is extremely important at this stage. During the implementation stage, only limited key users are participated in the configuration of ERP to help the system go live. After the installation of an ERP system, a critical mass of users start the exploitation and evaluation of the system and some uncontrolled problems may also appear. Post-implementation phase including the stabilization, operation and extension of the ERP system involves a large number of different users from different functions and previously silent users may express their dissatisfaction with the system, which will influence the acceptance of the ERP system (Markus & Ji-Ye, 2004; Wagner & Newell, 2007). Therefore, investigating post-implementation participation is critical for the system's survival and assimilation in the organization because users themselves need situated learning through use to figure out what is best from ERP system for existing practices.

A person's behavior intention is influenced by his/her personal relationship network in an organization (Sykes, Venkatesh, & Gosain, 2009; Zagenczyk & Murrell, 2009). This impacts the result of learning and knowledge exchange during the ERP post-implementing process. Therefore, a concept of social network is proposed to study the influences in different network relationship. How to use the network to achieve the enterprise target has been highly valued by the management because understanding an employee's network relationship is beneficial to find out the influential users during the process of ERP post-implementation. The potential users have greater influences in drawing the participation of other users and thus they indirectly enhance the possibility of successful post-implementation. Many researches show that the social network has significantly influence in individual job performance (Ahuja, Galletta, & Carley, 2003; Sparrowe, Liden, Wayne, & Kraimer, 2001). More and more studies reveal the behavior influence impacted by individual's network relationship (Sykes et al., 2009; Zagenczyk & Murrell, 2009). The network relationship in an organization has certain impact on user participation. Sykes et al. (2009) indicated that the counseling network relationship has significant influence on system usage. Meanwhile, the network relationship influences one's job involvement (Zagenczyk & Murrell, 2009). Individual's network relationship is a key variable in one's participation. During the post-implementation, the relevant users will be impacted by the social network, and the following behavior changes are key factors of successful post-implementation.

As studies on the ERP post-implementation phase are still underrepresented (Esteves & Bohórquez, 2007; Grabski, Leech, & Schmidt, 2011) and the call for investigating post-implementation user participation (Markus & Ji-Ye, 2004; Wagner & Newell, 2007), this research explains the influence of user participation and the relationship of the successful ERP post-implementation, based on the social network theory (Bonacich, 1972; Freeman, 1979) and the user participation theory (Barki & Hartwick, 1994a; Hartwick & Barki, 2001). It intends to understand the relationship of social network, user participation and the success of system post-implementation and to discover the role of social network in post-implementation and in the enhancement of user participation to accomplish the system post-implementation successfully.

Section one covers the relevant background literature. This is followed by theoretical framework and hypotheses section and

then the methodology one. We then analyze the results and we draw conclusions in the final section.

2. Conceptual background

2.1. Social network

A social network can be defined as a relationship comprising a series of persons, objects, and events; different networks can be formed with the same elements because of different types of relationship. In social network theory, these persons, objects, and events are defined as actors or nodes. The relationships between actors in a structural relationship and an individual actor in a network have a strong influence on the behavior, perception, and attitude of an individual or an entire organization (Knoke & Kuklinski, 1982).

When a corporation introduces an IS system, network centrality is one of the crucial elements; the corporation must invest considerable resources during the introduction, which makes the transmission and control of these resources highly valuable. The knowledge, intentions, and behavior of using the new system is also affected by the network (Sykes et al., 2009). Network centrality is defined as "the scope of individual participation in the network which facilitates information exchange among colleagues" (Sparrowe et al., 2001). Knoke and Kuklinski (1982) indicated that the interactions of numerous relationships, including the transmission and receipt of information, exist in the process of contact among individuals, and that the level of individual involvement can be judged by the number of relationships.

Researchers consider network centrality an essential structural attribute in social networks. Individuals situated in the network center can control the flow of resources and related knowledge. An individual is not affected by others; instead, he or she has influence on individual power in an organization, as well as resource control (Ibarra, 1993; Ibarra & Andrews, 1993). However, if the individual is situated at a lower level of network centrality, he or she must rely on others to pass on resources and knowledge and is subsequently easily influenced by the environment (Freeman, 1979). Freeman (1979) and Bonacich (1972) analyzed network centrality by using four dimensions: degree, closeness, betweenness, and eigenvectors.

In 1974, researchers started to apply social network concepts to the technology innovation diffusion model of an organization (Czepiel, 1974) and discovered that an informal communication network within an organization can ease the adoption of a new system. The network is also crucial to the IS system post-implementation, as well as the transmission and transfer of related resources and knowledge in the organization. Some studies have indicated that the structures of a social network can affect the transmission of valuable resources in an organization (Brass, 1984; Ibarra, 1993). Work-related resources, such as work counseling and strategic information, can be transmitted through a social network, as can social recognition, discipline, and support (Sykes et al., 2009). How knowledge and usage methods can be transferred to users during the post-implementation process of an ERP system is crucial. Informal personal networks play a key role in transferring the knowledge about a new system. Hence, Sykes et al. (2009) considered it difficult to accomplish the absorption and transmission of professional knowledge about a new system within a short timeframe; transferring knowledge among people with similar training, backgrounds, and work characteristics is easier. When an organization introduces a new IS system, it is more effective to share and transmit knowledge of the new system by using staff in the same department of the organization. In

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