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AN EXPLORATORY STUDY OF THE ROLE OF KEY USERS IN ERP IMPLEMENTATIONS

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Abstract

This research proposal presents a research design on the role of key users in ERP implementations. We intend to investigate the following research questions: (1) How do key users function in an ERP implementation project? (2) What factors influence key users' functioning? And how do the factors influence key users' functioning? (3) What are the benefits and impacts of key users? In this proposal, we first review current literature on key users, and then present the theoretical framework of boundary spanner. We also give our research design and data analysis strategy in the last part of the proposal.

Keywords: Key users, ERP implementations, boundary spanner.

1   INTRODUCTION

Though key users who are selected from user departments and are experts in the company's processes are considered to be important by both practitioners and academics (Wu & Wang, 2002), few studies have examined the role of key users. A better understanding is needed of how key users function through detailed analysis with empirical data. In this study, we seek to fill this void via investigating the practice of key users in Chinese ERP implementation projects. We focus on the following research questions: (1) How do key users function in an ERP implementation project? (2) What factors influence key users' functioning? And how do the factors influence key users' functioning? (3) What are the benefits and impacts of key users? This research will benefit key users, project champions and ERP project teams who are firmly concern with key users' effectiveness. Implementation consultants may also be interested in this study, who should frequently communicate with key users during an ERP implementation. This study will contribute to literature on ERP implementations. Researchers on ERP implementations are also potential audience to this study, especially, those who are concerned with human factors.

2   ERP IMPLEMENTATIONS: A ROLE-BASED VIEW

Traditional information system implementation can be depicted with a two-stage model of primary adoption decision by mangers and secondary adoption by end users (Leonard-Barton & Deschamps, 1988; Gallivan, 2001). We propose a three-stage framework for ERP implementation, emphasizing the transition stage. In the first stage of our model, top managers evaluate ERP products and make the decision of whether to implement an ERP system. Top managers may consult with external consultants. Consultants may also promote ERP products and service to top managers. If top managers decide to implement an ERP system, they provide a vision of the organization's future business model. The stage is similar to Markus & Tanis' (2000) chartering stage.

In the transition stage, key users will be responsible for turning top managers' vision into reality. In this stage, key users communicate with implementation consultants (Wu & Wang, 2002; Volkoff et al., 2002). Though key users play an important role in transition stage, they are also directed by top managers and need top managers' support. So, top managers will have an influence on key users. This stage is similar to Markus & Tanis' (2000) project stage.

Once the ERP system goes live, end users will use the system. It comes to the third stage, usage. If the system is successfully used by end users, it will be tightly integrated with business, which will take the organization substantial business value. End users' system usage is influenced not only by key users via training (Wu & Wang, 2002), also by top managers via administrative policy (e.g., incentive and evaluative measures) (Liang et al., 2007). The usage stage covers Markus & Tanis' (2000) two stages of shakedown and onward and upward. This conceptual model is depicted in figure 1.

Though IT staffs are always part of an ERP project team, implementation of an ERP system in an organization is typically directed by key users rather than IT staffs (Wu & Wang, 2002; Volkoff et al., 2002). The role of IT staff changes from that of system developers to that of supporting participants during ERP implementation (Wu & Wang, 2002). In ERP implementation, the most important participants are not IT specialists or consultants but business leaders from the areas affected by the new technology (McAfee, 2006). Key users are these business leaders or representatives of them.

3   LITERATURE REVIEW

Several studies on key users focus on the perspective of knowledge transfer (Suzlanski, 1996; Gable et al., 1998; Lee & Lee, 2000). Knowledge is transferred from consultants to key users (Haines &

Goodhue, 2003; Volkoff et al., 2004; Ko et al., 2005). Based on interviews of 12 companies, Haines & Goodhue (2003) find that knowledge transfer is explicitly mentioned by many companies as a key factor for the success for the implementation. Training was usually used as a mechanism for knowledge transfer. Key users are first trained by consultants, who then train end users. Technical knowledge and skills, such as system administration, system customization, and a good conceptual understanding of the system should be transferred (Haines & Goodhue, 2003).
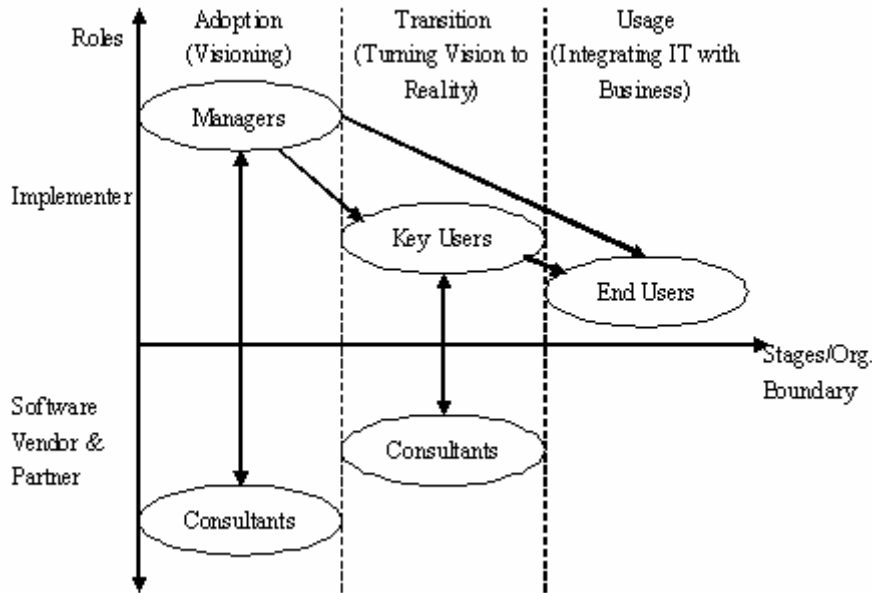
Figure 1. A three-stage ERP implementation model

Volkoff et al. (2004) studied the role of power users in ERP implementations. Power users are a subset of key users who may only participate in a part of ERP project jobs, usually testing and training. These key users represent two types of knowledge transfer mechanisms (Volkoff et al., 2004), namely training and personnel transfer.

Based on Szulanski's (1996) research model, Ko et al. (2005) developed a variance model to test antecedents of knowledge transfer from consultants to clients (key users included). Consultants' characteristics, i.e., communication competence, credibility, and intrinsic motivation, and key users' characteristics, i.e., communication competence, absorptive capacity, and intrinsic motivation are significant predictors to knowledge transfer. Shared understanding and relationship between consultants and key users are also predictors to knowledge transfer.

Studies on key users' role in knowledge transfer assume that knowledge is a kind of critical resource to the organization and knowledge (e.g., best business practice) embedded in an ERP system is superior. Key users are mediators of bringing external knowledge into internal. These studies have attracted researchers' attention to key users, and have made preliminary investigations on key users' function. However, in the research focusing on knowledge transfer, key users' functions are narrowly defined, and they are always seen as students learning from consultants. Key users' role in knowledge transfer reflects supply-side's view of technology which emphasizes the constraints of technology (Orlikowski, 1992) or external control (Markus & Robey, 1988), but agency of key users is omitted.

Other aspects of key users' functions were examined in a few studies. Baskerville et al. (2000) found that organizational learning becomes more dependent on key users when an organization implements an ERP system. Key users know more about the technical operation of the system than the IT developers and more about the value of the system in their own business context than the consultants (Baskerville et al., 2000). They have important effects on end users' learning.

Jones & Price (2004) and Jones (2005) found that key users are also sharing knowledge with other key users and organizational members, in addition to learning from consultants. In general, studies on the functions of key users are fragmented. There is a lack of deep understanding how key users' functions in an ERP implementation. We need a more holistic view on how key users function.

4 THEORETICAL BACKGROUND

Volkoff et al. (2002) suggested that key users function as boundary spanners who must help bridge the gaps between the software and organizational processes and between different functional areas. This research is intended to contribute to theory of boundary spanning. Systems theory suggests that as organizations grow, they differentiate, and specialized areas evolve to deal with particular tasks or environments (Katz & Kahn, 1966; Thompson, 1967). As these specialized units develop, each generates its own idiosyncratic norms, values, time frame, and coding schemes to permit effective processing of information (March & Simon, 1958; Katz & Kahn, 1966). Thus not only will different organizations have a mismatch in coding schemes, but differentiated subunits within the same organization will likely also have contrasting languages and coding schemes (Tushman & Scanlan, 1981b). One way to deal with the difficulties of communicating across organizational boundaries is to develop special boundary roles (March & Simon, 1958; Thompson, 1967; Aldrich & Herker, 1977). Individual filling these roles are capable of translating contrasting coding schemes and therefore of acting as boundary spanners between the work unit and external information areas (Tushman, 1977).

Boundary spanners' function is usually depicted as a two-step process (Tushman & Scanlan, 1981b). First, boundary spanners are able to gather and understand external information and subsequently they are able to translate this information into terms that are meaningful and useful to their more locally oriented colleagues. We put forward our first research question.

Q1: How dose key users function in an ERP implementation? Will the two-step model be applicable to key users' functioning?

Open systems theory suggests that a boundary spanners' behavior is shaped by environments (Aldrich & Herker, 1977). Key users as individual agents are embedded in complex institutional context. Institutional factors (e.g., culture and enterprise ownership) have more complicated implications to ERP implementations in China (Davison, 2002; Martinsons, 2004). We will investigate how institutional context impacts on key users' functioning as well as individual characteristics. We raise the following research question.

Q2a: How do institutional context influence key users' functioning?

Tushman & Scanlan (1981a) suggest that personal technical competence is a basic determinant of boundary spanners. Boundary spanners should also have both strongly internal and external linkages, which enable them to search out relevant information on one side and translate it on the other (Tushman & Scanlan, 1981a). We will investigate what individual characteristics of key users influence on their functioning.

Q2b: What are the individual characteristics of key users that influence key users' functioning?

Prior studies suggest that the characteristics of consultants also impact key users' functioning (Suzlanski, 1996; Ko et al., 2005; Jones & Price, 2004; Jones, 2005), so we propose the following research question.

Q2c: What are the individual characteristics of consultants that influence key users' functioning?

Ancona & Caldwell (1992) find that boundary activities have positive effects on project performance. To our knowledge, there's no study on the outcomes of key users' functioning. We will also explore how key users' individual behavior benefits the organization. So the last research question is

Q3: What are the benefits and impacts of key users?

Figure 2 depicts our research questions graphically. Our research intention is not to test any *a priori* model, and this broad framework is just for framing our research. We will refine this framework with empirical data.
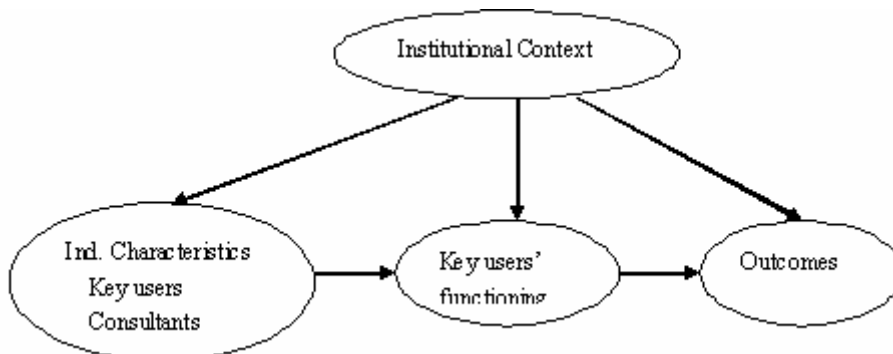

Figure 2. Research questions

5 RESEARCH DESIGN

With regard to our research questions, we are interested in how key users function, how contextual and individual factors influence their functioning, and why and how key users' functioning can benefit their organization. We use case study as our research strategy, as case study is particularly appropriate for exploring "how" and "why" questions (Yin, 2003).

5.1 Pilot study

Before the main study, a pilot study has been done. The pilot study includes a series of interviews with both key users and consultants. In the first round of the pilot study, four consultants were interviewed whose work experiences on both domestic ERP products and multi-national ones. In this round, more broad questions were asked. All interviewees were asked to talk about ERP projects broadly, such as ERP project management, critical success factors, and measurement of ERP success. All interviewees reported that key users are critical to ERP success, and they are interested in talking issues about key users, such as knowledge transfer from consultants to key users, or key users' learning. The four consultants provided us with preliminary information on key users' working activities in ERP projects and insights on key users' functions and roles. We tape-recorded and transcribed all the interview data. We also coded the data. In addition to ERP success factors, categories on key users' learning, such as indicators of key users' learning, factors influencing on key users' learning emerged. Being influenced by literature on knowledge transfer, we focused on how key users learning in this stage.

Based on the last round's interview, an interview protocol was developed, which included questions on the background information of the ERP project, how key users learn, what influences key users' learning, and outcomes of key users' learning. We tested this interview protocol in PetrifactionCo, a division of a large state-owned company. The CIO, five key users, one IT professional, and one end user were interviewed. All interviews were tape-recorded and transcribed. Based on our data analysis, we found that there are lacking sufficient details in our data. This might result from the too broad questions, so we further refined our research questions and added some questions on key users' practice in each stage of an ERP project.

In the third round of the pilot study, we interviewed three senior Oracle consultants with tenure ranging from 6 to 8 years to verify our interview protocol. We first introduced our research intention, and then elaborated our interview questions to ask for comments on each question. They shared their insights on key users' functions with us. They suggested that key users function more than learning

from consultants. Other activities, such as engaging in interdepartmental communication and coordination, are also critical for a qualified key user. This urged us take a broad view on key users' functions. Our final interview protocol for key users includes three parts: (1) personal background information and general information of the project; (2) main activities in each stage of the ERP project and gains through participating in the activities; (3) reflections on key users' functions, i.e., which factors influence on key user's functioning, and outcomes of key users' functioning.

5.2   5.2 Main study

5.2.1   Sampling

We selected five companies as the sample of our main study, i.e., SteelCo1, SteelCo2, AirportCo, PetroleumCo, and BathtubCo. We used theoretical sampling technique, rather than random sampling. We sampled key users from different companies and industries. The companies ranged from service sector to manufacture sector in industry, from state-owned companies to multinational company in ownership. We also sampled key users from different functional areas, engaged in ERP projects in different stage. We had completed the first stage of data collection since Nov 2007 to Jan 2008.

5.2.2   Data collection and analysis

Interview was employed as the major data collection method. We interviewed all or most of the key users, project managers, as well as department managers and CIO if possible. We have collected more than 300, 000 words of interview data. Before entering each research site, we collected archival data as many as possible. We accessed the Website of the company, and searched news and public articles about the company's ERP implementation. All the second-hand data made us get some background information, so that we could focus on our research questions during interviewing. We also employed questionnaire to collect quantitative data. The validity and reliability of the scales we used are validated in previous research, and we also made some adjustments to be applicable in our research context. In BathtubCo, we had an opportunity to do observations. We attended the morning meeting on ERP and get some information on how key users coordinated with each other.

Based on Miles & Huberman's (1994) suggestions, both within- and cross-case analysis will proceed. In the within case analysis, we will follow the following the three steps suggested by Strauss & Corbin (1998), and Van Maanen (1979).

First, we will code all the interview scripts sentence by sentence. In these initial rounds, we will code each interview separately on the basis of in vivo words, phrases, terms, or labels offered by the interviewees. For example, figure 3 is a part of our interview, and table 1 presents how we code sentence by sentence.

Second, we will reread each interview several times, each time marking phrases and passages that were similar to and different from each other, to discern similarities and differences from each other. We will use constant comparison of multiple informants and over time to detect conceptual patterns (Strauss & Corbin, 1998). Through these comparisons, we look to discern first-order codes, which employ language used by the informants that expressed similar ideas (Van Maanen, 1979). For example, we may discern from Table 1 that C5 and C7 have the similar meaning. Another code from the key user of SD also has the similar meaning. So we cluster the three codes together, and label them with "discussing with other key users of the same department", a phrase which is often mentioned by interviewees (refer to the third row of Table 2).

Third, along with developing first-order categories, we will start discerning links among these categories. These emergent links will enable us to cluster them into theoretically distinct groupings, or second-order themes (researcher-induced concepts, cast at a more abstract level) (Van Maanen, 1979). For example, the first-order categories of "communicating with key users of other departments" and

"discussing with other key users of the same department" are all about processing business knowledge, so they can be clustered into a second-order category and we label the second-order category "integrating business knowledge" (refer to the first two columns of Table 2).

Interviewee: In the stage of requirements analysis, we spent a long time discussing the arrangement of the warehouses. We didn't understand the solution proposed by the consultants. We had a heated discussion internally. Different people had different interpretations.

Interviewer B: What do you mean by "we"? Who discussed?

Interviewee: We were the internal members. For example, I always discussed with XW. Why? I was familiar with the management of fuel warehouse. XW was familiar with the management of spare part warehouse. We always discussed on how to arrange the warehouses. Sometimes, we didn't agree with each other.

Interviewer B: It is key users that always discussed with each other?

Interviewee: Yes. We always discussed on how to understand the words said by consultants. We didn't understand what they said. From the viewpoint of now, we were quite funny. But the discussions were quite important. If we made a mistake in the blueprint stage, it would take us into wrong directions and the following work would be all wrong. We are internal consultants. We are the *key* users.

Figure 3. A part of interview on the key user of MM

Sentences	Code
In the stage of requirements analysis, we spent a long time discussing the arrangement of the warehouses.	C1: Many internal discussions
We didn't understand the solution proposed by the consultants. We had a heated discussion internally. Different people had different interpretations.	C2: Difficulties in understanding the consultants
I always discussed with XW. Why? I was familiar with the management of fuel warehouse. XW was familiar with the management of the spare parts warehouse. We always discussed on how to arrange the warehouses.	C3: Expertise in different areas.
Sometimes, we didn't agree with each other.	C4: May have conflicts
We always discussed on how to understand the words said by consultants.	C5: Discussing on what consultants said
We didn't understand what they said.	C6: Didn't understand the consultants' words
From the viewpoint of now, we were quite funny. But the discussions were quite important. If we made a mistake in the blueprint stage, it would take us into wrong directions and the following work would be all wrong.	C7: Discussions among intradepartmental key users are important
We are internal consultants. We are the key users.	C8: Key users are important

Table 1. Sample of Initial coding

Second-order categories	First-order categories	Representative Quotations
Integrating business knowledge	Communicating with key users of other departments	Because ERP reflects the business process it's like a line. We needed to know about other departments across the process. (The key user of MM) I would communicate with other key users on whatever related to accounting. For example, when a batch of materials was purchased, we would communicate on how to keep accounts of each step. (The key user of FI/CO) The last step of our process is selling. Along with the key users of sales and distribution, we decided that only when the product had been checked out by us (inspectors), they (salesmen) could see it in the system; otherwise, they couldn't see it in the system. We always communicated on all these issues. (The key user of QM)
	Discussing with other key users of the same department	I always discussed with XW (another key user of MM). Why? I was familiar with the management of fuel warehouse. XW was familiar with the management of spare part warehouse. We always discussed on how to arrange the warehouses. (The key user of MM) I always discussed with XW (another key user of MM) on how to understand the words said by consultants. (The key user of MM) There were three persons in the sub-team of SD, one IT personnel, two business ones. We learnt together. We talked about what we learn after every training session. It was seldom that we learn the same things…We benefited from the process. (The key user of SD)

Table 2. First-order and second-order categories

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