EXAMINING THE INFLUENCING FACTORS OF CROSS-PROJECT KNOWLEDGE TRANSFER: AN EMPIRICAL STUDY OF IT SERVICE FIRMS

Research-in-Progress

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Abstract

Despite the significance of knowledge transfer in IT service industry, our understanding of knowledge transfer between projects remains limited. Different from the existing studies mainly examining knowledge transfer at organizational level or at individual level within the same project team, this study examines the factors that influence cross-project knowledge transfer in IT service firms. Based on the process logic of knowledge transfer, we develop an integrated theoretical model that posits that cross-project knowledge transfer is influenced by knowledge, transfer activities, project teams' transfer capabilities, project team context and project task context. We use the recipient IT project implementation performance to measure the effectiveness of cross-project knowledge transfer. Results of the preliminary test show that the designed questionnaires have scalability for the latent constructs, and the theoretical model has its rationality to some extent. To fully assess our proposed research model, we will collect large data set and perform a complete data analysis to test our model. Our study contributes to existing research by focusing on cross-project knowledge transfer and empirically investigating the performance effect of project-related factors. Results of the study will have important implications for IT practitioners.

Keywords: knowledge management, knowledge transfer, cross-project knowledge transfer, influencing factors, IT project management

Introduction

Organizations increasingly use project teams to accomplish specific tasks, and commonly believe that a project can benefit from the knowledge and learning of another project and avoid the risk of "reinventing the wheel". Prior research has provided some evidence to support the positive impact of cross-project knowledge transfer on project outcome, such as on accelerating the project implementation progress (Hansen 1999). However, cross-project knowledge transfer is not always successful. Empirical research has evidenced problematic situations in cross-project knowledge transfer, such as problems encountered by a base project in documenting and storing "lessons learned" (Newell and Edelman 2008), and problems experienced by a new project in locating useful knowledge (Newell et al. 2006). Moreover, the turnover of its members often makes it difficult for a project team to retain the project-related knowledge of a departing employee and to train a newcomer on project tasks and procedures. From the perspective of knowledge management, these problems, to a large extent, are caused by the deficiency in cross-project knowledge transfer within the firm.

Cross-project knowledge transfer is playing an increasingly important role in information technology (IT) services firms. IT services firms are project-based companies. They rely on project teams to develop and deliver their products and services, whether in building a new software application or in implementing a packaged system. As IT projects are deployed to accomplish interdisciplinary and innovative tasks, knowledge and learning from an IT project become important knowledge sources for subsequent projects (Disterer 2002). Moreover, because IT services are based on integrating diverse and rapidly changing information technologies (e.g, hardware, software, networking, etc), it is essential for IT service firms to capture project-related knowledge and learning, and to facilitate knowledge transfer across projects. However, the dynamics of IT project teams often result in decentralization and knowledge fragmentation. For example, the quick disbanding of team members at the completion of a project causes the loss of useful project-related knowledge and experience for later reuse (Disterer 2002). Therefore, the significance of and problems in cross-project knowledge transfer motivated us to conduct this study on cross-project knowledge transfer in the organizational setting of IT services firms.

The phenomenon of knowledge transfer has been widely studied by organizational scholars. Knowledge transfer refers to "the process by which one unit of an organization, such as a group or department, is affected by the experience of another" (Argote and Ingram 2000, p. 151). The factors influencing knowledge transfer have been examined extensively in IT (Joshi and Sarker 2006; Ko et al. 2005; Sarker et al. 2005) and non-IT context (e.g. Sulanski 1996, 2000; Cummings and Teng 2003; Landaeta 2008). As a result, a theoretical framework including knowledge, source and recipient, transfer activities and context has been gradually established and empirically tested. For example, the motivation and capability of knowledge source are two frequently cited factors contributing to effective knowledge transfer (Argote 1999).

Although prior research offers useful insight into knowledge transfer in general situations, it offers us limited knowledge about project-related contexts and how those contextual factors contribute to the knowledge transfer across projects. First, scholars mainly focus on the knowledge transfer within the same project team; few investigate cross-project knowledge transfer. Second, existing literature pays little attention to the project factors (i.e., time urgency) and the significant "projectised" (Meo et al. 2010) characteristic embedded in the other factors influencing knowledge transfer in the IT context. For example, prior knowledge transfer research has studied extensively the knowledge transfer capacity of individuals, but not the capacity of the entire source project team. Third, for the flow of knowledge across projects, most researchers study its influencing factors from the perspective of organization learning rather than from the theoretical lens of knowledge transfer (Newell et al. 2002, 2004). To enhance our understanding of knowledge transfer at project levels, we intend to conduct an empirical study of cross-project knowledge transfer in IT services firms. In particular, our study seeks to answer the following two questions: (1) What are the factors influencing cross-project knowledge transfer? (2) How can these factors explain the effectiveness of cross-project knowledge transfer?

The paper is organized as follows. In section 2, we review studies on knowledge transfer and define cross-project knowledge transfer in our study. Next, based on the theoretical analysis, we propose an integrated model of the influencing factors on cross-project knowledge transfer and present the corresponding

hypotheses. We then explain the development of our survey instruments and the pretest result in section 4. Finally, we describe our plan to complete the research study.

Connotation of cross-project knowledge transfer

There are a variety of definitions of knowledge transfer. Most studies adopt the perspective of communication theory and view knowledge transfer as a process during which the source transfers knowledge to the recipient (Szulanski 1996; Ko et al. 2005). Scholars in this research stream emphasize that knowledge transfer process consists of two sub-processes, sending and receiving of knowledge (Davenport and Prusak 1998); knowledge transfer media and organizational management strategies play important roles in these processes (Albino et al. 2004). Meanwhile, other researchers focus on the performance effect of knowledge transfer, and argue that knowledge transfer is a process in which the recipient with less knowledge is influenced by the source with more related knowledge, and highlight the importance of absorbing and using the transferred knowledge (Argote 1999; Argote and Ingram 2000). Further, some other researches adopt the perspective of cognitive psychology, and define knowledge transfer as the process for applying the knowledge acquired in one situation to another (Singley and Anderson 1989, p.112-115; Björkegren 1999), with an emphasis on the role of context in the knowledge transfer process. In the cross-project context, knowledge transfer occurs between two different projects. It inherits the generic characteristics of knowledge transfer in the general context, but it is also significantly influenced by project-related factors. Drawing upon communication theory and integrating it with other theoretical perspectives, we define cross-project knowledge transfer as the communication activities of project-based knowledge from the source project to the recipient project so that the knowledge is absorbed and reused by the recipient project team.

There are two types of cross-project knowledge transfer, that is, knowledge transfer occurring in the concurrent projects and that in the sequential projects (Nobeoka, 1995, p.432). Concurrent project knowledge transfer refers to knowledge transfer between two parallel projects such that a new project begins to transfer knowledge from a base project before this base project has completed its task. Sequential project knowledge transfer occurs when there is not schedule overlapping between two projects so that a new project begins to transfer knowledge from a base project after the base project has finished its work. For sequential project knowledge transfer, a new project tends to transfer knowledge from multiple base projects at the same time, so it's difficult to test the effectiveness of knowledge transfer from a certain project. In other words, it becomes more difficult for us to match the pair of source-recipient projects for a large-sample empirical analysis. Therefore, we decide to focus our study on concurrent project knowledge transfer and to examine its influencing factors.

Research Model and Hypotheses

The theoretical model

There have been a lot of empirical studies on the factors influencing knowledge transfer. Szulanski (1996) proposed that the factors influencing knowledge transfer includes the characteristics of knowledge, the source, the recipient and the corresponding context, and empirically tested relationship between these factors and the effectiveness of knowledge transfer. This research framework provided a very useful reference for subsequent studies in this area. Cummings et al. (2002, 2003) further examined the important role of transfer activities (e.g., document, meeting, training, visits, etc.) in the process of knowledge transfer, and put forward a framework of four influencing elements including the characteristics of knowledge, source and recipient, transfer activities and transfer context. Here the "activities" consisted of an assessment of the forms and embeddedness of knowledge, the establishment of management structure for knowledge transfer, and the use of specific knowledge transfer channels. But they focus on the specific measurement of the third aspect, without considering the first two. Information system (IS) researchers gradually adopted the integrated research framework mentioned above to investigate the influencing factors of knowledge transfer in the IT context. For example, Sarker et al. (2005) and Joshi and Sarker (2006) analyzed multiple factors affecting knowledge transfer in information system (IS) development project teams, including knowledge, source, recipient, relationship between

them, and situational context. Drawing upon Szulanski's work (1996), Ko et al. (2005) conducted an empirical study on the factors influencing the knowledge transfer between IT consulting firms and their client organizations during enterprise resource planning (ERP) implementations. However, these researches mainly examine the knowledge transfer that takes place within the same IT project.

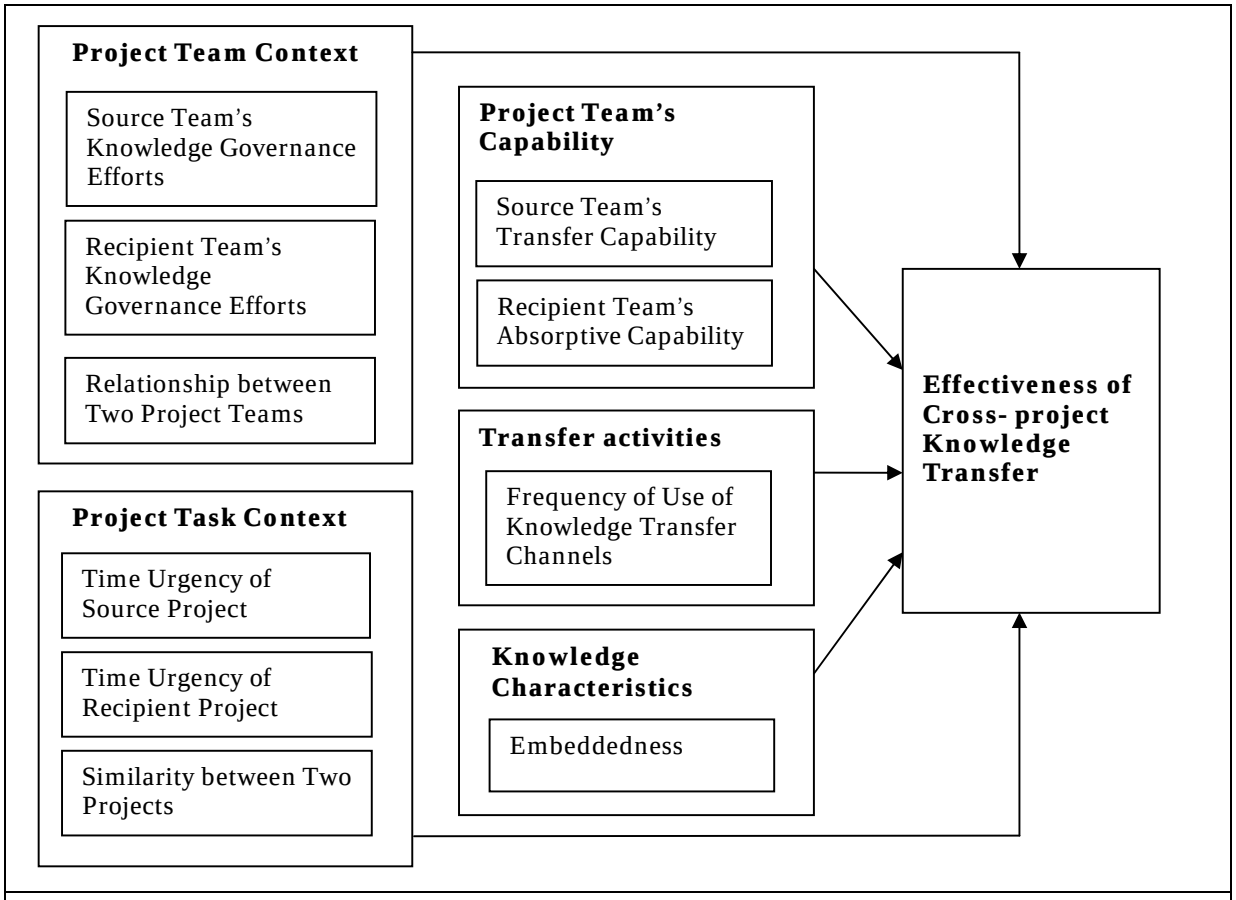

Figure 1. Model of Influencing Factors for Cross-Project Knowledge Transfer

This paper will draw on the classical integrated framework of knowledge transferto explore the factors impacting cross-project knowledge transfer in the IT practice. As shown in Figure 1, our research model of cross-project knowledge transfer tests two contextual factors specific to project level --- project task context and project team context --- in addition to the factors on knowledge source and recipient, transfer activities and knowledge characteristics. We argue that project task context is likely to play an important role in cross-project knowledge transfer for two reasons. First, projects are often defined by specific objectives and tasks constrained by budget and time (Disterer 2002). The context of tasks at the source project affects the relatedness and usefulness of the project-related learning for recipient projects (Newell et al. 2006). Second, prior research has emphasized the need to consider the context in which knowledge and knowledge transfer are based (Argote 1999; Szulanski 1996), necessitating the evaluation of project task context for project-level knowledge transfer. As for the project team context, we examine the influence of project team management support, answering Szulanski's call (1996) for further research on this important element. The management effort to pursue the best result of knowledge management is referred to as "knowledge governance" (Grandori 2001), which is becoming increasingly important in both theory and practice. Therefore, our model considers the impact of the project teams' knowledge governance efforts, including organizational technical infrastructure, structure and culture (Gold et al. 2001). Lastly, the effectiveness of cross-project knowledge transfer is likely to be influenced by the relationship between project teams.

The following section discusses the major influencing factors in our research model (Figure 1) and presents corresponding hypotheses. The dependent variable is the effectiveness of cross-project knowledge transfer. Here we measure it by using the perceived performance benefits of the cross-project knowledge transfer (Newell and Edelman 2008).

Hypotheses

(1) Project Team's Capability

Source team's transfer capability refers to the source's ability to identify potential uses of its knowledge and the contingent conditions, to assess the needs and capabilities of the potential recipient, and to transmit knowledge so that it can be put to use in another location (Martin and Salomon 2003). At the individual level, source transfer capability is positively and significantly correlated with knowledge transfer effectiveness (Shu 2006). This correlation, in our opinion, will also apply to the cross-project level within an IT firm because a team's knowledge and ability are the integration of individual knowledge and ability, according to Nonaka's (1994) knowledge creation theory. Thus the better transfer capability a source project team has, the more attention it will pay to the selection of proper knowledge and of transfer channels to meet the needs of a recipient team. As a result, the recipient team will become more effective in learning and applying the source project's knowledge. Based on this reasoning, we hypothesize that:

H1: Source project team' transfer capability is positively related to cross-project knowledge transfer.

Recipient team's absorptive capability is the ability of a recipient to identify the value of new, external knowledge, assimilate it, and apply it to commercial ends (Cohen and Levinthal 1990). When the recipient has developed a strong absorptive capacity, it can respond to external knowledge quickly and absorb and reuse it productively. Empirical research in IS area shows that the recipient's absorptive capacity has a positive impact on the performance of information systems project in general (Aladwani 2002), and on the process of knowledge learning in ERP implementations (Marabelli and Newell 2009). Similarly, in the context of cross-project knowledge transfer, strong absorptive capacity of the recipient project team is likely to lead to effective knowledge transfer. Therefore:

H2: Recipient project team' absorptive capability is positively related to cross-project knowledge transfer.

(2) Knowledge Transfer Activities

Frequency of use of knowledge transfer channels. Knowledge transfer channels are formal and informal means through which knowledge is transferred. They are indispensable for knowledge transfer. The channels (e.g., face-to-face meeting or email) differ in its richness, a medium's capability to process information during a time interval (Daft and Lengel 1986). For example, face-to-face communication often conveys richer knowledge than e-mails, due to the nonverbal cues and immediate feedback provided in face-to-face communications. In other words, the former channel can transfer explicit and tacit knowledge, while the latter can only transmit explicit knowledge generally. Project teams tend to use a variety of channels concurrently, as the channels complement each other in their strength and weakness. Frequent use of knowledge transfer channels can further facilitate the transmission of rich knowledge, and then enhance the effectiveness of knowledge transfer. Cumming and Teng's (2003) empirical study on R&D teams shows that frequent use of transfer channels contributes to knowledge transfer success. Therefore, this reasoning leads us to the following hypothesis:

H3: The frequency of use of knowledge transfer channels is positively related to cross-project knowledge transfer.

(3) Characteristics of Knowledge

Knowledge embeddedness refers to the characteristics that knowledge is embedded in people, tools, and tasks, as well as in related sub-networks among these elements (Argote and Ingram 2000; Cumming and Teng 2003). Empirical research in IS field has mostly confirmed that tacitness, causal ambiguity and other characteristics of knowledge would affect knowledge transfer in IT projects (Timbrell et al. 2001; Xu and Ma 2008), but it pays limited attention to the characteristic of embeddedness.Lacking assessment of the embeddedness of the to-be-transferred knowledge can result in a less successful outcome, even though a variety of knowledge governance strategies have been implemented to promote knowledge

transfer (Davenport and Prusak 1998). As an ad hoc system, a project is often located in a particular situation, and the project-related knowledge can be characterized by its embeddedness in a situational context. For an IT project, the knowledge can be embedded in complex organizational processes, legacy systems, externally based processes, and IT systems (Pan et al. 2001). And the more deeply the knowledge is embedded in specific situations, the more difficult it becomes to transfer the knowledge (Cumming 2002; Cumming and Teng 2003). Base on these reasonings, we predict:

H4: Knowledge embeddedness is negatively related to cross-project knowledge transfer.

(4) Project Team Context

Source team and recipient team's knowledge governance efforts. Knowledge governance means choosing certain governance structure and designing corresponding governance mechanisms to optimize the effect of knowledge management activities, including knowledge creation, knowledge transfer and knowledge utilization (Grandori 2001). Nonaka et al. (2006) arguedthat the hypertext structure, both rigid and flexible, not only provides basic organizational protection mechanism for knowledge transfer activities, but also improves its efficiency. Empirical studies have shown that effective contract mechanism (including incentive system) could help to motivate the source and recipient to transfer knowledge to each other,absorb the knowledge, and invest more time on it, which can further promote cross-project knowledge transfer and communication (Burgess 2005; Bosch-Sijtsema and Postma 2010). Goh (2002) emphasized that, in the project implementation process, the cultural incentives and project team management support play important roles in encouraging and reinforcing team members' enthusiasm in transferring and absorbing knowledge. In other words, an organization's strong capability to manage knowledge transfer activities is likely to lead to good performance. As the unit to execute a task, the project team would execute the organizational management efforts. So we argue that, in an IT firm, knowledge governance efforts of both the source and the recipient project team contribute to cross-project knowledge transfer. Therefore, we hypothesize the following:

H5: The source project teams' knowledge governance effort is positively related to cross-project knowledge transfer.

H6: The recipient project teams' knowledge governance effort is positively related to cross-project knowledge transfer.

Relationship between two project teams. To transfer and absorb knowledge, the source and recipient need to interact and exchange information frequently. Thus their relationship is one important factor contributing to cross-project knowledge transfer. Friendly cooperation (Faraj and Sproull 2000) and mutual trust (Bosch-Sijtsema and Postma 2009) can help enhance their communication and understanding of knowledge, which can facilitate the project implementation process and improve its success. Conversely, arduous relationship, especially competitive relationship, between the source and recipient can negate the success rate of IT projects (Ko et al. 2005). Therefore, we predict:

H7: Relationship between two project teams is positively related to cross-project knowledge transfer.

(5) Project Task Context

Time urgency of source project. Time urgency is defined as "the degree to which stakeholder claims call for immediate attention" (Mitchell et al. 1997). It is a kind of time pressure for a team to achieve the expected project goals. Moreover, it will affect the tendency of the team and its members' decisions and actions. As perceived time urgency becomes greater, the source project team is found devoting much more time and energy to completing their tasks and less time to communicating with others and sharing lessons learned. Perceived time urgency has been found to hinder the source project team's transferring knowledge to the recipient team (Wiewiora et al. 2009). Therefore, we hypothesize:

H8: Time urgency of source project is negatively related to cross-project knowledge transfer.

Time urgency of recipient project. Unlike the source project, the time urgency of the recipient project will create an urgent need to learn from the source project team (Newell et al. 2006). To solve difficult problems under time urgency, the recipient project teams are eager to learn from the successful experience of other projects, rather than to "reinvent the wheel." This is likely to increase the frequency of cross-project learning, improving the efficiency of project implementation. Thus, we predict:

H9: Time urgency of recipient project is positively related to cross-project knowledge transfer.

Similarity between two projects refers to the commonality in members, tasks, tools and so on. As mentioned above, project-related knowledge is embedded in these elements. Hence, it is possible that project similarity influences knowledge transfer cross projects. The greater the project similarity is, the more easily the source and recipient project teams can share a common understanding of knowledge "supply and demand" (Newell et al. 2006). This, as a result, can improve the recipient project's effectiveness in reusing knowledge from the source project, helping reduce the uncertainty emergent in cross-project knowledge transfer (Fitzek 1999). Moreover, project similarity increases knowledge relevance between two projects, which can increase the frequency of transferring and learning knowledge across projects. The higher the project similarity, the more likely the cross-project knowledge transfer will succeed. Therefore, we predict:

H10: Similarity between two projects is positively related to cross-project knowledge transfer.

Methods

Measurement development and validation

To test the model and hypotheses in Figure 1, we developed matched-pair survey instruments. Unfortunately, due to the page limit on conference submissions, scale items can't be shown in this paper. A source team provided information about source team's transfer capability, and the recipient team was asked about cross-project knowledge transfer and about its absorptive capability. Both the source team and recipient team responded to items about knowledge governance efforts, frequency of use of knowledge transfer channels, knowledge embeddedness, project teams' relationship, time urgency and project similarity. For the last five constructs, both teams' responses were combined to produce one measure.

Most of the items are adopted from prior research, or modified slightly. However, scale items for "similarity between two projects" and "transfer capability of source project team" are new items we developed. First, we developed the scale items for "similarity between two projects" by relying on insights from our field interviews on "the influencing factors of cross-project knowledge transfer" with a number of IT firms (eg. Kingdee Software Co., Ltd.) during March and April of this year. The similarity construct consists of the business association between the two projects, similarity in their business functions, technological methods, and their overall common features. Second, source transfer capability has been conceptualized in prior studies. Some studies consider it at the three component dimensions: ability, willingness, and competence (Knudsen and Zedtwitz 2003). Some others, based on the process dimension, view it as the ability of identifying, assessing and transmitting the transferred knowledge (Martin and Salomon 2003) or as the ability of choosing, preparing and deploying the transferred knowledge (Knudsen and Zedtwitz 2003). However, source transfer capability is rarely measured directly, especially in the cross-project context. Therefore, we developed new items for "transfer capability of source project team" in this study. As knowledge transfer is a process of performing a series of activities, we adopted the conceptualization at the process dimension to develop seven items.

In addition, we controlled for the impact of IT project size in this study, and measured it by the number of full-time equivalent (FTE) at the source and recipient projects (Ko et al. 2005)and by the project contract value (Lui et al. 2005). Also, we controlled for different types of IT projects as they may have some impact on cross-project knowledge transfer. Moreover, as different IT project managers had different levels of working experience, their perception of knowledge transfer between his project team and the other project team could be different. Thus we took IT project managers' working years as another control variable.

Preliminary test of the questionnaire

Pilot test

First, we conducted pilot test to confirm the content validity and face validity (Moore and Benbasat 1991) of the measurement. Initially, we invited three experts, who studied knowledge management in IT/IS area, to make a theoretical logic assessment of the developed scale items. Then, we invited five graduate students with IT project implementation experiences to discuss and comment on different aspects of the survey, including the wording of the measurement items, their consistency with the underlying construct, the ease of understanding by respondents, and the ordering of the items. We then incorporated all the participants' feedback into the revision of our survey items. For survey responses, we adopted a five-point Likert scale, ranging from (1) “strongly disagree” to (5) “strongly agree”.

To obtain a balanced perspective on cross-project knowledge transfer, we developed a matching pair of questionnaires. Questionnaire A measures the factors that impact source project team’s transferring knowledge to the recipient project team. In addition to the factors that influence the recipient project team’s learning from source project team, questionnaire B also measures the overall effect of cross-project knowledge transfer. Furthermore, questionnaires A and B need to be completed by people from source and recipient project teams separately. This multiple respondent strategy would allow us to collect richer data, to overcome the bias of common method approach and improve the accuracy of the data (Sethi and King 1994).

Subsequently, we interviewed five project managers in two IT firms. At the end of the interviews, these project managers all helped us fill out the draft questionnaire. In this process, we used the method of Think-aloud (Davey 1983), during which the respondents spoke out their reactions to difficult questions and confusing wording while they were filling out the questionnaires. After that, we also invited them to reflect on their rich industry experience and to review the content and structure of the questionnaire. Based on their feedbacks and the interview results, we revised and developed a new version of questionnaires.

Pretest

We randomly selected 50 managers who participated in the systems integration project manager training in Beijing in 2008 and now have more than three years of experience in IT projects practice to test our hypotheses in the Chinese IT services context. For those who were willing to participate in this study, we emailed them incentive mechanisms and instructions for the survey, including the URL link for online questionnaires A and B, the methods of completing the questionnaires in pairs, and other survey guidelines. In the instructions, we specified that if one project team appeared to transfer more knowledge to the other project team in an IT firm, then the IT manager should complete questionnaire A (the survey for the source project), and should invite the other IT manager of the recipient project to fill out questionnaire B. Conversely, if one’s project team acquired more knowledge from the other project team, then the IT manager should consider them as the recipient, thus complete questionnaire B, and invite the other IT project manager to fill out questionnaire A. We believe that this emphasis on the matching pair of source and recipient projects would allow us to collect more useful data. By the initial submission of this research-in-progress work, we have received 30 pairs of questionnaires.

According to our research model, we carefully processed and integrated the scores of the paired questionnaires accordingly into a completed piece of sample data in advance. Then we used SPSS 13.0 software to perform the principal component analysis on the items of each construct. According to Kaiser’s (1974) KMO value of the minimum 0.5 standard, most KMO values are greater than 0.5. These indicate the commonality of the items for their corresponding constructs, suggesting that it is appropriate to apply factor analysis in our study. However, for “similarities between two projects”, “recipient team’s absorptive capability”, “time urgency of recipient project”, the KMO value of their items are 0.444, 0.425 and 0.425 respectively, all less than 0.5. It’s mainly because that the factor loadings of some items are relatively low. So random assignment method and item-to-construct balance approach are combined to aggregate some items of these three constructs (Little et al. 2002). Subsequently, we performed the principal component analysis again, and obtained satisfactory KMO values, at greater than or equal to 0.5.

Thus all the items measuring the corresponding constructs are suitable for factor analysis. We also tried to use LISREL 8.8 software to run a confirmatory factor analysis, and got an estimated model after 3000 iterations. Because the total sample size is significantly small given the number of parameters needed to be estimated, parameters in the estimated model are unreliable. However, the estimated model shows that our theoretical model is relatively reasonable, given the fact that we have only collected 30 pairs of questionnaires at the writing of this research-in-progress paper. In addition to the survey responses for the construct items, we also collected qualitative data from those open-ended questions on the questionnaire. IT project mangers' answers to those questions would not only facilitate the revision and further improvement of the survey instrument, but also provide us rich contextual information, helpful for interpreting our final measurement scales and results.

Conclusion and Future Work

Based on the existing research, we developed a theoretical model of influencing factors for cross-project knowledge transfer and tested it in IT service firms. Here we have conducted pilot tests, checked content validity and face validity qualitatively, and pretested the construct validity quantitatively with a small sample. The results show that the designed questionnaires have scalability for the latent constructs, and the theoretical model is sound and reasonable.

Our study extends the existing research by studying systematically the factors influencing cross-project knowledge transfer in IT service firms. We are particularly interested in the uniqueness of these factors in the project contexts, i.e. their "projectised" features. To be specific, we examine project-related knowledge, knowledge transfer channels used by two projects teams, project teams' transfer capability and absorptive capability, context of a project team and of project tasks. Therefore, our research model can provide other scholars with systematic understanding of the factors influencing cross-project knowledge transfer and insight for further research on cross-project knowledge transfer in IT and non-IT context. Results will also have important implications for IT practitioners. Of course, some limitations exist. For example, we only examined Chinese IT project managers. With some caution, however, our results could be applied to other managers or IT professionals from other ethnic backgrounds.

We have made progress in developing the theoretical model and performing preliminary test of the questionnaire. We will continue to collect large data set and perform a complete data analysis to fully test our proposed research model. Because of the difficulty in collecting a large sample of matched questionnaires, we will take into account other structural equation modeling approaches that place less onerous burdens than LISREL, such as Partial Least Squares. Future research along this line of research will advance our understanding of knowledge transfer cross projects. A promising future research is to investigate the interplay between the transfer mechanisms and project-related knowledge. When knowledge is closely tied to individuals' practice, such as the project knowledge about process (how things are done), personalization strategies (i.e., face-to-face communications) prove to be effective mechanisms to transfer the knowledge (Hansen 1999). One important mechanism, the social network an employee is embedded and the network position the individual possesses, has been suggested to play significant role in employees' learning and knowledge transfer (Deng and Chandler 2010). So how to use social networks to promote cross-project knowledge transfer is an important question worth further investigation. Other directions for future research include testing the theoretical model presented in this paper in different cultural settings or in geographically distributed IT service projects, and to explore the knowledge governance mechanisms that can help IT project teams to achieve optimal effect of cross-project knowledge transfer.

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