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LEVERAGING SOCIAL CAPITAL AND ABSORPTIVE CAPACITY FOR KNOWLEDGE INTEGRATION: A CASE STUDY OF A CROSS-ORGANIZATION IT PROJECT

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Abstract

Based on an in-depth case study, this article studies a collaborative IT project (one IT service vendor and three clients) involving intensive knowledge integration activity. It explains how social capital (e.g. relational, cognitive, structural), absorptive capacity (e.g. exploratory, exploitative, transformative) interact with each other with the support of organizational culture (e.g. collective, cooperative, compatible) to ensure the success of cross-organization knowledge integration information system project. Dividing the project process into three phases, we discuss in detail that in initiation phase, relational social capital initiates the exploratory absorptive capacity while exploratory absorptive capacity enhances the relational social capital in return; in implementation phase, cognitive social capital and exploitative absorptive capacity are utilized and synthesized to keep the smoothness of the implementation process; and in assimilation phase, transformative absorptive capacity leads to the reconfiguration of structural social capital while the reconfigured structural social capital in turn reinforces the transformative absorptive capacity. Within these three phases, we identified the different roles that culture plays as norm, facilitator and harmonizer.

Key Words: knowledge integration, social capital, absorptive capacity, organizational culture

1 Introduction

In today's rapidly changing world, business success is more frequently achieved through collaboration of organizations (Laycock, 2005) and establishing collaborative information systems is an effective way to do so. To develop and implement this kind of systems, knowledge needs to be combined and integrated across organizations. And the system needs to be assimilated by the involved organizations, possibly by changing work processes and reconfiguring organizational memory (Huang et al., 2001). Therefore, in collaborative IT project, knowledge integration plays a critical role and its performance significantly influences the outcome of the whole project (Mitchell, 2006). Nevertheless, how knowledge integration could be successfully achieved has not been explicitly studied, especially in the setting of cross-organization projects.

In the current study, we adopt the theoretical lenses of social capital, absorptive capacity and organizational culture to address this research gap. To be more specific, the research question we seek to answer is how knowledge integration can be successfully achieved through the interaction of social capital and absorptive capacity in cross-organization IT projects. Also we attempt to shed light on the influential roles organizational culture plays in supporting the interaction process to achieve successful knowledge integration.

By constructing a three-phase process model towards a cross-organization IT project, this study contributes to the existing literature and informs the practice in several ways. First of all, the particular dimension of social capital that is of the utmost importance in each knowledge integration phase is identified with supports provided by the other two dimensions. Second, while prior literature studied the three kinds of absorptive capacity from a sequential perspective, we treat them as three dimensions of absorptive capacity and examine their effects separately. Moreover, a "6C" mechanism is proposed to explain how organizational culture supports the interaction of the two elements mentioned above. Last but not least, our findings inform organizations the different key factors they should focus on in different project phases to achieve successful knowledge integration.

The rest of the paper is organized as follows. We first review existing literature related to knowledge integration and the three theoretical lenses, then discuss the methodology adopted in the study. After that, a detailed case analysis and proposed framework is presented. At last, we conclude our findings, and discuss the contribution, implications as well as possible ways for future research.

2 Theoretical Background

2.1 Knowledge Integration IT Projects

Knowledge integration is an on-going collective process of constructing, articulating and redefining shared beliefs through the social interaction of organizational members(Huang et al., 2001). We adopt the definition of knowledge integration as an on-going collective process of acquiescing, combining, transforming and assimilating specialized knowledge among organizations(Huang et al., 2001).

Knowledge Integration IT projects are projects which require cross-organization knowledge to be combined and applied to develop and implement the information system, and the system needs to be

assimilated by the involved organizations, in terms of changed work processes and reconfigured organizational memory(Huang et al., 2001). Since different organizations involved in the project have different interests and goals, their motivations and capabilities of knowledge integration are quite different. As Leniva (2005) points out, when multiple parties are brought to work out a new IT project, there will be greater potential for all kinds of conflicts. Though some prior studies have investigated the knowledge integration among organizations (Newell et al., 2004, Huang and Newell, 2003, Bhatt, 2001), they mainly study from one specific perspective, such as social capital, knowledge type or organization structure, and focus on the particular mechanism during the knowledge integration process. Little research has comprehensively and systematically analyzed how to utilize the different interaction effects of social capital, absorptive capacity to achieve knowledge integration with the various effects provided by shared culture across organizations, especially the organizations from collective culture. How knowledge integration projects could succeed still remains to be an interesting research question which deserves more attention(Levina, 2005).

2.2 Social Capital

Social capital is gaining prominence as a concept that provides a foundation for describing and characterizing a firm's set of relationships (Inkpen and Tsang, 2005). In this study, we follow Nahapiet and Ghoshal (1998) and define social capital as "the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social units".

Nahapiet and Ghoshal (1998) classified the three dimensions of social capital as relational, cognitive and structural, which are discussed in individual level. Later, Inkpen and Tsang (2005) adopted this classification and discussed them in organizational level to explain the organizational strategy and behavior. Specifically, relational social capital focuses on the role of direct ties between actors and the relational, as opposed to structural, outcomes of interactions (Inkpen and Tsang, 2005). It emphasizes the critical role of trust among actors and treats it as a motivator for actors to cooperate. Cognitive social capital represents the resources that provide shared meaning and understanding among network members(Nahapiet and Ghoshal, 1998). With shared goals (short term or long term) and shared culture, actors can understand each other more easily and work more cooperatively to achieve better performance. Structural social capital is related to network ties, network configuration and network stability. Network ties (internal ties, external ties, etc.) deal with the specific ways in which the actors are related with each other, and they help to create the opportunities for social capital transaction and exchange (Adler, 2002).

In knowledge integration projects, distributed knowledge needs to be integrated and different organizations have to cooperate to achieve the success of the projects. Previous studies have indicated the positive influence of social capital on knowledge integration across organizations (Bhandar et al., 2007, Huang et al., 2001) and the organizational competitive capabilities (Inkpen and Tsang, 2005, Nahapiet and Ghoshal, 1998).

2.3 Absorptive Capacity

Absorptive capacity is initially conceptualized as the ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends (Cohen and Levinthal, 1990). Then it was reconceptualised as a dynamic capability pertaining to knowledge creation and utilization that

enhances a firm's ability to gain and sustain competitive advantage by Zahra and George (2002). While Zahra and George focused on the internal capabilities without considering the external sources, Lane and Koka (2006) suggested a more detailed and comprehensive definition of absorptive capacity. It is defined as a firm's ability to utilize externally held knowledge through three sequential processes: recognize and understand new external knowledge (exploratory learning), assimilate valuable external knowledge (transformative learning), and apply assimilated external knowledge (exploitative learning)(Lane et al., 2006). Rothaermel and Alexandre (2009) stated that an organization's absorptive capacity, is not merely directed outward through a focus on the acquisition and assimilation of external knowledge, but also encompasses an organization's ability to process knowledge internally. In this study, we adopt the perspective from Rothaermel and Alexandre (2009) to consider absorptive capacity as the acquisition and assimilation of external knowledge and the processing of internal knowledge.

The organization's knowledge integration capability reflects its absorptive capacity to a great extent. In other words, the absorptive capacity of an organization will directly influence its ability to integrate knowledge from both external and internal environments.

2.4 Organizational Culture

Organizational culture has been conceptualized in various ways by different researchers. Trice and Beyer (1984) believed that culture represented the accepted behavior rules, norms and rituals. Meek (1988) interpreted organizational culture as a unifying force that integrates the efforts of organizational members. Some authors emphasized more on the notion of shared ideologies, values and beliefs (Schwartz and Davis, 1981, Lewis and Boyer, 2002, White et al., 2003), or shared patterns of meaning and understanding (Louis, 1985). We follow the definition provided by Schein (1985) that culture is a pattern of basic assumptions and beliefs, developed by a given social group as it learns to cope with its problems of internal integration and external adaptation, that has worked well enough in the past and considered valid and passed on to new members as the correct way to perceive, think, and feel.

Previous studies have showed that culture can positively inspire and motivate knowledge sharing, and also encourage the building of reciprocal relationships between members of an organization, thus affect knowledge management in a positive way. Young et al. (2003) argues that the flexibility in culture is positively associated with the knowledge transferring ability. Organizational culture which fosters a trusting and trustworthy work environment is beneficial (Soliman and Spooner, 2000, Wagner, 2003).

In this study, we look at the different roles culture plays in the process of knowledge integration, and how it supports the interaction of social capital and absorptive capacity to achieve knowledge integration success.

3 Research Methodology

We use an exploratory case study strategy and conduct a detailed case analysis. Case study method is adopted since it allows us to better and truly answer the research question proposed earlier, i.e., how knowledge integration can be successfully achieved through the interaction of social capital and absorptive capacity in cross-organization IT projects. Given the fact that culture and social relationships are both embedded within and in the interaction between organizations, they are very difficult to examine and measure using quantitative method. Moreover, the interaction between social capital and absorptive

capacity in the process of knowledge integration is quite complex, thus the richness of case analysis makes the case study method more appropriate in our context.

4 Case Study

4.1 Case Background

The case took place in Singapore and it was a cross-organization IT project where one IV vendor and three clients were involved. ChemXlog was an IT vendor, which specialized in providing collaborative logistic solutions for chemical companies. PhotoChem was a photographic chemicals producer. Two logistic service providers, a haulier and a freight forwarder, provided services for PhotoChem to ship its products all over the world. As time went by, there was a strong need for PhotoChem to change the inefficient traditional way (e.g. through telephone, by fax) in which it interacted with the two logistic service providers and to set up a web-based collaborative logistic system which could enable online interaction among these three partners. ChemXlog was chosen to implement the system for its specialty in logistic information systems. The background of involved organizations is summarized in Table 1.

Company	Background and Business	IT Experience	Motivation
ChemXlog	IT vendor, supply-chain integrator	High	High
PhotoChem	Manufacturer, a major client of the logistic service providers	Middle	High
Freight Forwarder	Small, traditional firm coordinates with haulier for servicing clients' logistic activities	Minimal	Low
Haulier	Small, traditional firm provides logistic services	Minimal	Low

Table 1. Background of the collaborating organizations

4.2 Process Model

A process model is derived from the analysis of case data. The relevant constructs in the process model are summarized in Table 2 and the proposed model is depicted in Figure 1.

Social Capital	
Relational	Focuses on the role of direct ties between actors and the relational outcomes (e.g., trust) of interactions (Inkpen et al. 2005)
Cognitive	Represents the resources that provide shared meaning and understanding among network members (Nahapiet et al. 1998)
Structural	Network ties, network configuration and network stability (Nahapiet and Ghoshal 1998)
Absorptive Capacity	
Exploratory	Ability to recognize and understand new external knowledge
Exploitative	Ability to assimilate valuable external knowledge
Transformative	Ability to apply assimilated external knowledge (Lane et al. 2006)
Organizational Culture	
Collective	Members sharing common interests and values
Cooperative	Members willing to act in conjunction with others
Compatible	Members capable of existing or performing in harmony with others

Table 2. Summary of Relevant Constructs

We study which dimension plays a leading role and how the specific dimensions of social capital and absorptive capacity interact with each other in each phase, under the support of organizational culture.

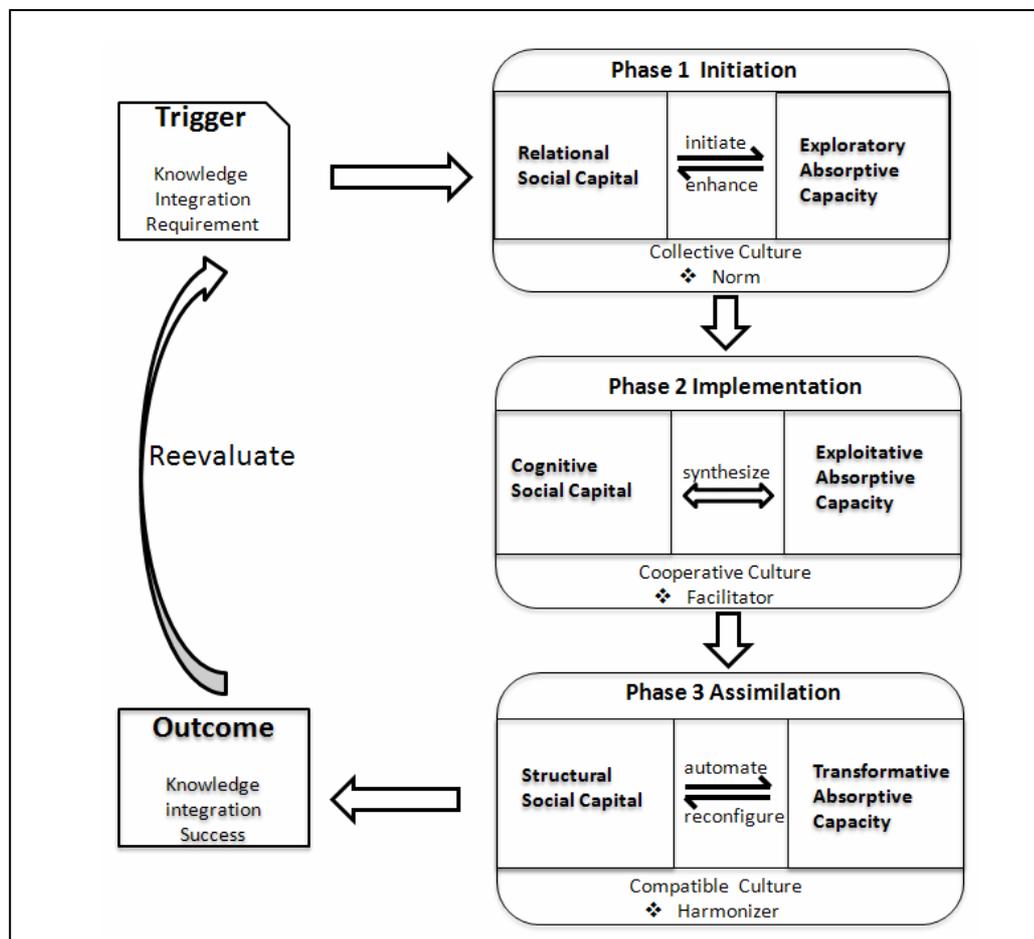


Figure 1. Process Model

4.3 Phase 1: Initiation of knowledge integration IT project

At the very beginning of this project, the knowledge integration requirement from PhotoChem triggered this whole cross-organization IT knowledge integration project. PhotoChem had a strong need to improve work efficiency after bearing several years' traditionally inefficient working and communication style. It planned to install a new knowledge integration information system among partners to facilitate efficient information exchange among organizations, such as shipment information update, confirmation and amendment. Facing this new knowledge integration requirement, the involved organizations had their own considerations not only because of their different strategy positions and interests in the transaction activities, but also because of the different absorptive capacity towards a new system implementation. The two logistic firms were both small, traditional, and cost conscious firms which were reluctant to change and averse to information technology. The Haulier's director talked about their difficulties:

“For us, we don't see the savings today. It's more of incurring extra expenditure. The cost of employing such a system on a large scale is quite exorbitant for my (company's) size. At this time, it's just extra costs and extra man-hours for getting into

the system.”

To solve these two logistic firms' limited resources problem, the account manager of the manufacturer managed to get the service providers the grant from Singapore government that helped SMEs (small and medium enterprise) pay for technology-based projects. Besides the encouraging grant, the manufacturer and the IT provider conducted extensive meetings with these two logistic firms and provided professional analysis for them (e.g. cost-benefit analysis). After months' hard work and close communications, the two logistic firms finally accepted this project and agreed to support it through the whole process. To the two logistic firms, the major reason that they agreed to involve in this knowledge integration project was the trust shared with their major client, PhotoChem, and they did want to maintain a good long-term relationship with it. The Haulier's director said about the relationship:

“Our business is quite unique. We establish personal relationships with our clients since we deal with goods worth millions of dollars. Our service is very personal, so we talk to them [the clients] and get their feedback from time to time. Our service is very unique. It's not like other businesses where: I have a few items to sell, so I check the newspapers or go to the Internet....This is a long term relationship and this business is all about trust.”

Relational social capital was critical in this phase to buy the two logistic service providers in and initiate the involved organizations' exploratory absorptive capacity. It was considered as the key enabler of effective collection activities (Levina, 2005) and believed to facilitate the knowledge share, transfer and integration across organizations (Dodgson, 1993, Doz, 1996). The trust existing among the parties gave them confidence and impetus to participate even with the risks affront. With the initiating effect of relational social capital, exploratory absorptive capacity could be activated to enable organizations to figure out the new requirement, new information, and the whole picture of the project. PhotoChem, the haulier, and the freight forwarder began to explore the new external knowledge (e.g., meeting with the IT provider) to find out what they should do and what they would benefit from the project. In this phase, exploratory absorptive capacity made these organizations evaluate their own specific capabilities (e.g. IT capability) and resources (e.g. human) to prepare for the following implementation phase. Facing new requirements, a lot of explanations, communications, and negotiations were conducted. Many direct and indirect opportunities were created by the extensive exploratory activities to help the involved organizations understand each other better (e.g., the other parties' attitude, motivation, consideration), as well as themselves, which in turn enhanced the relational social capital among them.

Besides, culture played a critical role as a norm that the organizations complied with in this initiation phase. The normative role of collective culture made the involved parties believe that collaboration was the right thing to do and not easy to say no (Meyerson and Martin, 1987, Robey and Azevedo, 1994). The traditional Chinese culture within the two logistic companies positively influenced their attitudes towards the knowledge integration requirement. And the collective setting made them difficult to say no towards the major client's cooperation requirement. From a third party's perspective, the business development manager from ChemXlog shared his opinion:

“The service providers acceded to the system because they felt obliged to payback PhotoChem for the seven years of business. It was also about giving face to the other parties, considering they are a traditional Chinese company. They could never refuse in a collective setting”.

In the initiation phase, relational social capital initiated exploratory absorptive capacity and the initiated exploratory absorptive capacity in turn enhanced relational social capital. The involved organizations mainly relied on exploratory absorptive capacity to get familiar with the new knowledge integration requirement. The collective culture played a normative role to support the interaction process in this initiation phase of knowledge integration.

4.4 Phase 2: Implementation of knowledge integration IT project

After getting the commitment and prior preparation of all the parties in the initiation phase, this phase focused on the development and implementation of the collaborative information systems. The cognitive social capital, which referring to the shared goals, shared understanding and shared meaning among organizations (Nahapiet and Ghoshal, 1998), was synthesized with the exploitative absorptive capacity to make sure the project proceed smoothly. Organizations used their exploitative absorptive capacity to search their domain knowledge and evaluate what information could be shared, as well as how it could be shared in the system, through extensive activities related to the system implementation (e.g. user requirement investigation, design and implement). The main client PhotoChem and its two service providers worked collectively with the IT vendor ChemXlog. A project team was built by grouping several members from each organization. The system requirements were provided by each partner and ChemXlog started the system development by building a prototype. The team kept refining it and adding extra requirements. This development process involved constant iterations of system building and requirement gathering through several collective meetings. Since each organization wanted the transition from the current manual system to the online system to be as smooth as possible for its own interest, conflicts and confusion appear. One user from the freight forwarder mentioned:

“They [ChemXlog] are indeed very well versed with logistics but we [freight forwarder] are not a logistics company. So it might not suit us. I think we have different points of view. Operationally, sometimes ChemXlog may not understand what we want. So we go through quite a number of rounds of amendments. Communication breakdowns... Sometimes I don't blame ChemXlog because they may have spoken to the haulier and the users there would have said something else, then they go to PhotoChem and they get another version there...finally, when it reaches us, we'll have our own say on the matter. In the end, what we needed was for all to sit down together and iron things out”.

To solve these problems efficiently, ChemXlog held several collective meetings. Because of the cognitive social capital shared among them, these conflicts were solved in a peaceful and efficient way, and exploitative absorptive capacity was also better utilized to some extent because of the saved time and effort. In turn, the shared understanding of the shared goals were enhanced with the assistance of the related activities of organizations' exploitative absorptive capacity, such as the evaluation of prior knowledge, the comparison of different knowledge and the filtration of confidential knowledge. During six months of this highly iterative process, extensive interaction and information sharing were conducted among partners and the IT vendor. Some of the information was confidential, but ChemXlog's business ethics were trusted by the service providers. As for PhotoChem, they signed a non-disclosure agreement with ChemXlog. Therefore, all parties were comfortable regarding this issue.

In this phase, the influential cooperative culture functioned as a facilitator to support the successful synthesis between the cognitive social capital and exploitative absorptive capacity. It enabled the

involved parties to keep positive attitudes towards possible confusion and conflicts occurred in the process. Besides the shared understanding, the cooperative consensus here positively facilitated the interplay between cognitive social capital and exploitative absorptive capacity.

4.5 Phase 3: Assimilation of knowledge integration IT project

After the initiation and implementation of the new system, the involved parties had to learn how to use the new system, how to assimilate the new external knowledge into their own and apply them into daily work. After system installation, organizations evaluated the new system from different perspectives and came with different feedbacks. Some thought it was very useful and efficient when integrated with organizational activities while others pointed out dissatisfactory issues. The critical compatible culture shared by the organizations worked as a harmonizer in this system evaluation and adoption phase. In our case, for instance, the users did reported some unsatisfactory issues (e.g., the system being slow), but the shared compatible culture made organizations choose to adjust it rather than complain a lot and disrupt the community. One user from the freight forwarder said:

“We did mention some issues about the system being slow etc., as for the other changes, we didn’t raise them, since everybody seems find with the arrangement now. We do not want to disrupt them”

As for the system usage, some employees who only did manual works and never had seen computers before refused to use the systems. This problem was more difficult to handle in the two logistic firms where the employees had been used to the traditional phone and fax way of operation. Facing these issues, transformative absorptive capacity enabled organizations to transform external knowledge into their own knowledge and keep it “alive” through organizational activities. The involved organizations handled this issue well by adopting the measure of learning, teaching and re-learning. Except that, they gave the users some trial period to get familiar and get used to the systems. The transformative absorptive capacity was mainly relied on and in the meantime was enhanced because of the increasing transformative learning activities and experience.

Transformative learning not only enabled organizations to get used to the new system and to assimilate it into business activities, but also led to the reconfiguration of structural social capital since business rules were enforced and formalized as a result of the newly implemented system. The formal ties (i.e. contractual ties) were strengthened while the informal ties (i.e. personal ties) were weakened. In this case, with the implementation of new system, the two logistic companies revealed that on the one hand, they felt they were locked into a long term relationship with the manufacturer because of the system shared among them; on the other hand, they worried that their formerly believed “personal touch” (i.e. personal relationship) were threatened. In the Haulier’s side, the director shared his feeling:

“I feel relationships suffer due to the system... The haulier service is very personal. So we see each other, there’s some bonding effect and you become friends. But your relationship tends to drift when you look into the computer instead of talking to the person. So that’s how I feel.”

The director of the freight forwarder had different opinion:

“The system enhances our customer orientation and it reduces the frequency of mistakes. On the phone system, sometimes you do more chitchatting and get carried away and miss some important points and make mistakes.”

Due to the new system, business rules took the place of unwritten rules to a great extent. The structural social capital was reconfigured and the reconfigured structural social capital also reinforced the transformative absorptive capacity. Since reconfigured structural social capital was better for the organizations' future performance with the assimilation of the new system, it fortified the organizations' transformative absorptive capacity to a large extent. In this case, formal ties were enhanced while informal ties were weakened, which gave the organizations the idea that only through more extensive transformative learning, the long-term collaboration could be ensured and improved. Seen from this perspective, the reconfigured structural social capital had a reinforcing effect on the transformative absorptive capacity.

Based on the discussion of three project phases above, the absorptive capacity and social capital of an organization directly influenced its ability to integrate knowledge from external and internal environment. The outcome of knowledge integration success would allow all the involved parties to better evaluate the knowledge integration requirements in the future and make them be more sensitive and accurate to the potential knowledge integration requirement, which would then sustainably enhance organizations' competitive capabilities in the markets.

5 Conclusion

The process model we derive seeks to answer the research question posed earlier in this paper which is how social capital and absorptive capacity interact with each other to achieve the success of knowledge integration in the context of organizational culture. Specifically, we identify in knowledge integration projects, different dimensions of social capital and absorptive capacity interact with each other in different ways. We also explicitly investigate the influential roles of organizational culture. Identifying different roles organizational culture plays in different phases allows us to better understand the attitude and actions taken by organizations. By focusing on the social capital, absorptive capacity, and culture within knowledge integration project, our study makes several theoretical and practical contributions.

First, we identify the particular dimension of social capital that plays the dominant role in each knowledge integration project phase while the other two dimensions play as supportive roles in each phase. From the enhancement of relational social capital in the very beginning of project initiation, the utilization of cognitive social capital in the implementation phase, to the reconfiguration of structural social capital in the assimilation phase, we provide better understanding about how social capital changes through this project process and what appropriate actions organizations could take according to their strategic positions. For instance, it is better for the organization who proposes the knowledge integration project to focus on enhancing relational social capital with other organizations to make the initiation of the project successful. During the implementation, all the organizations should utilize the cognitive social capital to make sure the smooth proceeding of system implementation. And after the IT system implementation, organizations should prepare for the reconfiguration of structural social capital. An organization which is in a supportive position and used to rely on personal ties (i.e., informal ties) should be prepared to make relevant adjustments towards the changes in the business environment. These implications have been rarely mentioned in prior literature while we explored them in depth.

Second, we look into the particular dimension of absorptive capacity which functions the most in each project phase with the mutual complementation from the other two dimensions. We point out that in the context of knowledge integration projects, exploratory absorptive capacity in initiation phase,

exploitative absorptive capacity in implementation phase, and transformative absorptive capacity in assimilation phase plays a more critical role compared to the other two dimensions of absorptive capacity. While prior literature considers these three components of absorptive capacity in a sequential perspective, we treat them as three dimensions of absorptive capacity and study their effects in different phases. These findings inform organizations to focus on the utilization of different dimensions of absorptive capacity in different phases to better conduct the project efficiently.

Third, we propose a “6C” perspective to illustrate the influential role organizational cultures plays in each project phase. The norm role collective culture plays in the initiation phase, the facilitator role cooperative culture plays in the implementation phase, and the harmonizer role compatible role plays in the assimilation phase emphasize the importance of organizational culture in the whole process of the project and how it contributes to the smoothness of the project flow and the final project success.

Last but not least, we explore how the different dimensions of social capital and absorptive capacity interact with each other in each project phase. The initiating effect of relational social capital on exploratory absorptive capacity and the enhancing effect of exploratory absorptive capacity in turn in the first phase, the synthesising effect of cognitive social capital and exploitative absorptive capacity in the second phase, and the boosting effect of transformative absorptive capacity to the reconfiguration of structural social capital as well as the reinforcing effect of reconfigured structural social capital on transformative absorptive capacity in the third phase, ensure the success of knowledge integration project.

This study mainly focuses on the interaction of organizational social capital and absorptive capacity as well as the influence of organizational culture in IT project. Of course there are alternative perspectives (e.g. strategic planning, resource-based view) which could provide insightful analysis about this case. Explicit evaluation of knowledge integration success within this case study could be further explored in the future. And multiple cases or quantitative methods could be used to generalize the model under other knowledge integration context.

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