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Enabling agile adoption practices through network organizations

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Enabling agile adoption practices through network organizations

Abstract

As distributed organizations increasingly rely on technological innovations to enhance organizational efficiency and competitiveness, interest in agile practices that enable adoption of information technology (IT) based innovations has grown. This study examines the influence of a network organization environment on the ability to develop agile adoption practices. An exploratory case study design was used to investigate the interactions between network structure, social information processing, organizational similarity (homophily), and absorptive capacity during the adoption of a large-scale IT system in two network organization environments within New York State. The data suggest that network organization characteristics and communication processes that reinforced social influence and supported knowledge transfer positively influenced adoption agility. We propose a model of agile adoption practices and discuss implications for the development of theory about network organization characteristics and capabilities to adopt IT based innovations .

Keywords: agility, network organization, information system adoption, absorptive capacity

Introduction

As investment in information technology (IT) in organizations has continued to grow, there has been increased interest by the Information Systems community in developing practices that increase an organization's agility or its capabilities "to sense and respond to predictable and unpredictable events" (Baskerville *et al.*, 2005, p. 3). IT innovations have a crucial role in supporting agile organizations, but the traditional view of the adoption of an IT itself is of a slow, multi-stage process (Lyytinen & Damsgaard, 2001). For organizations in rapidly changing and uncertain environments, there is increasing interest in understanding and applying organizational capabilities and environments that underlie agile adoption practices. Agility has been defined as "the ability to detect opportunities for innovation and seize...opportunities by assembling requisite assets, knowledge and relationships" (Sambamurthy *et al.*, 2003, p. 9). Agility, in this sense, is closely aligned with an organization's absorptive capacity, or its ability to acquire, assimilate, transform and exploit new knowledge (Cohen & Levinthal, 1990; Zahra & George, 2003).

In the spirit of looking beyond the dominant adoption paradigm (Fichman, 2004), this exploratory case study investigates the effect of *network organization form* on an organization's ability to develop agile adoption practices. Although recent organizational studies have examined the influence of internal capabilities (Hackbarth & Kettinger, 2004), mimetic isomorphism (Tingling & Parent, 2002), boundary spanning activities (Obstfeld, forthcoming; Mustonen-Ollila & Lyytinen, 2004), and speed of IT adoption (Bruque-Camara *et al.*, 2004), there is little research on the influence of organizational form on agile practices. The network organization

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form is distinguished from other organizational forms (Powell, 1991; Chisholm, 1998) by flexibility, decentralized planning and control, and lateral ties with a high degree of integration of multiple types of socially important relationships across formal boundaries (van Alstyne, 1997; Baker, 1992).

The study examines the process of voluntary adoption of a state-advocated information system (IS) by two network organizations. Each network organization was strategically formed by the state government to distribute knowledge in a phased manner from a lead organization to local organizations within the same consortium. Adoption was identified by the purchase and use of all or part of the state-advocated system. A comparison between a network with a high level of adoption and a network with a low level of adoption provides empirical data to examine communication network characteristics, social information processing, and the absorptive capacity construct, and leads to the development of an Agile Adoption Practices Model.

Theoretical background

Research on IT innovation adoption is often divided into insular domains by unit of analysis (individual, group, or organization) and by differences between variable studies and process or stage approaches (Larsen, 2003; Gallivan, 2001). Adoption research is frequently based on Rogers' (2003) Diffusion of Innovation framework (for a review see Fichman, 2000) which has a broad focus on how communication channels and opinion leaders shape adoption, but does not illuminate the network mechanisms by which variables and constructs interact and become important during adoption. Most adoption studies based on the Technology Acceptance Model (for a review see Venkatesh *et al.*, 2003) focus on the characteristics of individual adopters, theories of individual behavior, and antecedent variables. They do not, however, address the theories regarding the communication networks in which the individuals are embedded (Monge & Contractor, 2003). It has been well established that individual behavior is affected by social and informational influence within networks (Triandis, 1980; Sussman & Siegal, 2003), and research has confirmed the importance of networks in the diffusion process (Swan *et al.*, 1998). In addition, the perceptions of benefits, pressure, and social risks have been shown to influence adoption (McKay *et al.*, 2004). However, there is little research on process interaction or mechanisms by which social factors become influential in adoption success or failure (Gallivan, 2001; Pare & Elam, 1997). In addition, some research has questioned the applicability of the diffusion concepts (Larsen, 2001) and the conjectures underlying the diffusion model (Lyytinen & Damsgaard, 2001), particularly when examining organizational adoption. Adoption of innovation is enabled by access to new ideas (Swan *et al.*, 1998) and reduction of knowledge barriers (Chau & Tam, 1997). Additionally, recent research views adoption as a socially constructed process with greater proactive participation by adopters than previously conceived (McMaster, 2001). Investigation of the network processes that support IS adoption agility is critical because it provides another level of explanation from an organizational perspective, and further examines the importance of organizational agility in a system development and adoption setting.

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Research framework

Although there are several perspectives from which network level phenomena are examined (Nohia & Eccles, 1992; Monge & Contractor, 2003) this study specifically examines network processes and theories about the knowledge acquisition and absorption that enable an organization to detect and seize opportunities for IT innovation. These theories include the characteristics of communication networks, social information processing, homophily (selection of others who are similar), and absorptive capacity. The characteristics of social communication networks are relevant to an organization's ability to acquire knowledge about new IT. Homophily has been shown to influence the formation of communication networks. Without such networks, there is reduced potential for the social information processing of attitudes and behaviors that itself has been shown to influence system adoption. Finally, absorptive capacity addresses the ability to acquire and utilize new knowledge within and among organizations. These four perspectives of social networks provide a multi-theoretic lens through which to explore the influence of network organization form on agility. Although the processes described below have been demonstrated individually to influence the formation of networks and adoption of technology, previous work has not examined how the four interact within a network to influence IS adoption agility.

Characteristics of social communication networks

Although social communication networks are frequently viewed as emergent (McKelvey, 1997; Grandori & Soda, 1995), they can also be strategically formed and supported to encourage knowledge transfer between organizations (Gulati *et al.*, 2000). Network organization forms may be implemented with the intention of strengthening social communication networks, so as to improve knowledge acquisition and utilization. Communication contacts may be formal — with planned meetings, reporting structures, and training, or informal — with social connections through conferences, unplanned discussions, and similar mechanisms. Network strength can be defined as the frequency of communication, and the degree of the network is defined as the number of direct links with other network members (Monge & Contractor, 2003).

Social information processing

Social information processing is defined as the concept "that individuals may be influenced by cues from others about what to attend to, how to value salient dimensions of workplace phenomena and how others perceive the same phenomena" (Rice & Aydin, 1991, p. 220). Contacts provided by communication network are the mechanism by which people and organizations are exposed to information, attitudes, and behavior. Social information processing predicts that "socially constructed meaning about tasks, individual's past experiences about tasks, and objective characteristics of the work environment, all influence perceptions, assessments, attitude formation and behaviors" (Rice, 1990, p. 34).

Previous studies have identified network-related antecedent variables to adoption intention, e.g. subjective norms, social factors, social influence, social norms, or images (Kraut *et al.*, 1998; Venkatesh *et al.*, 2003). These factors form a class of *social influence variables* that may have a positive or negative valence (Stuart *et al.*, 2001), and can be grounded in Social information processing theory as well as theories of individual behavior. Social and informational influence,

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salient referent groups (Compeau & Higgins, 1995), and managerial- and organizational-level support for IT use (Thompson *et al.*, 1991) influence an individual's adoption intention only through the communication network in which the actor is embedded.

Homophily

Homophily predicts that organizations will be more likely to engage in direct contact with organizations they view as more similar to themselves. The selection of others who are similar "is thought to ease communication, increase predictability of behavior and foster trust and reciprocity" (Brass, 1995, p. 51) and is a motivation for the creation and maintenance of communication networks. Although research has been conducted on demographic and gender homophily (Monge & Contractor, 2001), little attention has been given to the effect of organizational homophily based upon attributes such as budget, managerial philosophy, attitudes regarding technology, and size. In addition to motivating direct contact, it seems likely that organizations may mimic the attitudes, beliefs and behaviors of other organizations viewed as similar.

Absorptive capacity

Absorptive capacity can be conceptualized as a set of organizational abilities to manage knowledge. Absorptive capacity relies on both external connections and internal social networks, and thus provides a contrast to the previous theories. Zahra and George (2003) identify four distinct dimensions: acquisition, assimilation, transformation, and exploitation. Within the organization, these dimensions are linked via social integration mechanisms, which can facilitate the distribution and exploitation of knowledge. Social integration may occur informally in social networks, or formally through the use of coordinators. In the context of IS adoption agility, an organization's absorptive capacity is built on network mechanisms for identifying and sharing knowledge, and for rewarding the transfer of knowledge. The time and resources organizations dedicate to acquiring and distributing information may be critical components for positive adoption. Previous experiences of individuals, diversity of knowledge sources, comprehension, and learning are all components of absorptive capacity (Cohen & Levinthal, 1990; Taylor & Todd, 1995; Zahra & George, 2003). Other work has emphasized the porosity of firm boundaries and formal and informal network structures that identify responsibilities and competencies (Matusik & Heeley, 2000) and as contributing to organizational absorptive capacity.

Study environment

In New York State, probation departments are a part of the criminal justice system providing an alternative to incarceration for criminals whose crimes or family situations justify community inclusion. Traditionally, they have lacked the technology needed to improve the efficiency and effectiveness of their core operations.

In June 1996, a survey by the state probation agency showed that most departments relied on paper forms and had limited personal computer use. Many departments were involved in uncoordinated and non-standardized IS development efforts. To encourage electronic record

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sharing, caseload management, and standard reporting information, as well as other activities, a statewide probation IS project focused on small- to mid-sized departments was initiated. After extensive network readiness surveys, requirements analysis, and review of proposals from vendors, a specific information system named PROBER was selected.

In 1997, eight geographically contiguous networks, called *consortia*, were organized to facilitate the adoption process. The consortia were intended to support knowledge distribution and sharing, and to make available the expertise required for successful IS adoption. Lead departments in each consortium were chosen to help customize, document, and provide final acceptance of the selected vendor's software. The lead departments were encouraged to schedule meetings, provide support by distributing solutions to problematic processes, and to involve the counties of their consortium in agile practices which would increase the chances of information system adoption.

Two adjacent consortia, referred to as consortium A and consortium B, with different levels of IS adoption, were compared in this study. Figure 1 shows the geographical distribution of the counties in the two consortia and indicates which county probation departments adopted the IS. Although the grouping of counties was designed by the state to create consortia with similar characteristics, the difference between the percentages of counties of each consortium that adopted the system (78% vs. 17%) raises questions regarding why the difference occurred. These were the first two consortia involved in the adoption process and had the longest involvement with the consortia networks.

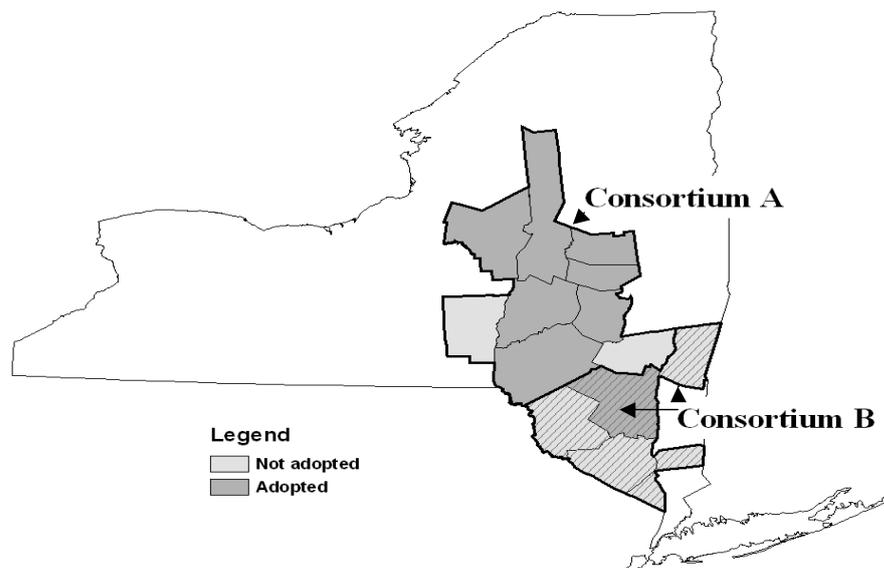


Figure 1. Adoption by Counties within Study Consortium

Method

The primary method of data gathering was through 37 semi-structured interviews with all of the primary decision makers of the two consortia. The interviews lasted an average of 1.25 hours each. Interviews included questions about the frequency and type of communication with other

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probation departments during the adoption process, and about the influences and factors that guided the IS decision process. A second line of questions probed the capacity and preparedness of the departments to acquire and utilize knowledge. Although the interviews were guided by prepared questions, a large degree of flexibility was incorporated to allow the researchers to pursue relevant issues that arose during the interview, and to allow subjects open-ended answers.

Interviews provided direct contact with the primary decision makers in all 15 departments in the study. Interviews were conducted with the probation directors in each county in the study, as well as with senior probation officers and senior staff members who were directly involved with the adoption decision. Both the current and former state project directors were also interviewed. In addition, a former director of one of the consortium departments was interviewed due to her involvement with the early stages of the project.

Data Analysis

In addition to the interviews, the data analyzed in this study included presentations given by the project director, an extensive set of project documents, observations of meetings, and the project director's monthly reports. Data analysis was performed following established standards (Miles & Huberman, 1994) in six distinct steps:

- **Code-book development:** A tree structure of codes was developed to mark the existence of an item (e.g., system adopted) and the directionality of attributes.
- **Database creation:** All transcripts and documents were named and formatted, and a database was constructed by using QSR NVIVO software.
- **Knowledge-base development:** Multiple analysis phases applied predetermined codes and allowed codes to emerge during coding. Reliability of coding was checked following established standards (Miles & Huberman, 1994) with two researchers coding a selection of the interviews with minimal disagreements. The remaining transcripts were checked for omitted codes by the second researcher, with no major omissions noted.
- **Retrieval of coded text:** The data were partitioned into different sets based upon system adoption to allow comparisons of codes, co-occurrences, and text-strings.
- **Text segment comparison:** Documents created from retrieved text segments were compared for the occurrence, frequency, and meaning of text segments to expose processes and reveal patterns in data. Research questions were addressed through deductive inference closely following the scientific methodology of controlled deductions in qualitative case studies outlined by Lee (1989).
- **Reexamination of data:** Comments, notes, and maps developed during the previous steps were used to reexamine the data and create codes for phenomena that had not been predicted.

The final stage of analysis involved identifying the interactions among the theories, and proposing an integrated model of the processes to indicate how the relationships that emerge in the social communication network may explain the differences between IS adoption outcomes.

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Findings - agile adoption practices

The two networks studied exhibited different adoption agility and outcomes. Each of the four research perspectives outlined earlier was used to examine the influence of the network organization on adoption agility.

Social communication networks

In the distributed organizational environment of the consortia in this study, the concept of a network organization form was instantiated differently. The data indicate that in consortium A, the use of formal communications structures and the subsequent creation of informal ties resulted in a strong, dense social communication network with central ties from local departments to the lead department and lateral ties between members of the consortium. In consortium B, however, the network form produced a noticeably less dense network with no increase in lateral ties or communication frequency. Changes in frequency of communication between dyads were aggregated to a comparative measure between the two consortia for central and lateral ties. To evaluate changes in network degree, the number of existing and possible central and lateral ties was determined prior to the consortia formation and was compared to the number of ties for the period during which the consortia were active. The differences between consortium A and consortium B in the degree of lateral and central ties (out of all possible ties) and the changes in frequency of communication of those ties indicate a stronger and denser social communication network in consortium A (Table1).

Table 1. Comparison of Central and Lateral Network Ties

		Prior to Consortia Formation	During Consortia Period	
		Network Degree Existing ties of (possible ties)	New ties created	Network Strength Ties that increased in communication frequency of (possible ties)
Consortium A (high adoption)	Central Ties	5 of (8)	3	8 of (8)
	Lateral ties	18 of (28)	4	9 of (28)
Consortium B (non-adoption)	Central Ties	2 of (5)	3	2 of (5)
	Lateral ties	4 of (10)	0	0 of (10)

In both consortia, social communication network strength increased after the network organization form was initiated. However, the increase in network strength was greater in consortium A for formal, central ties as well as for informal, lateral connections between local departments. In consortium A, a total of six formal consortium meetings were held in the five years after the consortia were established. All eight of the local departments of consortium A reported an increase in contact with the lead department, and roughly one-third of the potential

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lateral ties increased in communication frequency. At the consortium network level, both frequency of communication and number of possible connections increased in consortium A.

In contrast, no formal activities were held in consortium B after the initial planning meetings. Department directors traveled to other counties to examine the software, but no meetings among all consortium members were organized. None of the departments in consortium B reported an increase in the number of lateral connections. The network-level changes in strength and degree of connections in consortium B were fewer than was observed in consortium A.

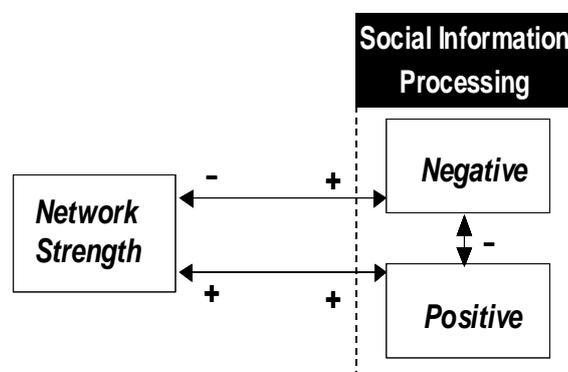
Social information processing

The data indicate that the social communication networks influenced information system adoption in consortium A by social information processing related to the PROBER project. In consortium A, almost all the directors commented on a specific benefit the system would provide. These benefits included managing caseloads, increasing officers' efficiency, automating restitution, and providing more direct involvement by officers in their cases. A typical statement from the director of an adopting county was that benefits, "on the positive side, I think outweigh [the negative]" potential problems with the system. The directors acknowledged that they had heard negative comments, but these were mostly about minor implementation difficulties, complaints from officers about having to perform clerical work, or resistance to change, rather than substantive doubts about the system. For example,

There was a lot of input, we're not data-entry clerks, ... and some of us can't type, and if you're hunting and pecking when you input this information, it's going to take a long time. It changes the job-requirement a little bit; it changes the skills you need to bring to the job. In the past you didn't have to know how to type to be a probation officer; nowadays it sure helps. There was a lot of frustration.

In contrast, directors in consortium B were far more ambivalent about the project and reported vague comments (e.g., "some people like it and some didn't like it" (Director in Consortium B)). Even when reporting positive attitudes, they included a negative counterpoint, such as wanting to wait until the bugs were fixed, expressing concern that the system wouldn't support departmental processes, or worrying that the system was too complex, inflexible, or limited in function.

Network ties provide the connections through which social influence, knowledge, and behaviors flow, and the data indicate that network strength enhances social information processing (Figure 2).



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Figure 2. Interaction of network strength and social information processing

Positive social influence is supportive of IT adoption, whereas negative social information processing contains information opposing system adoption. The +/- valences of the arrows in Figure 2 indicate the direction of interaction between network strength and social information processing (e.g. positive social information processing increases network strength whereas negative social information processing decreases network strength). The strength and density of the communication network alters the potential of social influence to affect adoption. Stronger network connections increase the likelihood that social influence will be received from different sources, and also increase the frequency with which such transfers occur. In consortium A, one director commented that:

[The consortium] creates an environment where directors can have a forum to discuss the issues, the goods and the bads about it, and be able to go back to their county and make some decisions ...I mean, that's the best piece about it... because you go to a meeting and I can get some pretty good information about the system, and then come back to my own county and say, well this is how it works, this is what it can do for us.

Social information processing is a crucial aspect of the adoption process during which supporting or discouraging knowledge is differentially attended to for decisions regarding system adoption. Social information processing of pro-adoption social influence, attitudes, and behaviors, can increase the likelihood of positive adoption outcomes while negatively oriented information decreases adoption likelihood. Typical of the evidence of the impact of negative social information processing:

There was a point in the process where two directors got disenchanted with the PROBER process, and they were significant directors, they are people who could influence people heavily. One of them went to the meeting and made a comment like "You have to be nuts to implement PROBER." So, he made that comment, he scared off [a probation department]. [The director of that department] definitely was thinking about PROBER and now they scared [the director] so much she didn't know what to do, so she was going to go with the alternative system.

Network members may attend to different information, depending on the specific source, the variety of sources, or the frequency of exposure to the information. Supporting knowledge transferred through the network may interact with and displace negative attitudes toward adoption. The opposite process, in which negative attitudes, beliefs, and behaviors are transferred and negatively influence adoption, can also occur. The strength and density of the social communication network partially determines the influence of social information processing.

Simultaneously, knowledge transfer in the form of social influence, norms, and attitudes strengthens or weakens communication network ties, depending on its valence. Generally, positive attitudes and behaviors tend to increase network strength, and negative attitudes result in fewer connections with less frequent communications.

Homophily

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The data also indicate that homophily, or "the selection of other who are similar" (Monge & Contractor, 2003, p. 223), influenced the willingness of counties to establish and maintain communication ties with departments in their own consortium and with counties in other consortia. In addition to motivating direct contact, organizations may mimic the attitudes, beliefs and behaviors of other organizations viewed as similar. Department directors observed that counties they viewed as similar to their own were assimilating the technology and concluded that they could also learn and adopt the system.

A couple of other small counties that said that they were working in it, which helped me to believe that maybe we could do it then. ...I saw a couple of the smaller counties and the directors said "oh, I don't have any computer knowledge at all, and we're working with it and we're doing it.

You learn so much more by doing things with the people you work with, ... the consortium that we were involved with was very demographically similar to us. If we were involved in a consortium with say [counties X, Y, Z], we wouldn't have anything to do with it, because they ... are monstrous compared to us.

The similarity between the lead county and the member counties is particularly important:

With [lead county] being similar to us, we all had the same problems and we all had the same solutions, or we could all work together to get the same solutions without worrying about the different kinds of problems that a bigger county would have.

During an extended adoption process, social information processing supported by a strong network can result in individuals altering their attitudes. Exposure to frequent positive attitudes, or similar attitudes from diverse sources, can overcome initial negative attitudes adopted from even respected sources. A director who had heard negative comments from a respected peer altered his decision when the positive comments he had heard eventually outweighed the negative comments.

I talked to my data processing director and the plan for us was to wait a year or so to see how the counties in the pilot project did and maybe some other counties... what they thought of it. ... I had heard enough good things about it last year I went and tried to get it for our department ...

This indicates that the transfer of attitudes and social influences of a positive valence can supplant negative attitudes and vice versa, particularly in a dense network with strong ties.

Absorptive capacity

The data indicate that the dimensions of absorptive capacity are highly aligned with the concept of agility. Greater network density increases the diversity of sources and enables organizations to sense changes and opportunities. Assimilation of knowledge is linked to attitudes regarding IT, prior experience with IT, and training. The transformation dimension is seen in the internalization of knowledge when internal organizational processes are changed. Knowledge

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exploitation is supported by social integration mechanisms within the organization, and inter-organizational networks that increase employee interaction and promote problem solving.

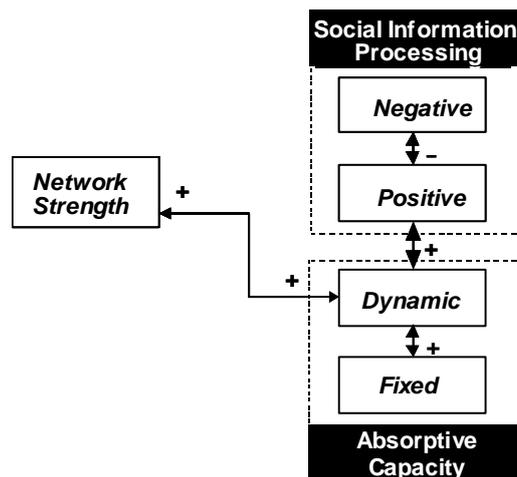
Our data indicate that departments relied on knowledge from members of their communication networks, for both the decision to adopt and for exploitation of the IT. This suggests that the previous conceptualization of absorptive capacity as fixed within the organization is incomplete. Elements that enable an organization to assimilate, transform, and exploit knowledge can be transferred through a social communication network and comprise *dynamic absorptive capacity*. The mobility of dynamic absorptive capacity through a network differentiates it from *fixed absorptive capacity*, which resides within the organization and cannot easily be shared. Fixed absorptive capacity is comprised of prior information system experience, interest, computer competence, and computer resources.

High levels of these capacities provide the potential to extend dynamic absorptive capacity with problem solving, training, and system support through network connections. Network members can overcome deficiencies in fixed absorptive capacity through strong communication network ties. Advice about specific problems and recommended changes in organizational procedures to better utilize the system can overcome adoption reluctance arising from low user computer experience. Thus, capacities grounded in the organization, such as technical and problem-solving support, can become knowledge exchange processes that move through the network and increase an organization's agility to assimilate and exploit the system. By increasing experience, knowledge, and problem-solving capacities in the beneficiary organization, dynamic absorptive capacity increases the fixed absorptive capacity of the recipient. All of the adopting counties in consortium A relied heavily on other consortium members for advice and help. One director reported that the departments that impacted his decision were "probably those counties that were into the system and had initiated it and I was able to get some answers from; they had some experience going through the system."

The ability of organizations to augment internal absorptive capacity deficiencies by obtaining knowledge from the network increases the chances of a positive adoption result. In one case, a senior officer stated:

But I deal with the counties all over, anyone who has a question about the system and [my director] has been willing to send myself and [my co-worker] to go anywhere that people need assistance.

Dynamic absorptive capacity exists at the level of the network and can increase network strength. As network members exchange problem solving or technical help, the diversity and communication frequency of network ties is increased as shown in Figure 3. There is a reciprocal relationship between social information processing and the organizations' ability to acquire, assimilate, and exploit knowledge (absorptive capacity).



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Figure 3. Interactions between social information processing and absorptive capacity

In addition, organizations possessing positive social attitudes are more likely to contribute dynamic absorptive capacity to network members. At the same time, the flow of dynamic absorptive capacity in the network increases the amount of positive information processed by network members. For example, a network member who is receiving problem-solving or technical help will likely communicate positive attitudes and normative behaviors to other network members. This is exhibited in comments such as:

I think what the consortium does, it gives the other probation directors some kind of feeling that there are other people out there willing to help them out when they are having a problem. The biggest fear, and it is a major decision, whether you are going to commit your department to an automation system, either this one or that one, and whenever you can feel secure that: number one, there are other people you respect who are doing it and have made that decision, you feel a little bit better about your own decision. And, then when you need it, those people are there and you can call on them for help; it makes you more willing to be a willing participant in the process.

For example, three departments in consortium A reported both positive and negative attitudes about adopting the PROBER system. These three departments all had negative experiences with prior software systems for other functions, which should have reduced their willingness to adopt the new system. But the social information processing interactions with adopting departments in their consortium persuaded them to adopt. In consortium B, where there were fewer and weaker network ties than in consortium A, negative experiences with prior software and negative comments regarding the PROBER system were not overcome by positive social information processing and dynamic absorptive capacity support flowing through the network.

Although the data supported social communications networks, social information processing, homophily, and absorptive capacity as important in explaining the differences in adoption between the two consortia, it was evident that the interactions of the processes were critical to the development of agile adoption practices. A model of these interactions is presented in the next section.

Discussion

This study demonstrates how consortia-based network organization form can influence agile adoption practices that increase an organization's ability to detect opportunities for innovation and to assemble the assets, knowledge, and relationships required for IT innovation adoption. Agile adoption practices at the organizational level are not entirely reliant on characteristics of an

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individual organization, but are influenced by the interactions of network structures and processes. An Agile Adoption Practices Model (Figure 4) combines Figures 2 and 3 to show the interactions and feedback among social communication network characteristics, the similarity of organizations within the network (homophily), social information processing, and absorptive capacity, which account for the difference in adoption between the consortia in this study.

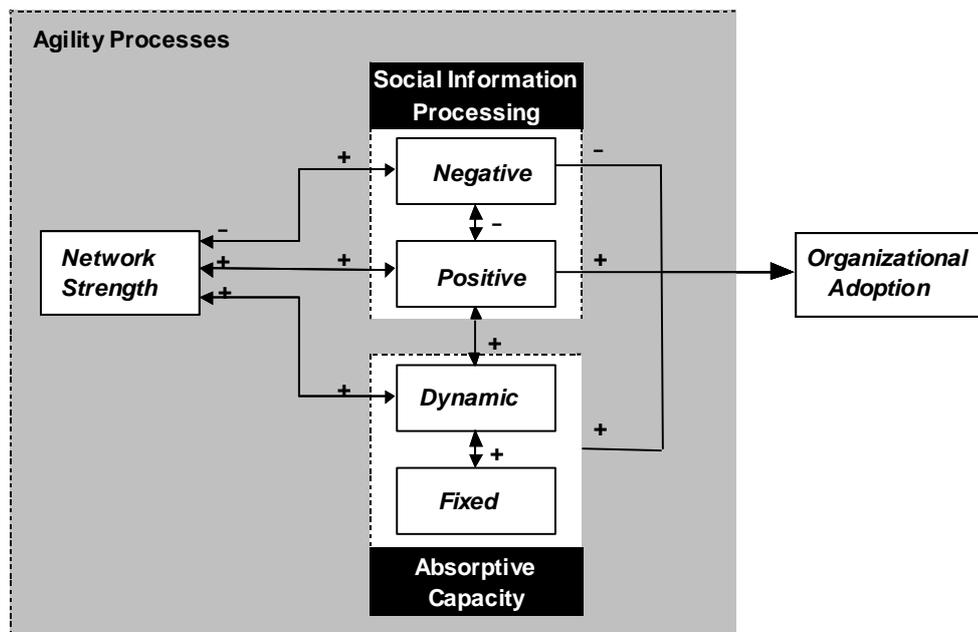


Figure 4. Agile Adoption Practices Model

By examining characteristics of, and processes that occur within a network, this study provides insights into how network form can be used to increase agile adoption practices. First, the consortia form of network organization enhances the creation of a strong, dense network of communication ties that support the social information processing of knowledge, attitudes, and behaviors that influence organizational adoption decisions. Second, network formation is influenced by the perception of similarity between members of the network, particularly similarity between lead organizations and other network members. Third, dynamic absorptive capacity at the network level can be enhanced through strong network ties and through social

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information processing of positive, supporting information. This extension of the absorptive capacity construct supplies a mechanism through which communication networks can support IS adoption agility across organizational boundaries through provision of technical support, implementation procedures, transfer of knowledge pertaining to software customization, and problem solving. In networks of autonomous organizations, the fixed absorptive capacity of a specific member can be enhanced by dynamic absorptive capacity from other network members. Finally, our data indicate that positive social information processing and dynamic absorptive capacity increase network strength and density.

Other theoretical perspectives and network processes not examined in this study may also be involved, and could be considered in future work. Other methods, such as longitudinal data collection, would reveal important insights into the sequence of events to further clarify the interactions and relative importance of different network processes and characteristics.

The Agile Adoption Practices Model presented in this research proposes interactions within the inter-organizational network that enable agile adoption practices. The interactions indicate that these social communication network theories are not separate, independent processes, but are actually intertwined in their influence. In the context of organizational agility, network communication theories should be considered together to fully understand the interactions of processes that increase the agility of an organization to adopt information technology-based innovations.

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References

- BAKER WE (1992) The network organization in theory and practice. In *Networks and organizations: Structure form and action* (NOHRIA N and ECCLES RG, Eds), pp 397-429, Harvard Business School Press, Boston, MA.
- BASKERVILLE RL, MATHIASSEN L and PRIES-HEJE J (2005) Agility in fours: IT diffusion, IT infrastructures, IT developments, and business. In *Business agility and information technology diffusion* (BASKERVILLE RL, MATHIASSEN L, PRIES-HEJE J and DEGROSS JI, Eds), pp 3-9, Springer.

Published as:

- Hovorka, D.S., Larsen, K.R. (2006) "Enabling Agile Adoption Practices Through Network Organizations," *European Journal of Information Systems*, v.15 n.2, p. 159-168
- BRASS DJ (1995) A social network perspective on human resources management. *Research in Personnel and Human Resources Management* 13, 39-79.
- BRUQUE-CAMARA S, VARGAS-SANCHEZ A and HERNANDEZ-ORTIZ MJ (2004) Organizational determinants of it adoption in the pharmaceutical distribution sector. *European Journal of Information Systems* 13, 133-146.
- CHAU PYK and TAM KY (1997) Factors affecting the adoption of open systems: An exploratory study. *MIS Quarterly* 21(1), 1-24.
- CHISLHOLM RF (1998) *Developing network organizations: Learning from practice and theory*. Addison-Wesley, Reading.
- COHEN WM and LEVINTHAL DA (1990) Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly* 35, 128-152.
- COMPEAU DR and HIGGINS CA (1995) Computer self-efficacy: Development of a measure and initial test. *MIS Quarterly* 19(2), 189-211.
- FICHMAN RG (2000) The diffusion and assimilation of information technology innovations. In *Framing the domains of it management: Projecting the future...Through the past* (ZMUD RW, Ed), pp 105-127, Pinnaflex Educational Resources, Inc., Cincinnati, OH.
- FICHMAN RG (2004) Going beyond the dominant paradigm for information technology innovation research: Emerging concepts and methods. *Journal of the Association for Information Systems* 5(8), 314-355.
- GALLIVAN MJ (2001) Organizational adoption and assimilation of complex technological innovations: Development and application of a new framework. *Data Base for Advances in Information Systems* 32(3), 51-85.
- GRANDORI A and SODA G (1995) Inter-firm networks: Antecedents, mechanisms and forms. *Organization Studies* 16(2), 183-205.
- GULATI R, NOHRIA N and ZAHEER A (2000) Strategic networks. *Strategic Management Journal* 21(3), 203-215.
- HACKBARTH G and KETTINGER WJ (2004) Strategic aspirations for net-enabled business. *European Journal of Information Systems* 13, 273-285.
- KRAUT R, RICE RE, COOL C and FISH R (1998) Varieties of social influence: The role of utility and norms in the success of a new communication medium. *Organization Science* 9(4), 437-453.
- LARSEN KRT (2003) A taxonomy of antecedents of information systems implementation: Variable analysis studies. *Journal of Management Information Systems* 20(2), 169-246.
- LARSEN TJ (2001) The phenomenon of diffusion: Red herrings and future promise. In *Diffusing software product and process innovations" IFIP TC8 WG8.6 fourth working conference* (ARDIS M and MARCOLIN B, Eds), pp 35-50, Kluwer Academic Publishers, Boston.
- LEE AS (1989) A scientific methodology for MIS case studies. *MIS Quarterly*, 33-49.
- LYYTINEN K and DAMSGAARD J (2001) What's wrong with the diffusion of innovation theory? In *Diffusing software product and process innovations; IFIP TC8 WG8.6 fourth working conference* (ARDIS M and MARCOLIN B, Eds), pp 173-190, Kluwer Academic Publishers, Boston.
- MATUSIK S and HEELEY MB (2000) A multilevel theory of absorptive capacity in the software industry. In *Organization Science Winter Conference*, Winter Park.
- MCKAY N, PARENT M and GEMINO A (2004) A model of electronic commerce adoption by small voluntary organizations. *European Journal of Information Systems* 13, 147-159.
- MCKELVEY B (1997) Quasi-natural organization science. *Organization Science* 8(4), 352-380.
- MCMASTER T (2001) The illusion of diffusion in information system research. In *Diffusing software product and process innovations* (ARDIS M and MARCOLIN B, Eds), pp 67-83, Kluwer Academic Publishers, Boston.

Published as:

- Hovorka, D.S., Larsen, K.R. (2006) "Enabling Agile Adoption Practices Through Network Organizations," *European Journal of Information Systems*, v.15 n.2, p. 159-168
- MILES MB and HUBERMAN AM (1994) *Qualitative data analysis: An expanded sourcebook*. Sage Publications Ltd., Beverly Hills, CA.
- MONGE PR and CONTRACTOR N (2001) Emergence of communication networks. In *The new handbook of organization communication* (JABLIN F and PUTNAM LL, Eds), pp 440-502, Sage, Thousand Oaks, CA.
- MONGE PR and CONTRACTOR N (2003) *Theories of communication networks*. Oxford University Press, New York.
- MUSTONEN-OLLILA E and LYYTINEN K (2004) How organizations adopt information system process innovations: A longitudinal analysis. *European Journal of Information Systems* 13(35-51),
- NOHIA N and ECCLES RG (Eds.) (1992) *Networks and organizations: Structure, form and action*. Harvard Business School Press, Boston.
- OBSTFELD D (forthcoming) Social network, the *tertius iungens* orientation, and involvement in innovation. *Administrative Science Quarterly*,
- PARE G and ELAM JJ (1997) Using case study research to build theories of it implementation. In *Information systems and qualitative research: Proceedings of the IFIP TC8 WG8.2* (LEE A, LIEBENAU J and DEGROSS JI, Eds), Chapman & Hall, London.
- POWELL WW (1991) Neither market nor hierarchy: Network forms of organization. In *Markets, hierarchies and networks - the coordination of social life* (THOMPSON G and FRANCES J, Eds), pp 265-276, Sage Publications.
- RICE RE (1990) Individual and network influence on the adoption and perceived outcomes of electronic messaging. *Social Networks* 12(1), 27-55.
- RICE RE and AYDIN C (1991) Attitudes toward new organizational technology: Network proximity as a mechanism for social information processing. *Administrative Science Quarterly* 36(2), 219-244.
- ROGERS E (2003) *Diffusion of innovations*. Free Press, New York.
- SAMBAMURTHY V, BHARADWAJ A and GROVER V (2003) Shaping agility through digital options: Reconceptualizing the role of information technology in contemporary firms. *MIS Quarterly* 27(2), 237-263.
- STUART WD, RUSSO TC, SYPHER H, SIMONS TE and HALLBERG LK (2001) Influences of sources of communication on adoption of a communication technology. In *Diffusing software product and process innovations; IFIP TC8 WG8.6 fourth working conference* (ARDIS M and MARCOLIN B, Eds), pp 191-204, Kluwer Academic Publishers, Boston.
- SUSSMAN SW and SIEGAL WS (2003) Informational influence in organizations: An integrated approach to knowledge adoption. *Information Systems Research* 14(1), 47-65.
- SWAN J, NEWELL S and ROBERTSON M (1998) Inter-organizational networks and diffusion of information technology: Developing a framework. In *Information systems innovation and diffusion: Issues and directions* (LARSEN T, Ed), Idea Publishing, Hersy.
- TAYLOR S and TODD P (1995) Assessing IT usage: The role of prior experience. *MIS Quarterly* 19(4), 561-570.
- THOMPSON RL, HIGGINS CA and HOWELL JM (1991) Personal computing: Toward a conceptual model of utilization. *MIS Quarterly* 15(1), 125-143.
- TINGLING P and PARENT M (2002) Mimetic isomorphism and technology evaluation: Does imitation transcend judgment. *JAIS* 3, 113-143.
- TRIANDIS HC (1980) Values, attitudes, and interpersonal behavior. In *Nebraska symposium on motivation: Beliefs, attitudes, and values*, pp 195-259, University of Nebraska Press, Lincoln.
- VAN ALSTYNE M (1997) The state of network organization: A survey of three frameworks. *Journal of Organizational Computing* 7(3), 83-152.

Published as:

Hovorka, D.S., Larsen, K.R. (2006) "Enabling Agile Adoption Practices Through Network Organizations,"
European Journal of Information Systems, v.15 n.2, p. 159-168

VENKATESH V, MORRIS MG, DAVIS GB and DAVIS FD (2003) User acceptance of information
technology: Toward a unified view. *MIS Quarterly* 27(3), 425-478.

ZAHRA SA and GEORGE G (2003) Absorptive capacity: A review, reconceptualization and extension.
Academy of Management Review 27(2), 185-203.