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Leveraging ICT for Collaborative Decision Making in Global Customer Support

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ABSTRACT

Advances in technology have allowed organizations to expand beyond traditional walls of a centralized office. Dispersed locations allow organizations to reduce cost, hire employees where expertise exists, and conduct operations world-wide 24 hours a day 7 days a week. One challenge facing organizations with a dispersed workforce is how knowledge is shared and subsequently applied to decision-making. This paper focuses on how information and communication technology (ICT) facilitates collaborative decision-making among dispersed employees in a customer support organization. While the research is in progress, we propose a model concentrating on social and technical factors that affect ICT usage and in turn affect collaborative decision-making efficiency and decision effectiveness. Results of this research will contribute important findings regarding collaborative decision-making applicable for both practitioners and researchers.

Keywords

Collaboration, decision-making, information communication technology, socio-technical system, social capital theory, dispersed locations.

INTRODUCTION

Many global customer support organizations (GCSO) have multiple call centers throughout world-wide. Locating call centers globally facilitates 24x7 hour support, support in multiple languages, and regional expertise. However, dispersed call centers also create challenges in sharing information and knowledge across locations thereby affecting decision-making efficiencies. Barriers for accessing knowledge can also reduce benefits of having multiple call centers. To maximize resources of all call centers, knowledge needs to be easily shared among groups, along with quick and effortless access to knowledge. An information and communication technology (ICT) enabling these conditions can be a valuable asset for customer support representatives. In addition to meeting organizational needs, an ICT should be considered as part of a socio-technical system with continuous consideration of both social and technical factors throughout implementation and utilization.

The organization studied in this article is a Fortune 500 software development company with numerous facilities world-wide. Although software development is the main function of the organization, other important functions include consulting, manufacturing, marketing and customer support. Despite continued success, improved collaboration within an individual location as well as among dispersed locations could provide further efficiency and effectiveness. This research focuses on the customer support division, where customer support representatives handle requests for assistance by engaging in an iterative process of collaborative decision-making with group members. Managers of customer support teams have called for investigation into problems affecting sharing and transfer of information and knowledge within the organization with a focus on members in dispersed locations. Managers are also interested in determining effectiveness of various technologies currently utilized.

Research of ICT is often approached through social informatics, thus examining design, use, and consequences of ICT in congruence with institutional and cultural contexts (Kling, 2000). Structuration Theory (Orlikowski, 2000), Adaptive Structuration Theory (DeSanctis and Poole, 1994) and Socio-Technical Systems Theory (Appelbaum, 1997) propose joint optimization between social and technical factors. These theories allow for close examination of tasks, processes and people involved in customer support. By considering, Social Capital Theory, focusing on connections and interactions between individuals and relationships defined by their shared ideas, values and visions which in turn provide valuable resources

(Coleman, 1988, Nahapiet and Ghoshal, 1998, Portes, 1998), we can examine factors affecting knowledge sharing and transfer.

Our research approach entails analysis of user perceptions of their collaboration processes and usage of information communication technologies. Initial interviewing of customer support managers indicated the presence of various factors affecting communication, collaboration and knowledge sharing and transfer processes, all precursors to collaborative decision-making. Furthermore, interviews revealed that ICT capabilities varied from sub-group to sub-group and that technology and social factors contributed to overall ICT capabilities. Upon analyzing interview results, a survey has been constructed to administer to customer support representatives to examine which factors most influence collaborative decision-making and ICT usage, with particular emphasis on the extent of collaboration taking place across locations. We categorized factors analyzed as social factors (trust and social network ties) and technological factors (ease of use, perceived usability, and training), and propose a model with intermediate variables of ICT Usage and Collaborative Decision-Making Process Efficiency, and a dependent variable of Decision-Making Effectiveness.

BACKGROUND

The new computing paradigm, viewed as "socially inclusive interactive community computing" (Khan, 2005) includes utilization of social software, collaborative software, groupware, and content or document management systems. Numerous tasks and processes can benefit from the aid of information technology, including management processes, operational processes, and supportive processes. With most processes stemming from needs of customers, effective systems for assisting these processes may contribute to improved customer satisfaction relations. Collaborative decision-making is an important process in customer support. In order to arrive at a decision, customer support representatives need access to pertinent knowledge, residing both in individuals as well as knowledge repositories.

Collaboration, CSCW and ICT

Collaboration is a key process in almost any organizational environment. Collaboration can provide benefits such as deeper resource pools, a variety of domain knowledge, and multiple viewpoints (Mohtashami, Marlowe, Kirova and Deek, 2006). As information systems have evolved, computer-aided collaboration has become commonplace, most notably web-based collaboration tools providing even further benefits of quick and easy accessibility of material, up-to-date versions, hyper-linking, independence of platform and application and content markup (Leuf and Cunningham, 2001).

Collaborative software packages range from elaborate and expensive options to lightweight, simplistic alternatives, allowing for tailored solutions meeting varied requirements of organizations. Collaborative software can be utilized in computer-supported collaborative work (CSCW), a design-oriented concept focusing on characteristics of groups and a computer system adequate to support group work. The concept is visualized by a matrix describing work contexts along two dimensions: time and place (see Table 1) (Grudin, 1994). For the purposes of this study we refer to "same time" and "different time" contexts as synchronous and asynchronous respectively, and "same place" and "different place" contexts as on-site and off-site respectively. CSCW can include usage of various information technologies, particularly information communication technologies (ICT), examples of which are listed accordingly.

	Synchronous	**Asynchronous**
On-site	Face-to-face Interactions Decision rooms, single display groupware, shared table, wall displays	Continuous Tasks Team rooms, large displays, shift work groupware, project management
Off-site	Remote Interactions Web-conferencing, real-time groupware, instant messaging, Internet chat	Communication & Coordination Email, Discussion forums, wikis, blogs, workflow systems, document/version control systems

Table 1. CSCW Work Context

Socio-Technical Systems Theory and Social Capital Theory

Interaction among individuals and groups is an integral component of ICTs. Given the presence of these social aspects, research of ICT is often approached from the angle of social informatics, thus examining design, use, and consequences of

ICT in congruence with institutional and cultural contexts (Kling, 2000). After arriving in organizations by the middle of the 20th century, computer systems continued to develop and evolve giving way to a productivity paradox: the addition or increase of information technology in an organization did not always result in increased productivity. More often than not, ineffective information systems implementation was blamed on human factors as opposed to technological factors. Realization of this paradox called for investigation of possible solutions, thus giving rise to Structuration Theory (Orlikowski, 2000), Adaptive Structuration Theory (DeSanctis and Poole, 1994) as well as Socio-Technical Systems Theory (Appelbaum, 1997).

Knowing that business organizations are governed by both human and technological aspects, we must consider the initially separated fields of study centralized around these two aspects, human psychology and information technology management. Adapted from Bostrom and Heinen (1977), visualization of the socio-technical system is depicted in Figure 1.

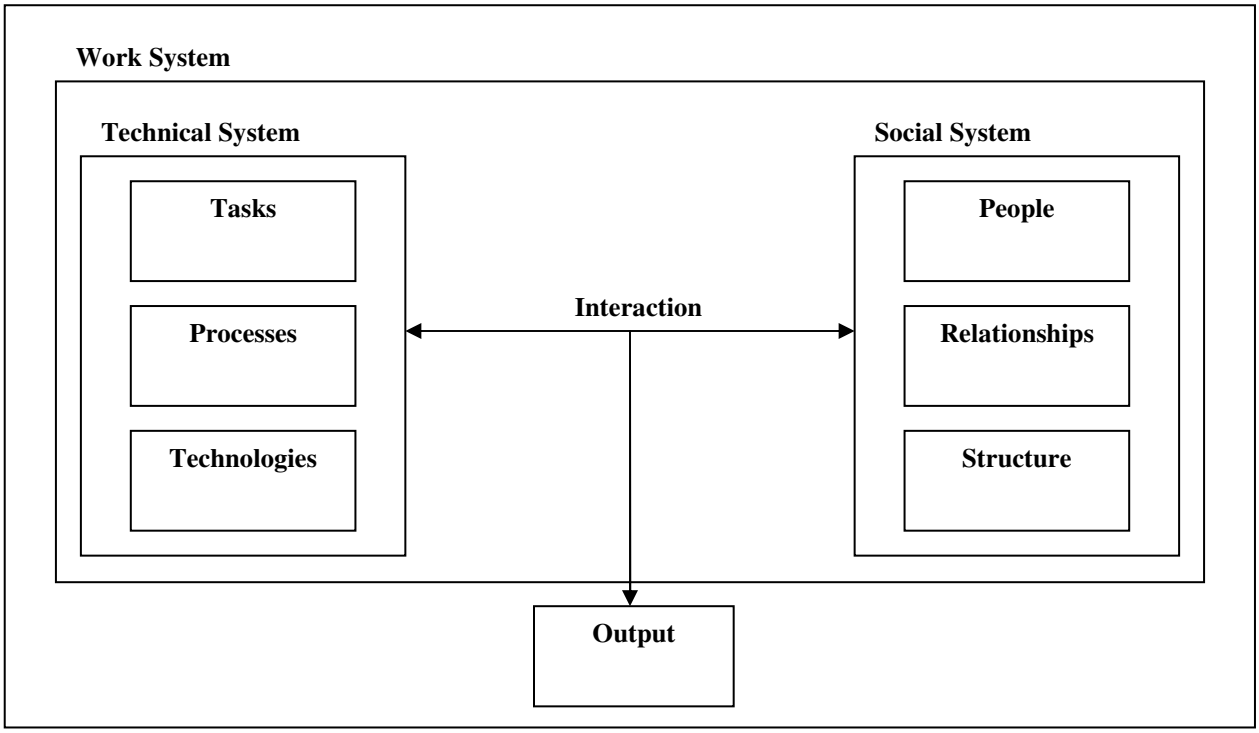

Figure 1. Socio-Technical System

Much debate has been given to the relationship between humans and technology and which, if either, aspect should be given more attention. Bostrom and Heinen suggest that problems and failures of information systems can often be blamed on lack of attention to organizational behavior (Bostrom and Heinen, 1977), and technology is "neutral" with human intervention determining success or failure of technology. One approach to maintaining viability and competitive advantage as well as succeeding in technological advancement and organizational change is to translate organizations into socio-technical systems (Appelbaum, 1997). Depicted in Table 3, the organization studied in this research is translated into a socio-technical system.

Further insight into behavior of organizational employees can be gained by exploring Social Capital Theory, which can be traced back to work built upon ideas of social networks and sociological theory (Granovetter 1973). Its concept of "weak ties" emphasized that processes in interpersonal networks should be analyzed. The "strength" of an interpersonal tie can be defined as "a combination of the amount of time, the emotional intensity, the intimacy (mutual confiding), and the reciprocal services which characterize the tie" (Granovetter, 1973). Instead of considering "weak" ties negatively, a better observation is that increasing one's "weak" ties can lead to increased opportunities and increased integration within a community. Continued theoretical development stressed the importance of consideration of both sociological and economical perspectives with important emphasis on obligations, expectations, trustworthiness, information channels, norms and effective sanctions

(Coleman, 1988). Recent studies indicate social capital as an integral facilitator of knowledge contribution (Kankanhalli, Tan and Wei, 2005), knowledge sharing (Wasko and Faraj, 2005), and knowledge transfer both within an organization (Inkpen and Tsang, 2005, Sherif and Sherif, 2006) and among strategic alliances (Inkpen and Pien, 2006) and subsidiaries (Li, 2005).

RESEARCH APPROACH

Research Site

Our research is focused on a single division within a Fortune 500 software development company having multiple call centers world-wide. While customer support calls are not the primary area of business, the company employs over five thousand people in its customer support division, supporting many different and unique product lines. When the customer support center receives a request for assistance, a qualified representative fulfills the request after determining whether they have appropriate knowledge to make a decision immediately or if they need further information acquired by consulting with other representatives or searching for knowledge within a repository. Collaboration with other individuals is often achieved by use of e-mail, Internet chat, or phone/web conferences. Other ICTs such as forums, wikis, and the customer support call system provide knowledge repositories as a source for searching and retrieving information. Acquisition of appropriate knowledge frequently involves an iterative process and numerous sources. Eventually customer support representatives arrive at a decision in the form of an answer or solution to convey to customers. In simple terms, the customer support work system involves input of a customer request, the process of collaborative decision-making, and output of the decision. A more detailed representation is given in Table 3, depicting customer support as a socio-technical system.

Technical System		**Social System**	
Task	Address Customer Request for Support	**People**	• Asia • Europe, Middle East, Africa (EMEA) • India • Latin America Division (LAD) • USA
Processes	• Assess Individual Knowledge • Assess Group Knowledge • Collaborate with Others • Access Knowledge Within Repositories • Make Decision	**Relationships**	• Intra-Group Relationships • Inter-Group Relationships • Other Organizational Relationships Outside of Customer Support Division

Technologies	• Phone/web conference
	• Internet chat
	• e-mail
	• Discussion forum
	• Wiki
	• Customer support call system
		Structure	• Customer Support Representatives
			  • Support Engineer
			  • Senior Support Engineer
			  • Principal Support Engineer
			• Division and Organizational Management

Output: Decision			

Table 3: Customer Support Work System

Initial interviews

Initial interviews were conducted to obtain preliminary information regarding problems and issues experienced by the organization. Structure of the interview was a set of open-ended questions that lead to a textual description of the phenomenon with follow-up questions if necessary (Creswell, 2007). Six initial interviews were conducted with each interview lasting approximately sixty minutes. Examples of open-ended questions are: "How is information and knowledge transferred among local team members as well as among various locations", "Are there tools used to collaborate among both on-site and off-site locations and if so what are they?" In addition to the interviews, information about processes and tools was gathered from existing documentation. Documentation included training materials, manuals, and recorded web conferences. Further information was gathered from discussion forums and wikis. Transcripts from six interviews were

analyzed and compared to identify common patterns and keywords, revealing several factors affecting collaboration processes: training, social network ties, trust, and communication issues due to time zone. Additionally, several ICTs were listed as being used: phone/web conference, Internet chat, e-mail, discussion forum, wiki, customer support call system (workflow system). Managers were particularly concerned about problems with collaboration across locations and effectiveness of various ICTs currently utilized. Key findings from the interviews have been summarized into the socio-technical system for customer support in Table 4. The numbers in parentheses indicate how many interviewees identified the topic during the interview.

Technical System		**Social System**	
Task	• Because of high turnover rates in some locations, training new employees has been a challenge. The cost of flying resources to conduct on-site training is too expensive. To reduce costs and to have repeatable material, the majority of new employee training is done via web-based recordings and video conference calls. (4)	**People**	• There is resistance from established employees to share knowledge to dispersed employees because of fear of losing their jobs. (5) • Once employees realize that they are not going to lose their jobs, they are willing to share knowledge and are able to focus on more rewarding aspects of their jobs. (4) • The high rate of employee turnover in the dispersed locations is an issue. (6)
Processes	• While there are standard processes for tracking customer interaction and problem resolution, there are no formal processes on how to use ICTs such as IM, forums or wikis. (6) • The new product division uses ICT as part of their development process. As new products are released and turned over to the customer support organization, the support organization leverages the knowledge contributed to ICTs by the new product division. (4)	**Relationships**	• For relationships to be established between employees in different locations, the most successful way to create the relationships is face-to-face communications. This is done by having employees go to the different support sites, as well as video conferencing and conference calls. Once the relationship has been developed, individuals use ICTs to collaborate. (3) • Because of time zone and language differences, dispersed employees mainly use ICTs to collaborate. (2)
Technologies	• There is no mandate from management to use a single ICT. Each group uses the technology that their employees feel comfortable using. (6) • Wikis are good for managing documents and links to other knowledge artifacts, while forums are better for sharing ad-hoc knowledge. (3)	**Structure**	• No one within a group is assigned the responsibility of maintaining ICTs, but over time 1 or 2 employees within the groups become experts on ICT solutions. (4)

Table 4: Interview Results

Theoretical Development

Interview results regarding the technical system emphasized importance of training and freedom to choose appropriate tools. Tools are chosen according to employees' comfort with using them and their perception of the tools' relevance. Consequently, we decided on Ease of Use and Perceived Usefulness from the Technology Acceptance Model (TAM) (Davis, 1989), as well as Training as Technological Factors in our model.

Interview results provided a variety of social factors in need of examination. Sharing knowledge and collaboration were important themes. Since sharing knowledge and collaboration depend on Social Network Ties (Inkpen and Tsang, 2005) and Trust (Kankanhalli, et al., 2005), these are the Social Factors in our model.

In order to address on-site vs. off-site collaboration concerns of managers, we divided social factors into two dimensions: intra-group (on-site) and inter-group (off-site). Technological factors will be measured according to each of the specific technologies identified (phone/web conference, Internet chat, e-mail, discussion forum, wiki, workflow system – call support system). Another issue raised by managers was that of communication problems across time zones, thus further consideration was given to the difference between synchronous and asynchronous technologies. We postulated that the aforementioned factors influenced two intermediate variables: ICT Usage and Collaborative Decision-Making Efficiency. Our dependent variable was identified as Decision Effectiveness. Definitions of the variables are given in Table 5. The proposed research model is depicted in Figure 2, followed by the propositions.

Variable	Definition	Source
Intra-Group Social Network Ties	The degree to which a group member believes that using ICTs facilitates intra-group social interactions and provides channels for knowledge exchange	(Inkpen and Tsang, 2005)
Inter-Group Social Network Ties	The degree to which a group member believes that using ICTs facilitates inter-group social interactions and provides channels for knowledge exchange	(Inkpen and Tsang, 2005)
Intra-Group Trust	The degree to which a group member believes in good intent, competence, and reliability of on-site group members with respect to contributing and reusing knowledge by using ICTs	(Kankanhalli, et al., 2005)
Inter-Group Trust	The degree to which a group member believes in good intent, competence, and reliability of off-site group members with respect to contributing and reusing knowledge by using ICTs	(Kankanhalli, et al., 2005)
Perceived Ease of Use	The degree to which a group member believes that using a particular ICT is free of effort	(Davis, 1989)
Perceived Usefulness	The degree to which a group member believes that using a particular ICT enhances his or her job performance	(Davis, 1989)
ICT Usage	The group's willingness to make the IT tools as part of the group's regular work routine.	(Pavlou, Dimoka and Housel, 2008)
Collaborative Decision-Making Process Efficiency	The degree to which a group member believes that using a particular ICT enhances collaboration by reducing process time and overall effort, and increasing the amount of cases handled in a given week	New
Decision Effectiveness	The degree to which a group member believes that using a particular ICT provides more information sources, improves overall decision quality, and enhances first-time success rate	New

Table 5: Variables in Proposed Research Model

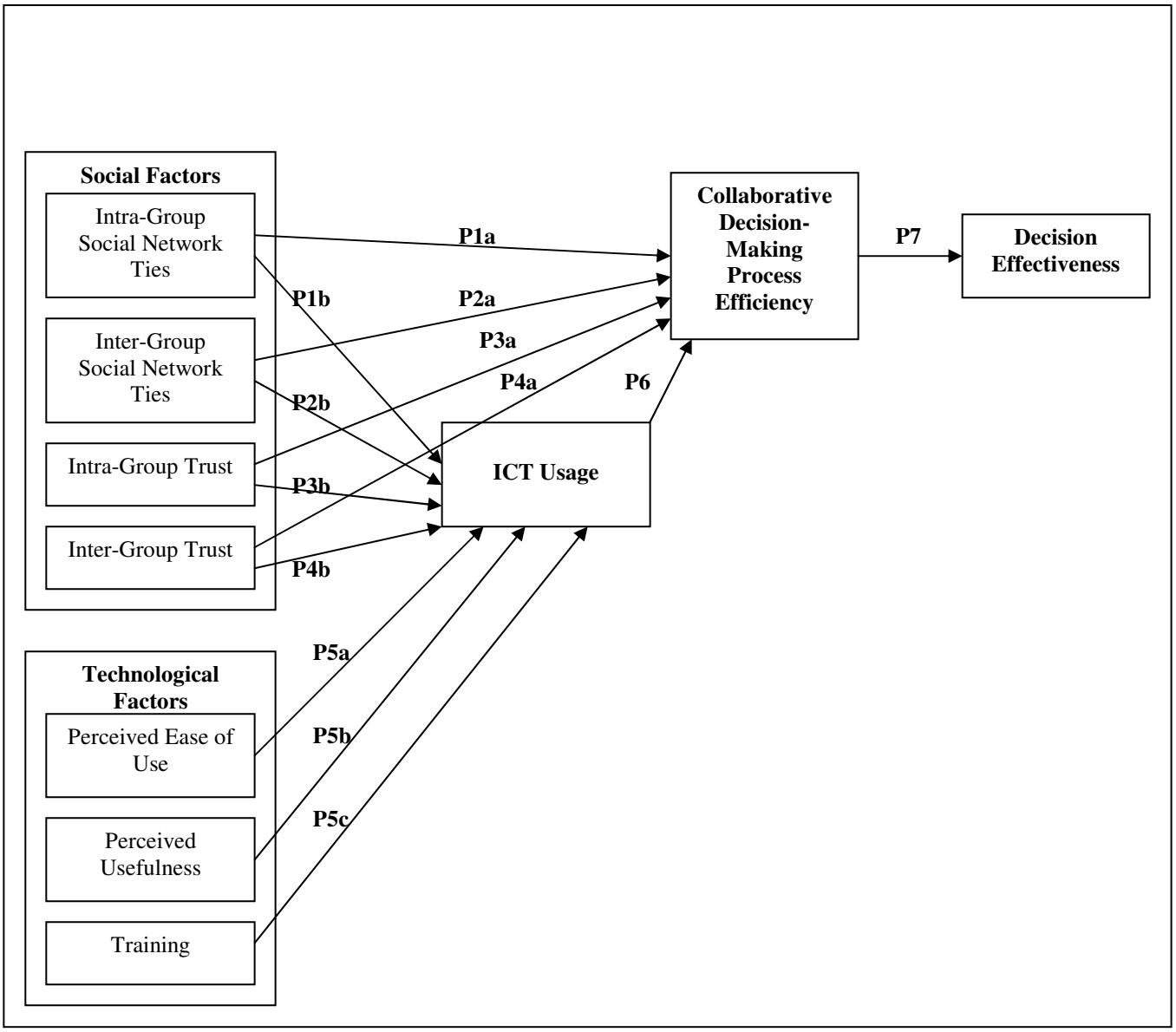

Figure 2: Research Model

Social factors

Social factors may affect collaborative decision-making directly or indirectly through ICT Usage. Social computing involves groups comprised of various network ties essential for access to resources. The "strength" of an interpersonal tie can be defined as "a combination of the amount of time, the emotional intensity, the intimacy (mutual confiding), and the reciprocal services which characterize the tie" (Granovetter, 1973). An organization consisting of numerous small sub-units of users with good relations can be a drawback; however, when groups expand their relationships to include additional users, the increase in number of ties, even if not particularly strong, can be beneficial. These personal networks facilitate more effective knowledge sharing (Bansler and Havn, 2003, Bock, Zmud, Kim and Lee, 2005) and knowledge transfer (Inkpen and Tsang, 2005), improving collaborative processes. When examining specific technologies used according to geographical location of users, we propose that intra-group social network ties will be more important when the technology is synchronous. Alternatively, inter-group social network ties are particularly important for asynchronous ICT due to lack of face-to-face interaction.

P1a: Intra-group Social Network Ties positively influence Collaborative Decision-Making Process Efficiency.

P1b: Intra-group Social Network Ties positively influence synchronous ICT Usage.

P2a: Inter-group Social Network Ties positively influence asynchronous Collaborative Decision-Making Process Efficiency.

P2b: Inter-group Social Network Ties positively influence asynchronous ICT Usage.

An extensive body of research examines a more specific aspect of relationships among organization members: trust. Dimensions of trust studied include perceived ability of others, integrity, benevolence, openness, competence and reliability (Jarvenpaa, Knoll and Leidner, 1998, Kankanhalli, et al., 2005, Nahapiet and Ghoshal, 1998). Increased trust may facilitate a higher contribution of resources to learning (Inkpen and Tsang, 2005), increased collaboration among virtual teams (Jarvenpaa, et al., 1998), and increased knowledge sharing and/or transfer among online communities (Thoms, Garrett, Herrera and Ryan, 2008), intranet users (Ruppel and Harrington, 2001), knowledge workers (Kankanhalli, et al., 2005), subsidiaries (Li, 2005), and trading partners (Madlberger, 2008). Here we will examine trust as user perceptions that group members use each other's knowledge appropriately and contribute the best knowledge they have (Kankanhalli, et al., 2005).

P3a: Intra-group Trust positively influences Collaborative Decision-Making Process Efficiency.

P3b: Intra-Group Trust positively influences asynchronous ICT Usage.

P4a: Inter-group Trust positively influences Collaborative Decision-Making Process Efficiency.

P4b: Inter-Group Trust positively influences asynchronous ICT Usage.

Technological factors

Following the Socio-Technical Systems approach, we have included technological factors potentially affecting collaborative decision-making indirectly through ICT Usage. We are using components of Technology Acceptance Model (TAM), a leading model in technology acceptance studies (Bagozzi, 2007). Antecedents in TAM, perceived ease of use and perceived usefulness, were deemed adequate indicators of users' perceptions of technology for the purposes of this study. In the classic model, the antecedents determine intentions to use a particular technology which in turn predicts usage behavior (Davis, 1989). Based on our interviews, we have also included training, a crucial component of users' ability to make the most of a given technology. Numerous studies have indicated user training as having a significant positive influence on technology use (Compeau and Higgins, 1995).

P5a: Perceived Ease of Use positively influences ICT Usage.

P5b: Perceived Usefulness positively influences ICT Usage.

P5c: Training positively influences ICT Usage.

Information communication technology capability

ICT Usage was measured as habit or frequency of usage of individual technologies. Usage was divided into three distinctions: requesting information or searching for knowledge, modifying or updating existing knowledge, and providing or contributing new information or knowledge. We posit that ICT Usage affects Collaborative Decision-Making Process Efficiency directly. In a similar model posed by Pavlou, et al., habit is given as an antecedent of Collaborative IT Tools Leveraging Capability (Pavlou, et al., 2008). While our approach is slightly different, we posit that habit will serve as an adequate measure.

P6: ICT Usage positively influences Collaborative Decision-Making Process Efficiency.

Collaborative decision-making process efficiency

Collaborative Decision-Making Process Efficiency was based on timeliness, amount of cases handled, and effort. We posit that Collaborative Decision-Making Process Efficiency affects Decision Effectiveness directly. Criteria for this variable were largely influenced by concerns of management. One measure comes from prior research, with the other two composed to target specific needs of managers.

P7: Collaborative Decision-Making Process Efficiency positively influences Decision Effectiveness.

Decision effectiveness

Decision effectiveness was based on first-time success, improved quality of the decision, and depth of information utilized in the decision. Like Collaborative Decision-Making Process Efficiency, managers of our organization were looking for specific measures of effectiveness. Again we used one measure from prior research and composed the other two accordingly.

Proposed Methodology and Analysis

The survey method for data collection will be used to test the proposed research model. Hypotheses will be examined by applying the partial least squares (PLS) method to data collected. The survey will be administered to customer support representatives in various locations, via an email containing a link to the on-line survey. Content validity will be maintained by using measurement items from existing literature for the majority of the measures, the only exception being those measures required by manager's indications during the initial interviews. All of the measures will also be examined by a group of managers as an informal pilot test. A two-stage analysis will be performed using confirmatory factor analysis to assess the measurement model followed by examination of the structural relationships (Hair, Anderson, Tatham and Black, 1998). Path modeling and analysis will be performed with SmartPLS (Ringle, Wende and Will, 2005).

CONCLUSION

In today's global economy, companies have offices and employees all around the world, posing a relentless challenge for effective collaboration and decision-making. Collaboration among groups allows organizations to increase the level of knowledge throughout the organization. Subsequent access to this knowledge facilitates various tasks and processes performed in organizations, particularly decision-making. To determine factors affecting effective use of ICTs and effective collaboration among groups, we studied a customer support division within a Fortune 500 company having call centers throughout the world. While previous research has focused on dispersed employees or ICT, little research has been published on decision efficiencies gained from the interaction between ICT-related technological factors and social factors relevant to dispersed employees.

Findings of the initial research indicated a variety of factors influencing collaborative processes and that numerous conversational management tools were being utilized. The social and technological factors as well as lack of standardized tools present obstacles to collaboration, knowledge sharing and transfer, and decision-making processes. A single division within the organization will be analyzed further which may or may not be indicative of the entire organization. However, valuable insight regarding improved collaboration processes will be relevant not only for the organization studied, but for a variety of organizations across industries and geographical locations. While different organizations may use different technologies for dispersed workers, the social and technical factors that affect their usage and knowledge sharing capabilities are universal.

The research in progress presented in this paper consists of initial interviews and theoretical development for a model to be tested by a survey instrument. In addition to the primary factors identified by interviews, job training, mentoring and experience require further consideration. Future research models will explore the impact of these variables on the collaborative decision-making process. Practitioners can use the results of this research to increase decision efficiencies by analyzing the social-technical capabilities of their organization. This improved understanding can assist in determining how to successfully implement ICT solutions. Furthermore, organizations that already have ICT solutions implemented can leverage this research to increase usage and efficiencies of their current solutions.

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