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Eliciting expert panel perspective on effective collaboration in system development projects

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Abstract

The success of System Development (SD) projects largely depends on individuals within the team who are able to collaborate effectively. We opted to develop our own survey instrument using the Delphi methodology based on prior literature. Delphi methodology is a technique designed as a group communication process, which aims to achieve an informed judgment with consensus on a particular topic. A panel of SD experts, certified project managers, and project management trainers were selected. Four rounds of review using the Delphi method have been effective in refining the survey items to achieve expert consensus. Results and discussion are provided in preparation for the empirical phase. A follow-up study is in progress to test the hypotheses and provide the empirical results.

Keywords: Delphi methodology in project management (PM), Delphi methodology in system development (SD) projects, effective collaboration, familiarity with organizational privacy policy, interpersonal trust building, knowledge sharing, information system (IS) projects.

Introduction

Research has demonstrated that system development (SD) is a combination of two basic processes, namely the social (e.g. interpersonal, non-technical) and technological processes (Laporte, Alexandre, & O'Connor, 2008). In this study, we chose to focus on the social process among SD team members. Considerable research has been conducted to understand the technological processes and use of collaboration tools (Rosen, 2005; Helquist, Deokar, Meservy, & Kruse, 2011). Previous system development teams studies reported upwards of 70% of the developer's cost is spent on team activities in large projects (Romano, Chen, & Nunamaker, 2002). According to Kellner (1991) and Helquist et. al, it is clear a number of substantive social (non-technical) challenges that continue to be serious impediments to the more effective practice of complex system development. These social issues include managerial, organizational, economic, political, legal, behavioral, psychological, and other social factors (Kellner, 1991). We concentrated on investigating the influence of interpersonal trust, knowledge sharing, and familiarity with privacy policy on effective collaboration in long and short SD projects. Research shows interpersonal trust leads to increased overall knowledge exchange (Abrams et al.,

2003; Owens, Mitchell, Khazanchi, & Zigurs, 2011). According to Holste and Fields (2010) and Nonaka and Tekeuchi (1995), interpersonal trust is identified as a necessary prerequisite for knowledge sharing. The study also set out to explore the relationship between familiarity with privacy policy and effective collaboration. Sensitive privacy information could become a bottleneck of inter-enterprise collaboration, especially in the case of competitive inter-enterprise collaboration.

Progress in SD projects depends largely on team member decisions and judgment. The human factor is not the only important consideration in the process, but it is critical for SD success (Rosen, 2005). Most commercial software is developed by teams of individuals, rather than by a single person. Moreover, SD projects strongly depend on human trust, commitment, and actions for its successful implementation (Basri & O'Connor, 2010; Rosen; Beaver, & Schiavone, 2006; Mitchell & Zigurs, 2009). Therefore, research has demonstrated that SD projects involve knowledge intensive exchanges and collaborations (Owens, Mitchell, Khazanchi, & Zigurs, 2011). This claim appears to support our belief that effective knowledge sharing among such development teams, both in the form of tacit and explicit knowledge, influences the degree of effective collaboration.

With the growth in such complex SD projects, and the demand for unique technical know-how, there is a greater need to explore the dilemma of effective knowledge sharing among individuals working in the SD project, and how their technical knowledge, perceptions, and social interactions shape the projects outcomes (*Removed for review*, 2013). Therefore, this research attempts to address the social process by using the Delphi Methodology to design an instrument to measure effective collaboration and knowledge sharing in short- and long-term SD projects. According to Stockmann (2011), the Delphi method has several classical uses, with one of them being to develop a standardized survey. This method is similar to a peer review, except for the types of experts used to assess the survey and to reach consensus (Stockmann). Traditionally, peer review involves experts in a specific field that are unable to reach consensus whereas, Delphi rather aims to obtain a representative view from as many experts in a given field as possible (Stockmann). This study combines the feedback from expert practitioners and academics to achieve a consensus on an instrument for employment in a future study.

Knowledge workers are increasingly important to short- and long-term projects, fulfilling critical tasks within the project development lifecycle. Team members face challenges on how to effectively collaborate in order to realize success (Seeber, Maier, & Weber, 2013). Often times, teams are made-up of individuals with varying backgrounds, expertise, and skills. They are expected almost instantly to function and produce positive results with little time provided for social interaction, let alone to form social bonds. Thus, the focus of our line of research emerged from such a challenge and this paper reports on our initial phase results. The following section provides a brief literature overview on empirical work related to effective collaboration, interpersonal skills, knowledge sharing, and familiarity with organizational information privacy policy. This research further explores the connection among these constructs in the context of SD teams, while forming the foundation for survey instrument development.

Effective Collaboration

Collaboration is a distinct behavior reflecting interpersonal cooperation. Collaborative behaviors include sharing of information, tools, and resources among team members. Moreover, group collaboration reflects training of new members, socializing with them, as well as sharing workloads. Collaboration also reflects representing the group positively outwards, and responding to errors made by others. Group collaboration assumes loyalty and reliability of team members. Collaboration has been recognized as a success factor in project management (Graham, 1995). In a typical SD project, a joint effort among departments is needed. Critical sharing of general, specific, and procedural knowledge affects materializing the common goals of reaching a successful project outcome. As projects become more complex in scope they require extensive collaboration and multiple feedback loops. Short-term projects tend to have fewer iterative cycles and opportunities for collaboration across teams. Instead, the team may rely on experts to achieve specific stark goals in strict short deadlines (Seeber, Maier, & Weber, 2013).

SD projects place an unique ground for collaboration among team members. The success of the team depends on the degree of efficiency and effectiveness among team members (Helquist, Deokar, Meservy, & Kruse, 2011). Effective collaboration is a combination of individually focused tasks and interactive teamwork (Mishra & Mishra, 2009). Within collaboration, researchers have recognized activities such as communication and coordination (Helquist et al.; Ribes & Finholt, 2007), knowledge transfer and negotiation (Seeber, 2013), training, engagement, task processes, and interpersonal trust building (Mitchell & Zigurs, 2009; Powell et al, 2004, Piccoli, & Ives, 2004; West, 2004). Subsequently, these activities lead to increasing the overall team performance, and organizational learning. Short SD projects have different goals compared with long-term projects. Both types of projects require effective collaboration on complex tasks, and a decision making process among team members, short term projects enable less time to form these collaborative processes, hindering the ability to establish a high degree of effective collaboration. Collaboration is often needed between the technical teams and management teams to achieve project goals. In this research study, we hypothesize that interpersonal trust among individuals, knowledge sharing, and familiarity with information privacy policy all have a significant contribution to effective collaboration.

Interpersonal Trust

Trust has been shown to have important consequences on group interaction and team success (Delgado-Márquez, Hurtado-Torres, & Aragón-Correa, 2012; Kanawattanachai & Yoo, 2007; McLeod & MacDonell, 2011). Moreover, researchers recognized that trust generates numerous benefits for organizations including growth, commitment, cooperation, and community collaboration (Gambetta 1988; McKnight et al. 2002; Tyler & Kramer 1996; Vidotto et al., 2008). Most trust research investigate trust in artifacts, while this study examines interpersonal trust (Owens, Mitchell, Khazanchi, & Zigurs, 2011). In this context, Interpersonal trust refers to the intention to "accept vulnerability based on positive expectations of the intentions or behaviors of another person" (Delgado-Márquez, Hurtado-Torres, & Aragón-Correa, p. 2). Interpersonal trust involves a "trustor and a trustee", and a mutual understanding of expectations between both parties (Möllering, 2001). Moreover, interpersonal trust suggests interdependence of the two parties where both parties share the same interest, and were found to be trustworthy (Rousseau et

al., 1998). Consequently, the trustor is expected to trust the trustee based on confirmed reliable information. Finally, trust between the trustor and trustee may not be symmetrical in nature where one party trust is not equal to another (Castelfranchi, 2008). In such cases the trustor and trustee parties may seek additional information or rely on a third party. Parties can take the time to form trust through exhibiting behaviors including observation, communication, and actions. In SD projects cross teams depend on one another for tasks, feedback, and constructive criticism in order to progress in the SD project. Lack of interpersonal trust within the team or across teams appears to hinder the effectiveness of the collaborations. On the other hand, studies have shown that high degree of interpersonal trust among team members meant information sharing freely flowed and tasks could be fulfilled by others due to the trust with members' competencies and skills (Griffith & Neale, 2001; Lewis, 2003; Mitchell, & Zigurs, 2009).

Researchers agree that it is difficult to accurately measure interpersonal trust (Delgado-Márquez, Hurtado-Torres, & Aragón-Correa, 2012). In fact, individuals may differ about their perception of interpersonal trust (Glaeser et al., 2000). On the other hand, interpersonal trust depends on situational factors (Gambetta, 1988; Hardin, 2002). Interpersonal Trust can be measured empirically by utilizing survey questions, or conducting field, and laboratory experiments. None of the existing methodologies use broad perspective for the evaluation of interpersonal trust.

Knowledge Sharing

The social exchange theory (SET) (Blau, 1964) is a commonly used classical theoretical base for investigating individual's knowledge-sharing behavior. According to SET, individuals regulate their interactions with other individuals based on a self-interest analysis of the costs and benefits of such an interaction. Davenport and Prusak (1998) have analyzed knowledge-sharing behavior and have outlined some of the perceived benefits that may regulate such behavior. These benefits include future reciprocity, status, job security, and promotional prospects. Knowledge-sharing behavior was defined as the degree to which one actually shares their knowledge with other individuals, groups, or organizations. In previous studies, researchers used various variables to measure knowledge sharing behavior, such as frequency, quantity, time spent on knowledge sharing (Wasko & Faraj, 2005).

As a result of previous studies on knowledge sharing behaviors, researchers have found individuals are the prime movers of knowledge creation within organizations (Nonaka, 1994). In agreement with Nonaka, other researchers suggest knowledge sharing is instrumental within organizations due to the increasing recognition that tacit knowledge provides individuals within a reference team or in other teams the ability to learn from one another (Haas & Hansen, 2005; Marouf, 2007). Grant (1996) identified knowledge sharing as one of the major challenges in organization knowledge management. However, Nonaka and Konno (1998) suggested that organizational members can absorb new knowledge from their colleagues to be leveraged by organizations. Other IS literature suggested that the individual's reference groups within an organization result in knowledge sharing which may keep knowledge and information obtained from various sources current in order to serve as a guide for future action (Lukas, Hult, & Ferrell, 1996). Other researchers suggested that learning in an organization results from an accumulation of individual-level learning (Shrivastava, 1983). Dodgson (1993) suggested intra-organizational knowledge sharing helps the organization by the diffusion of individual-level learning, to

achieve two major objectives of organizational learning: improving efficiency and innovativeness when the organization is facing environmental uncertainty.

Familiarity with Information Privacy Policy

Researchers show that the higher the level of information sharing, the greater the social benefits to organizations and consumers (Peijun, 2002; Ping, Weijun, & Fang, 2009). Complete information sharing has positive benefits to the organization, including cost reduction, shared benefits, enhanced utilization of time and human resources. Typically, the majority of inter-enterprise collaborative decision-making is carried out under incomplete information sharing, that is sharing common information and protecting sensitive information such as financial data including sales reports, cost and expenses reports, product specification, quality and production information (Ping et al., 2009, Eng, Chew, & Lee, 2014). Sensitive privacy information could become a bottleneck of inter-enterprise collaboration, especially in the case of competitive inter-enterprise collaboration. Sensitivity is defined as the need to protect past or current related information from being disclosed to others who might have low or unknown trustworthiness or undesirable intentions (Fan, 2012). Clearly, limiting or restricting information sharing impacts the level of cooperation among inter-enterprises. To achieve such common goals, cooperation between inter-enterprises often leads to sharing relevant information to achieve efficient allocation and combinations of resources (Gavirneni, Kapucinski, & Tayur, 1999). Organizations develop specific policies, for example, a privacy policy that seeks to guide employees on how to protect corporate sensitive information. Studies related to familiarity shows that familiarity and recognition based on prior experiences leads to an automatic decision process. Thus individuals who are familiar with their organization privacy policy will likely experience a higher level of information sharing, as well as interpersonal trust (Jones, Brown, & Atchley, 2007, Sirieix, Delanchy, Remauud, Zepeda, & Gurviez, 2013). Individuals, who are not familiar with the organization's privacy policy, will not be able to recollect prior experiences, and will reject or decline communication about sensitive information with certain individuals across teams. In some cases such individuals may seek support and guidance from a team leader or simply decline the communication all together. Though fewer studies have addressed individuals' familiarity with privacy policy, researchers propose to investigate the contribution of familiarity on sharing of information behavior (Park, 2013; Solove, 2007). Thus, our research study also seeks to investigate the contribution of familiarity with privacy policy on effective collaboration. This framework was discussed in a published article in greater details (Ramim, & Lichvar, 2013). Figure 1 depicts the conceptual model of this future research and identifies the research hypotheses.

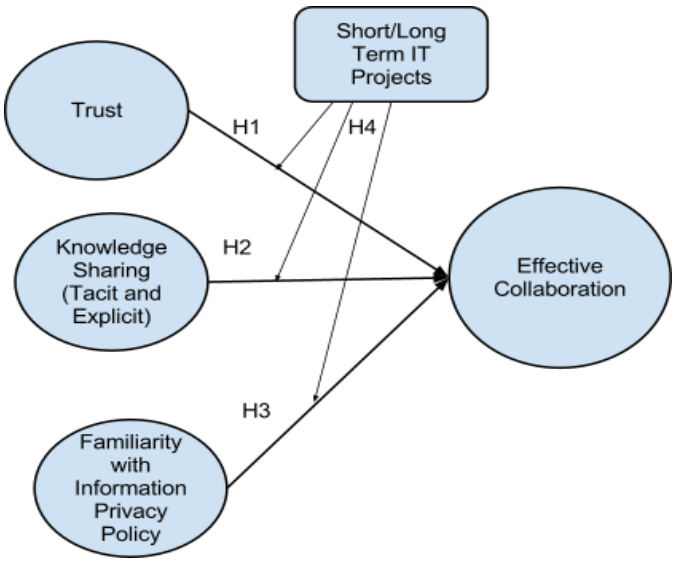

Figure 1. Conceptual Model for Effective Collaboration.

Delphi Methodology and Data collection

We reviewed existing literature on the proposed survey development constructs. One of the challenges that we encountered included uncovering prior validated constructs measures. As a result, we opted to develop our own survey, which would be a good fit in the context of the focus of this study. We employ the Delphi methodology to develop the survey. The Delphi methodology is mainly used in the situation where accurate information is unavailable and human judgment input is crucial (Best, 1974). To design this study survey, we used practitioners and academics knowledgeable in collaboration and project management.

The intent of the Delphi, as it was originally conceived, was to create a method using expert opinions to provide informed judgment (Brown, 1968). According to Clayton (1997), a panel size depends on the type of homogeneous groups used to provide informed judgments. This research used a panel of 7 individuals with expertise on the topic. According to Clayton, expert panel definition for homogeneous groups which include social and professional groups; requires a panel of 5 to 10 experts. In addition, this research performed four anonymous evaluation rounds on the proposed survey with a geographically dispersed expert panel. The expert panel included experts in the SD field, project managers, and academia to evaluate the survey. These experts were invited to participate via email by the authors based on having expertise in knowledge sharing, collaboration, interpersonal trust, and project management. Our response rate for the initial invitation to participate as a panelist was 100 %. Our final panel thus consisted of 7 experts who completed all rounds of the survey design evaluation. Table 2 depicts the design approach of this Delphi study.

Criteria	Choice for Study
Purpose of the study	Survey design
Number of rounds	Four
Participants	Heterogeneous group
Mode of operation	Virtual
Anonymity of panel	Full
Communication media	Email
Concurrency of rounds	Sequential

Table 2. Delphi Design Approach

Validity

Gay (1996) defined validity as "the degree to which a survey measures what it is supposed to measure and consequently, permits interpretation of scores" (p. 23). According to Litwin (1995), validity refers to how well an item or a scale measures what it intends to measure. Other scholars describe validity as giving researchers, their peers, and the society at large the confidence that the methods selected are relevant to the quest for scientific truth (Straub, Boudreau, & Gefen, 2004).

The expert panel assessed the survey participants' ability to understand, answer, and read the survey instrument (Fowler & Floyd, 1991). The participants in this expert panel were asked to provide feedback on all survey items as either no evidence of a problem, possible problem, or definite problem (Fowler & Floyd). Comments on or suggestions about the survey items' sequence, wording choices, and measures were analyzed to determine if the survey instrument needed to be modified due to understandability, answerability, or readability. In addition, we asked the panel of experts to respond to the following questions in table 3.

I am seeking your feedback on the survey directions in sections A through E. a. Are the directions clear in each section? b. Would you recommend changing the survey direction verbiage? If so, how?
Do the survey items in sections A through E appear to be clear, readable, and properly scaled in each section? Would you recommend changing the survey item verbiage or scale? If so, how?
Are the survey items in sections A through E a good fit based on our constructs?

Table 3. Delphi Questions

Email was the primary method used to collect data due to geographical separation of the panelist from the authors. Email also ensured anonymity of the panelist from one another and provided the panelists freedom to make suggestions without being influenced by other panelists. Data collection took place in four rounds. The results of the first round were compiled and returned to the experts along with follow-up questions. The responses to the questionnaires were kept anonymous.

Data Analyses

LeCompte and Schensul (1999) define analysis as the process a researcher uses to reduce data to a story and its interpretation. Patton (1987) indicates that three things occur during analysis: data are organized, data are reduced through categorization, and patterns and themes in the data are identified and linked. This study organized the data based on the five sections of the survey before categorizing data by clear directions, readability, scale, good fix and recommended changes. The round one data was analyzed according to the analysis process to determine the necessary changes to the survey. The second round distributed the revised survey to the existing and one new panelist for additional comments or consensuses. The second round results were related to slight changes in verbiage and the type of scale being used for this survey. Appendix 1 contains the final survey after vetting it with expert panel.

Findings

According to Patton (1987), one of the challenges with analyzing qualitative data is identifying patterns and themes in the data. As shown in Table 3, the panelist comments were categorized. After further analysis, it became apparent that knowledge sharing section was a concern with the panelist requiring an audit for grammatical errors. This study adopted the panelist feedback in round one in order to reduce the number of questions in the knowledge sharing section, resolve the issue with the scale, and revise the specific questions identified by panelist one. The survey also adopted more panelists' comments on revising the question verbiage for the rest of the sections. The demographic section was revised to use a single option and expand the number of demographic questions to include development methodology. Based on the panelists' comments, the survey items in sections A through E appear to be a good fit based on our constructs. The second round distributed the revised survey to the first round panelists. Round two findings identified grammar errors and panelist seven concerns regarding the type of scale being used for this study.

Conclusion

SD depends on human decision and judgment. According to Rosen (2005) human factors are an important consideration in any process and essential to its success. We employed the Delphi method in developing our survey due to our inability to uncover prior validated constructs measures for effective collaboration in SD projects. The Delphi methodology allows researchers to seek consensus on informed judgments from participants who have expert knowledge of SD and/or certified PMI project managers. This study established a panel of experts to validate the questions to determine if the survey instrument met understandability, answerability, and readability requirements. The anonymous expert panelists were encouraged to express their

findings and recommendations to help resolve any survey question issues. The feedback received from the expert panel was organized in accordance to survey section then categorized by data by clear directions, readability, scale, good fit, and recommended changes. Our survey design approach provides a degree of validity towards a more comprehensive understanding of the human factors in SD projects.

Further empirical work is in progress. The focus of this research was to develop a deeper understanding of the contribution of interpersonal trust, knowledge sharing, and familiarity with privacy policy on effective collaboration. Finally, the next phase of this research will investigate the role of short- and long-term projects on effective collaboration and contribute best practices that will be helpful to project managers and practitioners in this context.

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References

Abrams, D., Viki, G. T., Masser, B., & Bohner, G. (2003). Perceptions of Stranger and Acquaintance Rape: Role of Benevolent and Hostile Sexism in Victim Blame and Rape Proclivity. Journal of Personality and Social Psychology, 84(1), 111-125.

Basri, S., & O'Connor, R. (2010). Evaluation of Knowledge Management Process in Very Small Software Companies: A Survey. Paper presented at the Proceeding of Knowledge Management 5th International (KMICe 2010) Conference, Kuala Terengganu, Terengganu.

Beaver, J. M., & Schiavone, G. A. (2006). The effects of development team skill on software product quality. ACM SIGSOFT Software Engineering Notes, 31(3).

Blau, P. (1964). Exchange and Power in Social Life. New York: John Wiley & Sons, Inc.

Brown, B., B. (1968). Delphi Process: A Methodology Used for the Elicitation of Opinions of Experts. Santa Monica, CA: RAND Corporation.

Castelfranchi, C. (2008). Trust and reciprocity: Misunderstandings. International Review of Economics, 55, 45–63

Clayton, M. J. (1997). Delphi: A technique to harness expert opinion for critical decision-making tasks in education. Educational Psychology, 17(4), 373-384.

Davenport, T. H., & Prusak, L. (1998). Working knowledge: how organizations manage what they know. Boston, MA: Harvard Business School Press.

Delgado-Márquez, B. L., Hurtado-Torres, N. E., & Aragón-Correa, A. (2012). Social networks and trust-building processes: implications for organizational environments. In the Handbook of research on business social networking (1st ed.), (pp.358-373). Hershey, Pa.

Dodgson, M. (1993). Organizational learning: A review of some literatures. Organization Studies, 14(3), 375–394.

Eng., S. W. L., Chew, E. P., & Lee, H. E. (2014). Impacts of supplier knowledge sharing competences and production capacities on radical innovative product sourcing. European Journal of Operational Research, 232(1), 41-51.

Fan, S. (2012). Three Case Studies on Business Collaboration and Process Management. Management Information Systems, Tucson: University of Arizona, 163.

Fowler, J., & Floyd, J. (1991). Improving survey questions: Design and evaluation. Applied Social Research Methods Series, 38(3), 392-397.

Gambetta, D. (1988). Can we trust? In D. Gambetta (Ed.), Trust: Making and breaking cooperative relations, (pp. 213–217). New York: Basil Blackwell.

Gavirneni, S., Kapucinski, R., & Tayur,S. (1999). Value of information in capacitated supply-chain. Management Science, 45(1), 16-25.

Gay, L. R. (1996). Educational research: Competencies for analysis and application (5th ed.). Upper Saddle River, NJ: Prentice-Hall, Inc.

Graham, J. W. (1995). Leadership, moral development, and citizenship behavior. Business Ethics Quarterly, 543-554.

Grant, R. M. (1996). Toward a knowledge-based theory of the firm. Strategic Management Journal, 17, 109–122.

Griffith, T. L., and Neale, M. A. (2001). Information Processing in Traditional, Hybrid, and Virtual Teams: From Nascent Knowledge to Transactive Memory, Research in Organizational Behavior, 23, 379-421.

Haas, M. R., & Hansen, M. T. (2005). When using knowledge can hurt performance: The value of organizational capabilities in a management consulting company. Strategic Management Journal, 26(1), 1–24.

Hardin, R. (2002). Trust and trustworthiness. New York: Russell Sage.

Jones, C. T., Brown, S. A., & Atchley, P. (2007). Feature and conjunction effects in recognition memory: Toward specifying familiarity for compound words. Memory & Cognition, 35(5), 984-998.

Kanawattanachai, P., & Yoo, y. (2007). The impact of knowledge coordination on virtual team performance over time. MIS Quarterly, 31(4), 783-808.

Kellner, M. I., Curtis, B., DeMarco, T., Kishida, K., Schlumberger, M., & Tully, C. (1991). Non-technological issues in software engineering. Paper presented at the Proceedings of the 13th international conference on Software engineering, Austin, Texas, USA.

Laporte, C. Y., Alexandre, S., and O'Connor, R. (2008). A Software Engineering Lifecycle Standard for Very Small Enterprises. Paper presented at the EuroSPI Springer-, CCIS.

LeCompte, M. D.,and Schensul, J., J. (1999). Analyzing and interpreting ethnographic data. Walnut Creek, CA: AltaMira Press.

Lewis, K. (2003). Measuring Transactive Memory Systems in the Field: Scale Development and Validation. Journal of Applied Psychology, 88(4), 587-604.

Litwin, M. S. (1995). How to measure survey reliability and validity. London: Sage Publications.

Lukas, A., Hult, M., & Ferrell, C. (1996). A theoretical perspective of the antecedents and consequences of organizational learning in marketing channels. Journal of Business Research, 36(3), 233–244.

Marouf, L. (2007). Social networks and knowledge sharing in organizations: A case study. Journal of Knowledge Management, 2(6), 110–125.

Mishra, D., & Mishra, A. (2009). Effective communication, collaboration, and coordination in extreme programming: Human-centric perspective in a small organization. Human Factors and Ergonomics in Manufacturing, 19(5), 438-456.

Mitchell, A., & Zigurs, I. (2009). Trust in virtual teams: Solved or still a mystery? Database for Advances in Information Systems, 40(3), 61-83.

Möllering, G. (2001). The nature of trust: From Georg Simmel to a theory of expectation, interpretation and suspension. Sociology, 35(2), 403–420.

McLeod, L., & MacDonell, S. G. (2011). Factors that affect software systems development project outcomes: a survey of research. ACM Computing Surveys, 43(4), 24.

McKnight, D., Choudhury, V., & Kacmar, C. (2002). Developing and validating trust measures for ecommerce. Information Systems Research, 13(3), 334–359.

Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. Organizational Science, 5(1), 14–37.

Nonaka, I., & Takeuchi, H. (1995). The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation. New York: Oxford University Press.

Nonaka, I., & Konno, N. (1998). The concept of "ba": Building a foundation for knowledge creation. California Management Review, 40(3), 40-54.

Owens, D., Mitchell, A., Khazanchi, D., & Zigurs, I. (2011). An Empirical investigation of virtual world projects and metaverse technology capabilities. Database for Advances in Information Systems, 42(1), 74-101,7.

Park, Y. J. (2013). Digital literacy and privacy behavior online. Communication Research, 40(2), 215-236.

Patton, M. Q. (1987). How to use qualitative data analysis: As expanded sourcebook (2nd ed.). London: Sage.

Peijun, H. (2002). Information sharing effects and problems. Systems engineering-theory and Practice, 6, 105-107.

Ping, W., Weijun, Z., & Fang, L. (2009). Collaborative ordering of enterprises with differentiated products under the protection of sensitive information. Paper presented at the E-Business and Information System Security, Wuhan, China.

Powell, A., Piccoli, G., & Ives, B. (2004). Virtual teams: A review of current literature and

directions for future research. The DataBase for Advances in Information Systems, 35(1), 6-36.

Ramim, M. M., & Lichvar, B. T. (2013). Effective collaboration and knowledge sharing in short vs. long term SD
Projects. Online Journal of Applied Knowledge Management, 1(1), 133-147.

Ribes, D., & Finholt, T. A. (2007). Tensions across the scales: planning infrastructure for the long-term. Paper presented at the Proceedings of the 2007 international ACM conference on Supporting teamwork, New York, NY.

Romano, N. C.., Chen, F., & Nunamaker, J. F. (2002). Collaborative project management software. Paper presented at the 35th Hawaii International Conference on System Sciences, Hawaii.

Rosen, C. (2005). The Influence of Intra Team relationships on the systems Development Process: A theoretical Framework of Intra-Group Dynamics. Paper presented at the 17th Workshop of the Psychology of Programming Interest Group, Sussex University.

Rousseau, D. M., Sitkin, S. B., Burt, R. S., & Camerer, C. (1998). Not so different after all: A cross- discipline view of trust. Academy of Management Review, 23(3), 393–404.

Shrivastava, P. (1983). A typology of organizational learning systems. Journal of Management Studies, 20(1), 7–28.

Sirieix, L. D., Marion; Remaud, Hervé; Zepeda, Lydia; Gurviez, Patricia. (2013). Consumers' perceptions of individual and combined sustainable food labels: a UK pilot investigation. International Journal of Consumer Studies, 37(2), 143-151.

Solove, D. (2007). The future of reputation: Gossip, rumor, and privacy on the Internet. New Haven, CT: Yale University Press.

Straub, D., Boudreau, M., & Gefen, D. (2004). Validation guidelines for IS positivist research. Communications of the Association for Information Systems, 13, 380–427.

Tyler, T., & Kramer, R. (1996). Whither trust? In R. Kramer & T. Tyler (Eds.), Trust in organizations (pp. 1–16). Thousand Oaks, CA: Sage.

Vidotto, G., Vicentini, M., Argentero, P., & Bromiley, P. (2008). Assessment of organizational trust: Italian adaptation and factorial validity of the organizational trust inventory. Social Indicators Research, 88(3), 563–575.

Wasko, M. M., & Faraj, S. (2005). Why Should I Share? Examining Social Capital and Knowledge Contribution in Electronic Networks of Practice. MIS Quarterly, 29(1), 35-57.

West, M. (2004). Effective teamwork: practical lessons from organizational research, (2nd ed). BPS Blackwell: Oxford.

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Appendix 1 Final Survey

Knowledge Sharing (KS)
KS1. I often participate in sharing knowledge with team members on system development projects
KS2. I usually spend a lot of time sharing knowledge on system development design architecture issues
KS3. When participating in system development discussions, I usually actively share my personal expertise with other team members
KS4. Sharing knowledge enables effective collaboration.
KS5. I actively share project related documents with other team members.
KS6. I am hesitant to share knowledge with people whom I have not met before on the team.
KS7. I am more comfortable sharing knowledge with team members whom I have already worked with before
KS8. I am more comfortable sharing knowledge with team members whom I trust.
KS9. Personal experiences are better shared during informal team gatherings/socialization.
Inter-Personal Trust (IP T)
IP T1: Face-to-face exchanges help to build trust.
IP T2: I share knowledge with team members whom I trust.
IP T3: I maintain strong ties with team members whom I trust.
IP T4: My project team members are trustworthy.
IP T5: I feel some of my team members wouldn't share knowledge usually with others due to trust.
IP T6: Trust is essential for effective collaboration.
IP T7: I usually trust the team when I ask them not to forward or share any of the organization's sensitive information.
Familiarity with the Information Sharing Policy (FwPP)
FwPP1: The Information Sharing Policy has received widespread publicity in my team.
FwPP2: I am aware of the intent of my organization's Information Sharing Policy.
FwPP3: I consider myself knowledgeable of the Information Sharing Policy's concern.
FwPP4: Everyone in the team is usually aware of who is responsible for the enforcement of the Information Sharing Policy.
FwPP5: I am very familiar with the Information Sharing Policy.

FwPP6: Familiarity with Information Sharing Policy enables effective collaboration.
FwPP7: Familiarity with Information Sharing policy enables knowledge sharing
Effective Collaboration (EC)
EC 1: Clear predefined team purpose and goal contribute to team effective collaboration
EC 2: The quality of interactions within my team will result in effective collaboration
EC 3: My contribution during team interactions will result in effective collaboration
EC 4: Trusting my team members will lead to effective collaboration.
EC 5: The complexity of the system development project requires more effective collaboration.
EC 6: Increase in team system development project interactions contributes to higher level of effective collaboration.
EC 7: Good cooperation among team members can lead to effective collaboration
EC 8: Good Interpersonal relationship among team members leads to effective collaboration.