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Digital Cross-Organizational Collaboration: Towards a Preliminary Framework

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ABSTRACT

Digital collaboration in cross-organizational settings is an emerging subfield of information systems research. This paper proposes a framework which describes digital collaboration as a continuous process influenced by a number of factors. The framework is derived from a systematic literature review of 80 research papers, published from 2000 to 2007, in six leading journals. The proposed framework may help to explain various aspects of digital cross-organizational collaboration.

Keywords

Collaboration, Integration, Literature Review.

INTRODUCTION

Information systems (IS) have considerably contributed to various kinds of collaboration. Many different types IS have largely facilitated boundary-spanning forms of collaboration and thus enabled numerous changes in cross-organizational processes. Particularly if digital collaboration, also called e-collaboration (Kock 2005), takes place across the boundaries of organizations and countries it can be challenging for the involved partners.

Given the large number of publications focusing on digital collaboration, it could be expected that a common understanding of this concept exists. However, in IS literature there is a large heterogeneity of approaches which varies not only by the kind of collaboration involved, but also by their methodologies, implications, and contribution goals. Moreover, extant studies on collaboration apply numerous different theoretical foundations (Pick, Romano Jr. and Roztocki 2009), which results in a colorful, yet confusing picture of findings about collaboration in practice. The consequences of this situation are twofold. The positive outcome is that various lenses are available which allows applying different views on a complex issue like collaboration. The critical consequence is that there is no common and systematic understanding of collaboration, which may lead (a) to inconsistencies of findings, (b) a highly fragmented knowledge without a “big picture”, (c) a lack of comparability of study results, and (d) incompleteness of knowledge in the field.

Although a high number of publications on various aspects of digital collaboration in cross-organizational settings confirm the importance of the topic, the research is highly fragmented. This fragmentation of research is clearly demonstrated in a systematic literature review conducted by Madlberger and Roztocki (2008). This literature study of 52 papers in four major IS journals identifies a large dispersion of investigation topics and a substantial number of underlying theories, while pointing to numerous research gaps. For example, only a small number of work in IS research appears to focus on digital cross-organizational collaboration in cross-border settings. Though the literature review by Madlberger and Roztocki (2008) clearly contributed to the body of knowledge no framework or theory explaining digital collaboration was proposed. Thus, in this paper, building on the work by Madlberger and Roztocki (2008), we propose a preliminary framework on digital collaboration in cross-organizational settings. This framework is derived from a systematic review of an extended sample of 80 papers in six leading IS journals.

The remainder of the paper is organized as follows. After reviewing the concept of digital collaboration, we outline the research methodology. Subsequently, based on the results of our literature review, we propose a framework on digital collaboration in a cross-organizational context. We conclude our paper with clarifying our contributions and pointing out promising research avenues.

DIGITAL COLLABORATION

To construct a framework of digital cross-organizational collaboration (COC) settings it is necessary to provide a general understanding of the concept. Basically, the digital COC in our work is described as “the integration of people, information systems, processes, and infrastructure across organizations, borders, nations, and world regions to enable productive teamwork and mutual goal attainment” (Romano Jr., Pick and Roztocki 2007). The term “digital” highlights the integrative role of information systems that serve as a technical basis for the collaboration. While COC in general could be performed without any IS support, digital COC relies on the extensive use of inter-organizational systems that significantly support or even enable this collaboration. An organization is understood as “a social arrangement for achieving controlled performance in pursuit of collective goals” (Buchanan and Huczynski 2004), p.5) or, in other words, “a social entity that has a purpose, has a boundary, so that some participants are considered inside while others are considered outside, and patterns the activities of participants into a recognizable structure” (Butler 1991), p. 1). A special case of digital COC is, when the organizations are located in different countries or economies, as depicted in Figure 1.

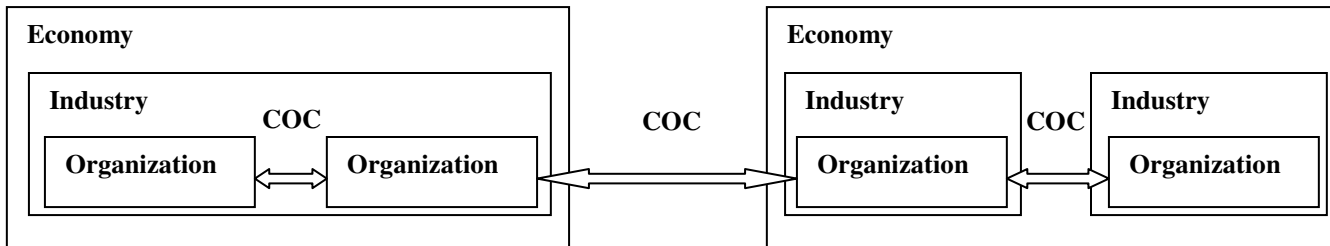


Figure 1. Digital Cross-Organizational Collaboration (COC)

RESEARCH METHODOLOGY

Our construction of the framework was conducted in three major steps. First, we identified a set of papers which could be assumed to be representative to the topic digital COC. In step two, we conducted a full text review and analysis of papers in our sample. Following the procedure from our earlier work (Madlberger and Roztocki 2008), to select a paper for the sample we used three questions prior to reading all papers: Does the paper examine the integration of people or information systems across various organizations to enable mutually beneficial teamwork or the execution of transactions? Does the paper examine the integration of people or information systems across various countries to enable mutually beneficial teamwork or the execution of transactions? Is the integration described in the paper achieved by a substantial involvement of information technology? To be included in the sample either the first or the second question or both had to be answered with “yes” while the third question always needed to be answered with “yes”. Therefore we included not only the technological aspect by relating to various kinds of inter-organizational systems, but also on the business-related collaboration that is based upon the use of these systems. Finally, in step four we constructed a framework that is derived from the analysis.

To construct a framework, we focused our analysis on papers published from 2000 until 2007 in six IS journals which are a part of the so-called Association for Information Systems (AIS) Senior Scholars' Basket of Journals. The journals included in this basket are European Journal of Information Systems (EJIS), Information Systems Journal (ISJ), Information Systems Research (ISR), Journal of AIS (JAIS), Journal of MIS (JMIS), and MIS Quarterly (MISQ) (for more information about this basket of journals: <http://home.aisnet.org/displaycommon.cfm?an=1&subarticlenbr=346>).

The analysis started by examining the distribution of the articles by journal and publication year (Ngai 2003; Paulissen, Milis, Brengman, Fjermestad and Romano Jr. 2007). After that, we applied various literature review techniques which included the categorization of papers by the topics of investigation, data source, and theories used (Jiang, Frazier and Heiser 2007; Webster and Watson 2002). This analysis guided us towards establishing the proposed framework (Gunasekaran, Ngai and McGaughey 2006; Zhao, Xia and Shaw 2005). In this approach, a framework is developed based on the synthesis of major concerns, insights and conclusions.

RESULTS

Sample Characteristics

Our analysis of a total of 1,180 papers resulted in a final sample consisting of 80 papers. The counts and percentages per journal and year are depicted in Table 1. A detailed list of the papers in the sample is available in (Madlberger and Roztocki 2009).

| Journal | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | Total |
|---------|----------|---------|----------|----------|----------|----------|----------|----------|----------|
| EJIS | 4 20% | 0 0% | 0 0% | 1 5% | 0 0% | 3 10% | 2 4% | 3 5% | 13 6% |
| ISJ | 2 13% | 1 7% | 0 0% | 2 12% | 3 18% | 1 6% | 0 0% | 1 5% | 10 7% |
| ISR | 2 9% | 2 9% | 3 11% | 1 6% | 1 5% | 1 5% | 0 0% | 5 23% | 15 9% |
| JAIS | 1 10% | 0 0% | 3 43% | 0 0% | 1 6% | 1 7% | 0 0% | 3 8% | 9 6% |
| JMIS | 1 3% | 0 0% | 1 3% | 0 0% | 5 14% | 4 10% | 4 9% | 1 2% | 16 5% |
| MISQ | 1 5% | 1 6% | 2 13% | 1 5% | 4 18% | 2 8% | 4 11% | 2 6% | 17 9% |

Table 1. Absolute and Relative Paper Distribution

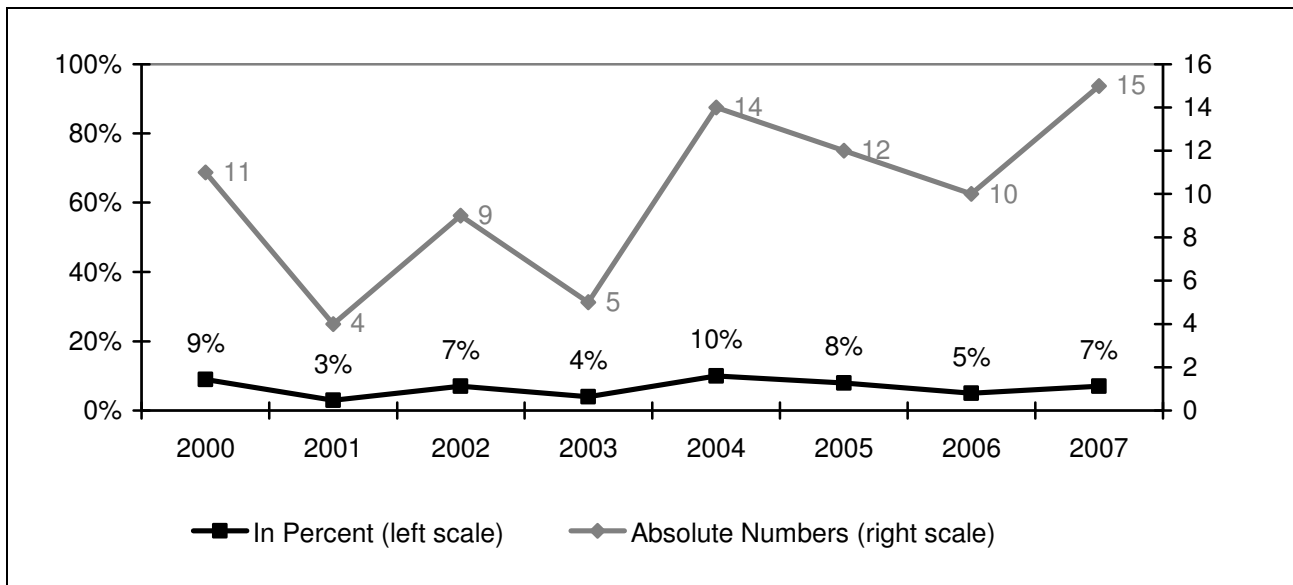


Figure 2. Absolute and Relative Paper Distribution for the Sample

Although the total number of papers appears to increase, across all six journals a substantial variation over time can be seen.

Topics of Investigation

Next, we categorized the papers in our sample by looking at the major topics of investigation. For this purpose, we differentiated between partner characteristics issues, task characteristics issues, business process characteristics issue and technology characteristics issues. The results of our categorization are depicted in Table 2.

| Issue | Topic of investigation | EJIS | ISJ | ISR | JAIS | JMIS | MISQ | Total |
|--|---|---------------|------------------|----------------|----------|------------|------------|-----------|
| Partner Characteristics Issues | | | | | | | | 6 |
| Industry | EJIS: (Johnston and Gregor 2000) | X | | | | | | 1 |
| Size | EJIS: (Poon 2000). JMIS: (Son, Narasimhan and Riggins 2005) | X | | | | X | | 2 |
| Management style | ISJ: (Venters and Wood 2007). ISR: (Schultze and Orlikowski 2004). JMIS: (Han, Kauffman and Nault 2004) | | X | X | | X | | 3 |
| Task Characteristics Issues | | | | | | | | 22 |
| | EJIS: (Cho and Mathiassen 2007); (Ljungberg 2000). ISJ: (Gallivan 2001); (Gallivan and Depledge 2003); (Heng and de Moor 2003); (Ibbott and O'Keefe 2004). ISR: (Chwelos, Benbasat and Dexter 2001); (Ghose, Mukhopadhyay and Rajan 2007); (Kauffman, McAndrews and Wang 2000); (Majchrzak, Malhotra and John 2005); (Palmer and Markus 2000); (Raghunathan and Yeh 2001). JAIS: (Datta 2007). JMIS: (Grover and Saeed 2007); (Otjacques, Hitzelberger and Feltz 2007); (Paul 2006). MISQ: (Christiaanse and Venkatraman 2002); (Hanseth, Jacucii, Grisot and Aanestad 2006); (Markus, Steinfield, Wigand and Minton 2006); (O'Leary and Cummings 2007); (Teo, Wei and Benbasat 2003); (Zhu, Kraemer, Gurbaxani and Xu 2006) | XX | X X X X | XX XX XX | X | XXX | XXX XXX | |
| Business Process Characteristics Issues | | | | | | | | 25 |
| | EJIS: (Erat, Desouza, Schäfer-Jugel and Kurzawa 2006); (Kotlarsky and Oshri 2005); (Levy, Loebbecke and Powell 2003); (Lin, Huang and Burn 2007); (Zhang and Faerman 2007). ISJ: (Tang, Yasa and Forrester 2004). ISR: (Bala and Venkatesh 2007); (Bharadwaj, Bharadwaj and Bendoly 2007); (Malhotra, Gosain and El Sawy 2007); (Saraf, Langdon and Gosain 2007). JAIS: (Greenaway and Chan 2005); (Narendra 2002); (Soffer and Wand 2007); (Wasko, Faraj and Teigland 2004). JMIS: (Chatfield and Yetton 2000); (Clemons and Hitt 2004); (Espinosa, Cummings, Wilson and Pearce 2003); (Patnayakuni, Rai and Seth 2006); (Wang, Tai and Wei 2006). MISQ: (Lin, Geng and Whinston 2005); (Malhotra, Gosain and El Sawy 2005); (Malhotra, Majchrzak, Carman and Lott 2001); (Paul and McDaniel Jr. 2004); (Rai, Patnayakuni and Seth 2006); (Tillquist, King and Woo 2002) | XX XX X | X | XX XX | XXX X | XXX XX | XXX XXX | |
| Technology Characteristics Issues | | | | | | | | 27 |
| | EJIS: (Damsgaard and Truex 2000); (Daniel and White 2005); (Holmqvist and Pessi 2006); | XX XX | X X | XX XX | XXX X | XXX XXX | XXX XX | |

| | | | | | | | | |
|---|---|---|--|--|--|--|--|--|
| (Puschmann and Alt 2005). ISJ: (Allen, Colligan, Finnie and Kern 2000); (Bunduchi 2005); (Buxmann, von Ahsen, Diaz and Wolf 2004); (Klecun-Dabrowska and Cornford 2000). ISR: (Basu and Kumar 2002); (Lyytinen and Yoo 2002); (van der Aalst and Kumar 2003); (Zhu and Kraemer 2002). JAIS: (Grover, Teng and Fiedler 2003); (Hueseemann 2002); (Khazanchi and Sutton 2001); (Kim, Fox and Sungupta 2007). JMIS: (Gosain, Malhotra and ElSawy 2004); (Kauffman and Mohtadi 2004); (Kim, Umanath and Kim 2005); (Straub, Rai and Klein 2004); (Wigand, Steinfield and Markus 2005); (Zhang and Faerman 2007). MISQ: (Barua, Konana, Whinston and Yin 2004); (Majchrzak, Rice, Malhotra, King and Ba 2000); (Melville, Kraemer and Gurbaxani 2004); (Miscione 2007); (Subramani 2004) | X | X | | | | | | |
|---|---|---|--|--|--|--|--|--|

Table 2. Factors in Digital Cross-Organizational Collaboration

As can be seen in Table 2, there were only six papers in our sample that specifically dealt with partner characteristics issues. In contrast, much more papers focus on task characteristics (22), business process characteristics (25), and technology characteristics issues (27). Moreover, the papers focusing on these factors are fairly even distributed.

A closer look at the journals reveals that there are some considerable differences. While technology characteristics issues appear in a similar intensity in all investigated journals (ranging from four to six publications), the journals show a large variation in papers related to business process characteristics and task characteristics issues. Business process characteristics issues are most frequently dealt with in MISQ articles, but also in EJIS, JMIS, and, to a lower extent, also JAIS and ISR publications. In contrast, only one ISJ paper deals with business process characteristics issues. A similar structure is found for task characteristics issues. Here the highest density of articles in this category can again be found in MISQ, but also ISR. Also ISJ and JMIS published several task characteristics issues-related papers. In contrast, JAIS published only one article in this category. Concerning partner characteristics issues, the analysis revealed that MISQ and JAIS did not publish any articles in this area, on the other hand, JMIS and EJIS published two articles each.

Following, we classified papers according to their focus on specific aspects of collaboration, i.e., motivation of collaboration, the collaboration process, and outcomes of collaboration. The results of our classification are summarized in Table 3.

| Issue in COC | Topic of investigation | EJIS | ISJ | ISR | JAIS | JMIS | MISQ | Total |
|--------------|--|------|-------------|-----|------|------|------|-------|
| Motivation | EJIS: Adoption of IOS by industries (Johnston and Gregor 2000); Knowledge sharing under co-opetition (Levy et al. 2003). ISJ: Trust and transaction costs in interfirm relationships (Bunduchi 2005); Trust and control in virtual organizations (Gallivan 2001); Trust in interfirm partnerships (Gallivan and Depledge 2003). ISR: Antecedents of EDI adoption (Chwelos et al. 2001); Network externalities and network adoption (Kauffman et al. 2000). JAIS: Antecedents of information privacy behaviors (Greenaway and Chan 2005); IT in cooperative behavior (Grover et al. 2003); Knowledge contribution in electronic networks of practice (Wasko et al. 2004). JMIS: Antecedents of IOS integration (Grover and Saeed 2007); Incentive for e-procurement systems (Kauffman and Mohtadi 2004); Antecedents of information sharing (Patnayakuni et al. 2006). MISQ: Adoption of IOS (Teo et al. 2003); Adoption of open-standard IOS (Zhu, Kraemer, Gurbaxani and Xu 2006) | XX | X X X | XX | XXX | XXX | XX | 15 |
| Process | EJIS: Design of EDI standards (Damsgaard and Truex | XX | X | XX | XXX | X | XX | 17 |

| | | | | | | | | |
|------------------------|---|----------|-------------|----------------|-----|------------|-----------------|----|
| | 2000); Integration architecture for process portals (Puschmann and Alt 2005); Distributed leadership and knowledge management (Zhang and Faerman 2007). ISJ: Conceptual model of IOS (Allen et al. 2000); IS in telemedicine (Klecun-Dabrowska and Cornford 2000). ISR: Workflow management systems (Basu and Kumar 2002); Internet referral services in supply chains (Ghose et al. 2007); XML schema for interorganizational workflows (van der Aalst and Kumar 2003). JAIS: Knowledge management model (Datta 2007); XML schema for information exchange (Huesemann 2002); Assurance services in e-commerce b2b (Khazanchi and Sutton 2001); IS model using ontologies (Kim et al. 2007); Distributed IS allowing agents to collaborate (Narendra 2002); Multiple processes in supply chain management (Soffer and Wand 2007). JMIS: Poaching in interorganizational information sharing (Clemons and Hitt 2004). MISQ: Inter-organizational virtual teams (Majchrzak et al. 2000); Communication between partners (Tillquist et al. 2002) | X | X | X | XXX | | | |
| Outcomes | EJIS: Knowledge exchange through communities (Erat et al. 2006); Supply chain agility (Holmqvist and Pessi 2006); E-commerce benefits (Lin et al. 2007); Internet commerce benefits for SME (Poon 2000). ISR: Process standards (Bala and Venkatesh 2007); IS-based integration for coordination (Bharadwaj et al. 2007); Quick response and strategic alignment (Palmer and Markus 2000); Value of CRP and information sharing (Raghunathan and Yeh 2001); Impact of IS application capabilities on performance (Saraf et al. 2007); Measurement of e-commerce capabilities (Zhu and Kraemer 2002). JMIS: Impact of embeddedness on strategic payoff of EDI (Chatfield and Yetton 2000); Fit between IT and business context (Kim et al. 2005); ICT-based collaboration in telemedicine (Paul 2006); Performance measurement of networks (Straub 2006); Vertical IS standards (Wigand et al. 2005). MISQ: Effect of digitalization on business value (Barua et al. 2004); Effects of electronic channels (Christiaanse and Venkatraman 2002); Communication between Partners (Lin et al. 2005); IT resources impacting firm performance (Melville et al. 2004); Geographically dispersed teams (O'Leary and Cummings 2007); Trust in virtual collaboration (Paul and McDaniel Jr. 2004); IT in supply chain (Subramani 2004) | XX XX | | XX XX XX | | XXX XX | XXX XXX X | 22 |
| Motivation and Process | EJIS: Analysis of telehealth IS (Cho and Mathiassen 2007); Future forms of organization (Ljungberg 2000). MISQ: Telemedicine System/Communication between Partners (Miscione 2007) | XX | | | | | X | 3 |
| Process and Outcomes | EJIS: Future development of IOS application (Daniel and White 2005); Social ties and knowledge sharing (Kotlarsky and Oshri 2005). ISJ: Collaborative authoring (Heng and de Moor 2003); Trust and | XX | X X X | XX X | | XXX XXX | XXX | 17 |

| | | | | | | | | |
|-------------------------------------|---|--|--------|---|--|---|----|---|
| | planning in global IOS (Ibbott and O'Keefe 2004); Business process analysis (Tang et al. 2004). ISR: IS-based collaboration know-how (Majchrzak et al. 2005); Standard electronic business interfaces (Malhotra et al. 2007); IOS use on interpersonal level (Schultze and Orlikowski 2004). JMIS: Boundaries in teamworks (Espinosa et al. 2003); Flexibility loss by collaborating in supply chains, (Gosain et al. 2004); IOS ownership impacting information exploitation (Han et al. 2004); Information sharing in government (Otjacques et al. 2007); Manufacturing flexibility (Wang et al. 2006); Diffusion of e-business standards (Zhao, Xia and Shaw 2007). MISQ: Supply chain collaboration (Malhotra et al. 2005), Virtual Teams (Malhotra et al. 2001); Supply Chain Management (Rai et al. 2006) | | | | | | | |
| Outcomes and Motivation | ISJ: Supply chain management software use (Buxmann et al. 2004); Degenerative structures in knowledge management (Venters and Wood 2007). JMIS: Impact factors on IOS use (Son et al. 2005). MISQ: Electronic patient record system (Hanseth et al. 2006); Vertical IS standards (Markus et al. 2006) | | X X | | | X | XX | 5 |
| Motivation and Process and Outcomes | ISR: Application of nomadic IS (Lyytinen, Baskerville, Iivari and Te'eni 2007) | | | X | | | | 1 |

Table 3. Issues in Digital Cross-Organizational Collaboration

As can be seen in Table 3, the majority of the papers focus on a very narrow aspect of digital COC. Only one of 80 papers specifically focuses on all three aspects. Most of the investigated papers focus on outcomes (22). A relatively large number of papers examine the relationship between the process of digital collaboration and the outcomes (17) as well as process alone (17). In contrast, the motivation to enter into digital collaboration with partners from different organizations is primarily examined in separation and without clear link to the process and outcomes. Fifteen papers fall into this category, whereas only three papers deal with issues of motivation and process and five papers deal with outcomes and motivation. Therefore it can be concluded that there might be two different research streams. The first stream focuses on the interrelations between process and outcomes, and the second on motivation.

An analysis by journals shows that motivation is most equally distributed among the journals (between two and three articles in each of the investigated journals). Process-related articles appear similarly frequently as motivation-related articles, with the exception of JAIS that published more than twice the number of articles in this area. Even more heterogeneity between the journals can be observed in the context of outcomes-related papers. Here we identify journals with a large number of articles (MISQ: seven articles, ISR: six, JMIS: five, EJIS: four) while the other two journals (JAIS and ISJ) did not publish any articles in this field. The heterogeneity even increases in the context of papers with a wider focus. The frequently appearing category focus on process and outcomes shows the largest publication density in JMIS (six articles), no publications in JAIS, and two or three publications in each of the other journals. The other categories show one or two publications in a few of the investigated journals.

PROPOSED FRAMEWORK

Our systematic review of 80 papers suggests that digital COC can be seen as a dynamic and continuous process. Several authors have proposed a dynamic viewpoint on the development and application of information systems and related processes. A prominent example is the approach by (Silver, Markus and Beath 1995) who elaborated an information technology interaction model. Parts of this model are the external environment that influences a continuous loop of IS development, implementation, and use. Our findings reflect a similar structure, however we seek to achieve a more detailed framework that specifically addresses the particularities of digital COC that might differ from IS application in general.

The literature review has revealed that the highly complex activity of digital COC is influenced by external environment, such as economic conditions, competitive pressures, and globalization. It is also affected by a number of other factors which are classified as task characteristics, business process characteristics, technology characteristics, and partner characteristics as depicted in Table 2. All these characteristics are made up of the context of the COC (task, business process, and partner) as well as the involved information systems (technology characteristics). Each of these characteristics may influence and also may be influenced by the other characteristics. In other words, there seems to be a strong interplay between task characteristics, business process characteristics, partner characteristics, and technology characteristics. Furthermore, the analysis of papers in Table 3 suggests that the process of digital COC also follows a continuous loop. In this closed loop, the process of digital COC begins with motivation to collaborate, frequently affected by a number of the influential factors as described above. The process of digital COC is also influenced by the external environment. The motivation step in the COC loop is followed by the process of digital collaboration, which is again affected by the same influential factors. The process of digital collaboration results in specific outcomes. These outcomes are once more affected by the same influential factors. These outcomes influence continuity of motivation for digital COC. In this way, the loop continues as depicted in Figure 3.

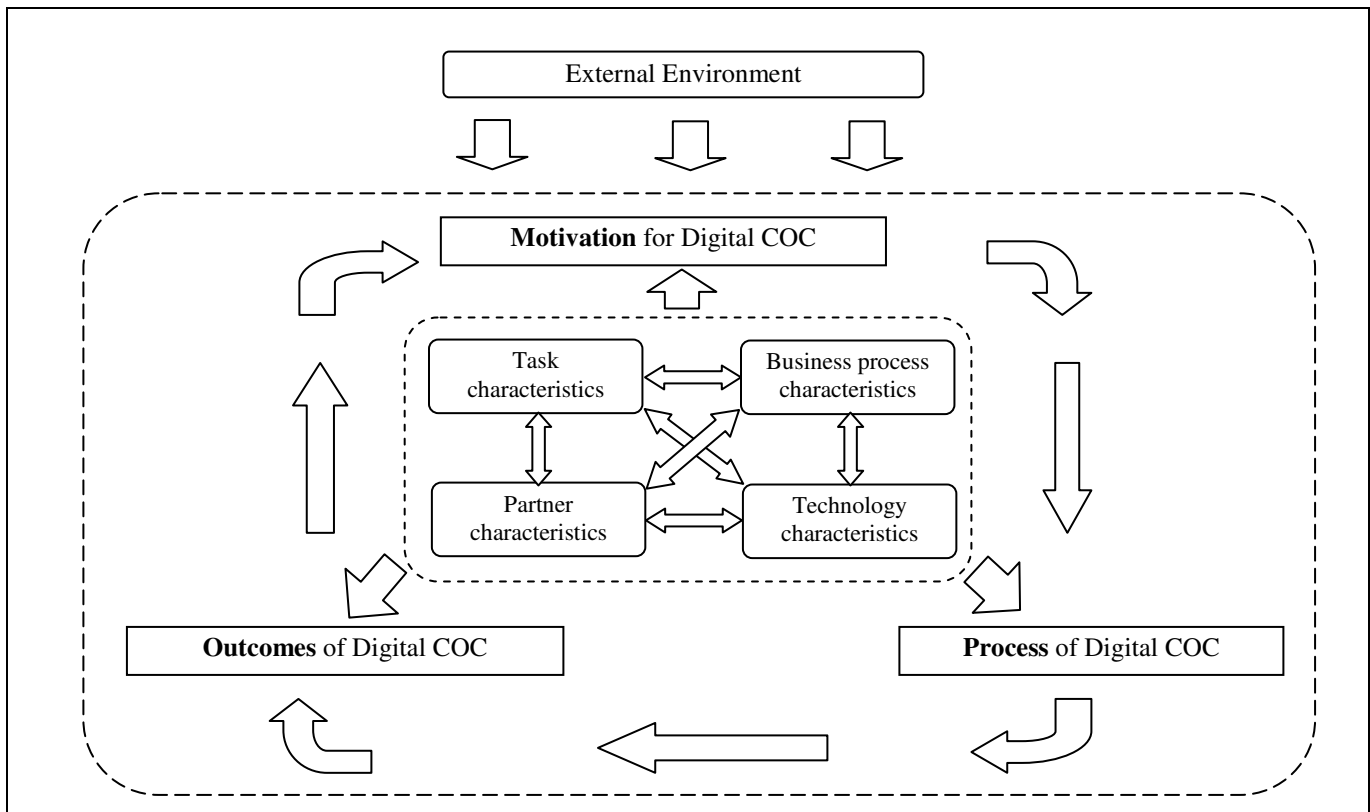


Figure 3. Process Theory of Digital Cross-Organizational Collaboration (COC)

To achieve a maximum generalizability combined with a detailed view on relevant elements of digital COC we have abstracted from individual constellations in cross-organizational relationships. In IS literature, concepts of trust, power, leadership, nature of relationship etc. have been extensively discussed and were also part of many papers that were analyzed in the literature review. These constructs are inherent in the framework, and can be explained well using the chart in Figure 3. For example, the trust building process in the context of digital collaboration could also be seen as a continuous process which starts with initial motivation to achieve a specific task. The initial trust level is frequently determined by perceived partner characteristics, such as culture, language, and socio-economic status, but also other characteristics in our framework. The initial trust level may then change with the progress of the collaboration process and potential differences in expected and achieved outcomes. This may then lead to changes in motivation. Also power is a very valid indicator for partner characteristics. Similarly, also dimensions of collaboration such as conflicts or work environment are elements that make up the task and business process characteristics. Thus, many relevant issues in inter-organizational systems use can be explained by task characteristics, business process characteristics, and particularly partner characteristics.

DISCUSSION

As shown in the results section, the majority of the investigated papers focus on a very narrow part of collaboration and usually only one of the four major factors (e.g. the impact of technology characteristics on outcomes of digital collaboration processes). In contrast, our framework suggests a more comprehensive picture. This is of particular relevance as the closed loop suggests possible interrelations between the issues which might remain uncovered if only single aspects are analyzed. Furthermore, the recurring cycle of the phases in collaboration is often not addressed sufficiently. For example, we could not identify articles in the sample that address the impact of outcomes of digital COC on motivation (however there are articles that address the opposite impact).

The framework seeks to capture digital COC as a dynamic, not a static concept. In doing so it allows analyzing digital COC over longer periods of time which adds an additional dimension to the nature of collaboration. In literature, there are several approaches to describe and explain lifecycles in interfirm relationships (Jap and Anderson 2007); (Hsieh, Chiu and Hsu 2008). Thus also a lifecycle point of view on digital COC can contribute to additional useful insights into the dynamics of collaboration. Furthermore, the technological progress implies certain changes over time and thus enforces a dynamic, ever-changing nature of digital COC.

Most important, the proposed framework is useful to understand all types of digital collaboration. It is abstract enough to apply it for various kinds of collaboration, for example in supply chain optimization, knowledge management, virtual organizations and many more. Moreover, the framework could be applied for different units of analysis: individual, team, organization or group of organizations.

LIMITATIONS AND FUTURE RESEARCH

Our study is subject to two major limitations. First, the proposed framework is constructed from analysis of papers published in only six IS journals. Second, all the papers were published from year 2000. Unquestionably, a greater number of journals and a longer time period would benefit our work and provide a more complete picture. Thus, we plan to validate our framework by including additional journals (possibly also not IS journals) and examining papers published before 2000.

Additionally, the proposed framework seeks to show relevant interrelations in digital COC on a high and abstract level. In doing so we do not include concepts that significantly impact digital COC, such as power or trust. The framework could, however, be extended to such a more concrete view that would allow firms to analyze more deeply their individual situations. Another dimension that is not covered by the framework, but deserves further extension is the way and intensity of how information is exchanged across the organizations. The framework of a collaboration lifecycle could be extended by a lifecycle of information exchange, starting from information sharing (e.g., the mutual exchange of business data), including knowledge sharing, and ending up with cross-organizational knowledge creation.

CONTRIBUTION AND CONCLUSION

Despite the limitations, we believe that our framework represents a valuable contribution to the subfield of digital cross-organizational collaboration. First, our framework is perhaps the first general model able to describe and explain a complex process of digital COC and may help assist other researchers interested in the topic with their own research. Second, our systematic review of 80 papers reveals research gaps, which represents research opportunities. These research gaps are particularly related to a more holistic understanding of the dynamics in digital COC as well as the manifold interrelations that impact the various stages of collaboration. Third, the framework can support the development of a more comprising theory of how digital COC evolves and develops over time. Together with an analysis of relevant theories it can contribute to better structure research on digital COC. Finally, by addressing the dynamic perspective of digital COC and thus the lifecycle concept, the framework can also help to improve the practical relevance of this research field. Last but not least it might help practitioners to systematically analyze their digital COC engagements and manage and revise them according to the respective stages. To conclude, we hope that other researchers will embrace our model to advance the field of IS research.

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