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CROSS-ORGANIZATIONAL AND CROSS-BORDER IS/IT COLLABORATION: A LITERATURE REVIEW

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ABSTRACT

The topic of collaboration in cross-organizational and cross-border settings is an emerging subfield of information systems research. This paper presents a comprehensive literature review of 52 research papers, published from 2000 to 2007, in four leading journals. The focus of the analysis are topics of investigation, sources of data, and the underlying theories. The results indicate that most of the research still focuses on a limited number of technical issues related to inter-organizational systems adoption. The identified research gaps which represent promising research opportunities are discussed.

Keywords

Keywords: Collaboration, Integration, Literature Review.

INTRODUCTION

The objective of this paper is to present results of a literature analysis related to technology collaboration in cross-organizational (CO) and cross-border (CB) settings. Essentially, the topic of our study is defined 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). We differentiate between cross-organizational collaboration (COC) and cross-border collaboration (CBC). The integration of people, information systems, processes and infrastructures achieved among different organizations is defined as COC. Subsequently, CBC is a special case of COC, when the organizations are located in different countries or economies, as depicted in Figure 1.

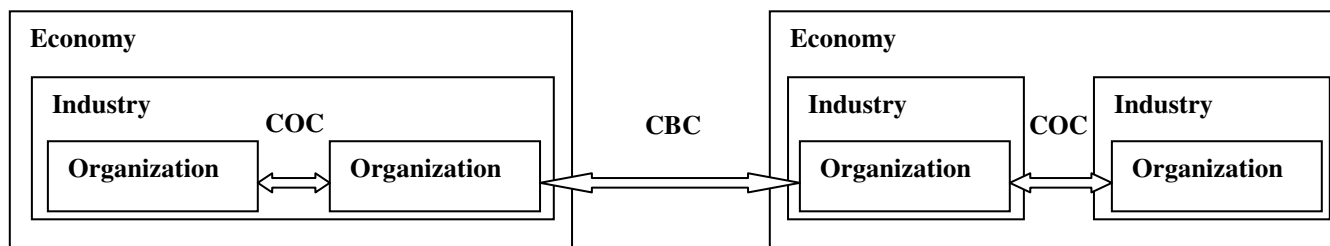


Figure 1. Cross-Organizational Collaboration (COC) and Cross-Border Collaboration (CBC)

Although the topic of technology collaboration in CO and CB settings is gaining academic attention in the field of Information Systems (IS) research which is evident in a high number of publications, according to our knowledge a systematic literature review on this subject does not exist. However, a review of existing literature is a very important step in many research projects (Webster and Watson 2002). A literature review may help other authors to advance their own research by providing a solid theoretical foundation. This lack of systematic review provides motivation for our literature study presented in this paper.

The remainder of our paper is structured as follows. After discussing the methodology, we present our results which are divided into results on research topics, sources of data, and theories used. Then, based on our results, we discuss some important implications of this study and point to several gaps that may constitute promising research opportunities. We conclude our paper with summarizing our contributions.

METHODOLOGY

Our literature review was conducted in three major steps. First, we identified a set of journals which could be assumed to be most influential in the field of IS research. Then, in step two, we conducted a full text review for suitable articles, which focus on collaboration in the inter-organizational environment and/or cross-border settings, or both. In step three, we conducted an extensive analysis of the articles in our sample.

We decided to start our review with the most influential journals in the field of IS. Most ranking studies continuously recognize *Information Systems Research (ISR)* and *MIS Quarterly (MISQ)* as top IS journals (Peffer and Ya 2003). In addition to these two journals which enjoy the highest reputation among IS researchers, we included the *European Journal of Information Systems (EJIS)* and the *Journal of Management Information Systems (JMIS)* in our list. As our research progresses, we plan to include further publication outlets. In order to account for most recent publications in the field, we decided to include articles published from 2000 to 2007.

Similar to other literature review studies, we started our analysis by examining the distribution of the articles by journal and publication year (Ngai 2003; Paulissen et al. 2007). Then, we applied three dimensions of investigation which included the topics of investigation, data source, and theories used; all dimensions were gleaned from earlier studies (Jiang, Frazier and Heiser 2007; Webster and Watson 2002) and modified for the purpose of our review.

RESULTS

Sample Characteristics

Our literature search resulted in 52 papers; all the papers in our sample focus on COC. However, only six papers explicitly investigated CBC. The counts and percentages of COC and CBC-related papers per journal and year are depicted in Table 1.

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%)	0 (0%)	10 (5.2%)
ISR	2 (8.0%)	2 (8.7%)	3 (11.1%)	1 (5.9%)	1 (5.0%)	1 (4.8%)	0 (0%)	0 (0%)	10 (6.2%)
JMIS	1 (2.9%)	0 (0%)	0 (0%)	1 (2.9%)	4 (11.1%)	3 (7.3%)	4 (9.3%)	3 (14.3%)	16 (5.8%)
MISQ	1 (4.2%)	1 (5.9%)	2 (11.1%)	1 (4.7%)	4 (16.0%)	2 (7.1%)	4 (9.3%)	1 (5.9%)	16 (8.3%)
Total	8	3	5	4	9	9	10	4	52

Table 1. Absolute and Relative Paper Distribution by Journal and Year

Over the investigation period, the total number of articles included in all four journals seemed to increase. Within the particular journals a substantial variation over time can be observed. A view on the individual journal publications reveals that MISQ shows the largest continuity in terms of COC. In each publication year, there was at least one article that deals with COC. MISQ also showed a relatively high share of recent COC articles (2006-2007). In the investigation period JMIS also showed a relatively high number of COC-related publications, particularly in the recent years. Fourteen out of sixteen COC articles in JMIS appeared in 2004 or later. Thus JMIS showed the largest growth of COC-related articles among the surveyed journals. Another issue of interest was the comparably high share of CBC-related articles which also have been published rather recently (between 2003 and 2007).

Topics of Investigation

We continued our analysis by looking at the major topics of investigation. For this purpose, we differentiated between partner characteristics issues, non-technical relationship issues and technical issues. The results of our analysis are summarized in Tables 2, 3 and 4.

Issue	Topic of investigation	EJIS	ISR	JMIS	MISQ
Industry	None				
Size	Impact of firm size on benefits obtained by Internet commerce (Poon 2000)	X			
Management style	Impact of self-service technology on embedded relationship (Schultze and Orlikowski 2004)		X		

Table 2. Partner Characteristics Issues

There were only two papers that dealt with partner characteristics issues. One was published in EJIS and investigated the impact of the firm size on COC issues. The other article appeared in ISR and referred to the management style in COC. There were no articles on the industry as a COC/CBC factor.

Issue	Topic of investigation	EJIS	ISR	JMIS	MISQ
Partner choice	Optimal number of retailers for a manufacturer (Raghunathan and Yeh 2001)		X		
Communication	Open source movement (Ljungberg 2000); Virtual team communication (Majchrzak, Malhotra and John 2005); Teams in global firms (Espinosa, Cummings, Wilson and Pearce 2003); Collaboration in virtual settings (Paul 2006)	X	X	XX	
Trust/Risk	Knowledge sharing between small businesses (Levy, Loebbecke and Powell 2003); Knowledge sharing in global teams (Kotlarsky and Oshri 2005); Knowledge sharing with customers (Erat, Desouza, Schäfer-Jugel and Kurzawa 2006); Inter-firm contracting (Clemons and Hitt 2004); Information exploitation (Han, Kauffman and Nault 2004); Information sharing across the supply chain (Patnayakuni, Rai and Seth 2006); Identification in data sharing (Otjacques, Hitzelberger and Feltz 2007); Interpersonal trust in virtual collaboration (Paul and McDaniel Jr. 2004); Knowledge transfer between parties with asymmetric and incomplete information (Lin, Geng and Whinston 2005); Knowledge sharing in supply chain partnership (Malhotra, Gosain and El Sawy 2005)	XXX		XXXX	XXX
Power	EDI usage in customer-supplier relationship (Son, Narasimhan and Riggins 2005)			X	
Management	Management of cross-organizational processes and data integration (Gosain, Malhotra and ElSawy 2005); Management of cross-organizational virtual teams (Malhotra, Majchrzak, Carman and Lott 2001); Modeling inter-organizational relationships (Tillquist, King and Woo 2002); Supply chain management (Rai, Patnayakuni and Seth 2006)			X	XXX
Conflict	None				
Performance Measurement/ Economics	Payoffs from EDI adoption (Chatfield and Yetton 2000); Measuring financial performance of networked organization (Straub, Rai and Klein 2004); Performance of a supply chain (Kim, Umanath and Kim 2006); Business value of IT supported manufacturing flexibility (Wang, Tai and Wei 2006)			XXXX	

Table 3. Non-Technical Relationship Issues

The sample contained 24 articles on non-technical relationship issues. The findings depicted in Table 3 indicate that almost half of these papers (ten articles) were related to trust. Furthermore, numerous articles investigated trust in the context of knowledge sharing. The second frequent categories were management and performance measurement – both with four

papers. All four papers focusing on performance measurement were published in JMIS. The communication issues were covered in two papers and partner choice was investigated by one article. Interestingly, there were no publications that deal with conflict in COC which is a key element in COC research.

Category/Sub-category	Topic of investigation	EJIS	ISR	JMIS	MISQ
Systems Integration Technologies					
Systems design	Integration architecture (Puschmann and Alt 2005);	X			
Systems adoption and implementation	None				
Systems integration	Application of XML for describing process schemas (van der Aalst and Kumar 2003)		X		
Performance measurement	None				
Inter-Organizational Systems (IOS)					
Systems design	Research suggestions on nomadic computing, i.e. highly mobile systems with large-scale services and infrastructure (Lyytinen and Yoo 2002)		X		
Systems adoption and implementation	IOS adoption (Johnston and Gregor 2000); Adoption of "Quick Response" (Palmer and Markus 2000); Adoption of automated teller machines (Kauffman, McAndrews and Wang 2000); EDI adoption (Chwelos, Benbasat and Dexter 2001); Vertical information systems standards (Markus, Steinfield, Wigand and Minton 2006; Wigand, Steinfield and Markus 2005); Procurement technology platform adoption (Kauffman and Mohtadi 2004); IOS implementation and digital integration (Christiaanse and Venkatraman 2002); Adoption of technology-based inter-organizational linkage (Teo, Wei and Benbasat 2003); Standardization project for electronic patient record system (Hanseth, Jacucii, Grisot and Aanestad 2006); Adoption of open-standard IOS (Zhu, Kraemer, Gurbaxani and Xu 2006)	X	XXX	XXX	XXXX X
Systems integration	EDI standards (Damsgaard and Truex 2000); Integration/IOS (Daniel and White 2005); Supply chain integration platform (Holmqvist and Pessi 2006); Workflow management (Basu and Kumar 2002); Factors affecting IOS integration (Grover and Saeed 2007); Internet, coordination between businesses and financial performance (Barua, Konana, Whinston and Yin 2004)	XXX	X	X	X
Performance measurement	Performance measures for e-commerce systems (Zhu and Kraemer 2002); IT business value in the competitive and macro environment (Melville, Kraemer and Gurbaxani 2004); Benefits obtained by use of IOS (Subramani 2004)		X		XX
Collaboration Tools					
Systems design	None				
Systems adoption and implementation	Introduction of a telemedicine system (Miscione 2007)				X
Systems integration	Collaboration technology and inter-organizational virtual teams (Majchrzak, Rice, Malhotra, King and Ba 2000)				X
Performance measurement	None				

Table 4. Technical Relationship Issues

In total, 26 articles focused on technical issues of COC. Within this group, the majority covered Inter-Organizational Systems (IOS), as Table 4 indicates. Twenty-two articles fell into this category, out of them eight articles were published in MISQ, six in ISR and four in both JMIS and EJIS. Some of the papers investigating IOS mainly focus on design, but also substantially span over adoption/implementation and performance (Lyytinen and Yoo 2002). Concerning the investigated stages of the IS lifecycle, we observed that most articles referred to the adoption of different IOS (twelve articles), followed by the systems integration issue (six articles).

Source of Data

In the next step of our analysis, we examined the papers in our sample for the main source of data (see Table 5). The most common data collection methods were case studies and field work (20) as well as surveys (15). Conceptual models and frameworks, without data collection, were proposed in six papers. Secondary data and multiple methods approach were used only in one paper. Other data collection methods, such as Delphi study and hazard modeling, were used in seven papers.

Data collection	EJIS	ISR	MISQ	JMIS	Total
Case study/Field work	5	1	9	5	20
Survey	1	3	4	7	15
Conceptual model/framework	1	3	2	2	8
Secondary data	0	1	0	0	1
Multiple methods	0	0	1	0	1
Other data collection methods	3	2	0	2	7
Total	10	10	16	16	52

Table 5. Source of Data

Theories Used

Finally, during the last step of our analysis we looked at the theories used. Several papers used multiple theories; in this case the dominating approach was selected. The results of our analysis are summarized in Table 6.

Theory	EJIS	ISR	MISQ	JMIS	Total
Absorptive Capacity			1		1
Actor-Network Theory			2		2
Asymmetric Information			1		1
Business Agility	1				1
Collective Action Theory			1	1	2
Communication Model		1			1
Coordination Theory				1	1
Control Theory	1				1
Critical Mass Theory		1			1
Game Theories				1	1
Institutional Theory			1		1
Network Effect Theory		1	1		2
Resource Based Theory		1	4		5
Resource Dependence Theory			1		1
Social Capital		1			1
Social Ties	1				1
Strategic Alignment		1			1
Structuration Theory			1		1
Technology-Organization-Environment Framework		1			1
Theory of Embeddedness				1	1
Theory of Emerging Grammars	1				1
Theory of Incomplete Contracts				1	1
Transaction Cost Theory			1	4	5
Multiple theories				3	3
Theory development	1	1	1	1	4
Not applicable	2	2			4
No explicit theoretical lens(es) mentioned	3		1	3	7
Total	10	10	16	16	52

Table 6. Applied Theoretical Approaches in the Sample

The results in Table 6 show that the theoretical basis of COC and CBC was very heterogenous. In 52 papers, we identified 23 underlying theories. Moreover, there were four papers that aim at developing new theories. In four publications theoretical foundations were not applicable (for example because a prototype was developed). Seven papers did not explicitly indicate a theoretical basis. In three papers authors integrated several theories without one dominant approach. The most frequently used theories in our sample are described below shortly.

The *Resource Based Theory (RBT)* was applied by five papers. RBT assumes that in order to survive and prosper a company must possess a set of resources that differentiate it from competitors (Barney 1991). In IS literature RBT is applied to explain

how IT as a resource can contribute to competitiveness (Wade and Hulland 2004). One paper in the sample examined the effect of Internet usage on more efficient use of firm resources (Barua et al. 2004). A different paper investigated the implementation of an IOS and its effects on digital integration (Christiaanse and Venkatraman 2002). One paper extended the traditional single organization RBT to an inter-organizational context and potential synergies (Melville et al. 2004). Furthermore, RBT was used to explain supply chain management issues (Rai et al. 2006) and to assess the contribution of e-commerce to firm performance (Zhu and Kraemer 2002).

Transaction Cost Theory (TCT) was also used by five papers in our sample. TCT seeks to explain governance mechanisms between organizations; it distinguishes between markets (loose governance structures, little coordination) and hierarchies (tight linkages, higher integration, large mutual dependencies). In the sample, one paper used TCT to examine risk related to information sharing (Clemons and Hitt 2004), the second to explain factors affecting implementation of E-procurement systems (Kauffman and Mohtadi 2004), the third to assess the value of vertical information systems standards (Wigand et al. 2005). The two other papers examined possible benefits from using supply chain management systems or other coordination tools (Patnayakuni et al. 2006; Subramani 2004).

Actor-Network Theory (ANT) explains complex systems as the alignment of social networks of human and nonhuman actors or other elements. In IS literature, ANT is frequently used to explain complicated interactions related to implementation and use of IT (Sarker, Sarker and Sidorova 2006). Two papers used ANT as an underplaying theory: one examined a standardization project for electronic patient record system (Hanseth et al. 2006) and the second described the implementation of a telemedicine system (Miscione 2007).

Collective Action Theory (CAT) is grounded in political science and economics and postulates that individuals tend to a free-riding behavior if the group it belongs to undertakes to provide public goods. Two papers used CAT to explain standardization initiatives: vertical information systems standards (Markus et al. 2006) and e-business standards (Zhao, Xia and Shaw 2007).

Network Effect Theory (NET) suggests that adopters of a particular network technology obtain benefits that are proportional to the size of the existing network. Simplified, the value of a given product increases with the growing number of users (Oren and Smith 1981; Rohlfs 1974). In IS literature, NET is often used to explain adoption and diffusion of a technology. Overall, NET was used in two articles on technology adoption: implementation of automated teller machines (Kauffman et al. 2000) and open-standard inter-organizational systems (Zhu et al. 2006).

Among these five mostly used theories in our sample, we can observe that four out of them (TCT, ANT, CAT, and NET) are related to the behaviors of several players that are involved in various kinds of relationships. Thus these theories examine the interplay of actions within a group of players. In contrast, RBT is related to one individual behavior (i.e. obtaining appropriate resources), which seems to be different from a cross-organizational behavior. However, if cross-organizational relationships, processes or knowledge are considered resources, RBT is able to explain why and how COC or CBC could contribute to benefits.

In addition to these five theories, we identified eighteen more theories in our sample. Among them we could observe that sixteen theories are related to relationships between several players, although the underlying backgrounds vary considerably. We could identify research streams from an economic background (e.g. Game Theory, Institutional Theory), a sociological viewpoint (e.g. Social Ties, Theory of Embeddedness), and approaches from disciplines other than information systems or business administration (e.g. the Theory of Emerging Grammars). The remaining two theories (Absorptive Capacity, Business Agility) are grounded in strategic management and explain how an organization could improve its performance.

DISCUSSION

Our literature review produced several interesting and important observations. First, only six out of 52 examined papers focus on CBC. This is very surprising, as in the current “flattered world” (Friedman 2005) CBC is meanwhile a corporate reality. One explanation of this scarcity of publications could be seen in the relatively high effort, which requires investigators to conduct their research in multiple countries. Second, case studies and field work are the most common data collection methods. In contrast, secondary data is used only once. It is quite possible that the extensive use of case studies indicates an early stage of the research. Third, the authors use a large number of underlying theories to explain COC and CBC. This large number of theories used and attempts to develop a new theory may indicate the complexity of the topic and limitations of existing theories. Fourth, the majority of applied theories are related to the behavior of individual players that are in a relationship with other players. The use of theories that are originally conceptualized for explaining behaviors or actions independent from cross-organizational relationships show that also these approaches are believed to be appropriate for COC

and CBC-related research. Finally, there is a high developmental dynamic of this research field, which varying intensity of the appearance of the journal papers indicates.

LIMITATIONS AND FUTURE RESEARCH

As all studies, our work is subject to limitations. First, the findings presented in this paper are derived from reviewing only four journals; a greater number of journals would unquestionably provide a more complete picture. Second, we examine only papers published from year 2000; a longer time period would also benefit our work. We plan to expand our review before the conference to address the limitations by including additional journals and examining more papers published before 2000.

CONTRIBUTION AND CONCLUSION

In spite of the limitations, we believe that our paper makes several valuable contributions to the field. First, our work is perhaps the first systematic literature review on COC and CBC research. Our list of 52 papers may assist researchers interested in the topic with their own literature search. Second, our review of the topics of investigation reveals several beneficial findings and points to some literature gaps, which clearly deserve more attention. Third, our description of data collection methods and underlying theories may help other authors in pursuing their own work. Finally, our observations derived from the literature review point to some specific, important issues and may also result in additional future research projects.

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