E-Collaboration Technologies and Organizational Performance:

Current and Future Trends

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This article has the objectives to discuss the background for the two special issues of International Journal of e-Collaboration on electronic collaboration in organizations, examine four theoretical frameworks with particular regard to their relevance to the content in the articles in the special issues, and summarize each of the nine articles in these issues. The articles in the special issues are diverse in conceptual theory, units of analysis, research methods, and levels of collaboration. Units of analysis span from the individual, virtual team, company to the dyadic relationship between firms. Electronic collaboration is studied in locales including Austria, Korea, the Netherlands, Switzerland, and the United States. The diversity extends knowledge within varied realms of the electronic collaboration field. This introductory article offers an overall framework for these two special issues to help readers and potential authors see how the studies relate to one another and to the overall body of knowledge.

Chapter 2
Internationalization of Online Professional Communities: An Empirical Investigation of AIS-ISWorld 13
Martin Yuecheng Yu, Baruch College, City University of New York, USA
Karl R. Lang, Baruch College, City University of New York, USA
Nanda Kumar, Baruch College, City University of New York, USA

We report on an empirical investigation of the internationalization of an online community of practice situated in academe and which fosters among its members communication and collaboration. Attracting additional active participants throughout the world is an important goal for many online professional communities. Based on theories and findings in the innovation diffusion and international business

literature, we propose that cultural distance has significant negative effects on the activity of an online community encompassing different countries, while economic conditions will moderate this negative impact. An empirical study based on the archival data from AIS-ISWorld, an online community of information systems academics, supports our central hypotheses.

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A Reference Model for E-Collaboration within the Dispersed Sales Force Training Process in Multinational Companies 30
Florian Heidecke, University of St. Gallen, Switzerland
Andrea Back, University of St. Gallen, Switzerland

Multinational pharmaceutical companies are facing the challenge of finding the right balance between local responsiveness and global integration. A cross-case study analysis of the sales force training process at the Swiss company Roche Pharmaceuticals identified four areas of collaboration, each of which comprises a certain number of collaborative tasks. The equivocality and complexity of these tasks should, however, be taken into account when considering information and communication technology, ICT support. The authors developed a task-media fit matrix and used it to choose and justify the usage of certain information and communication technologies. The end result of this article is a reference model for the three layers of strategy, process, and ICT for e-collaboration within the dispersed sales force training process in multinational pharmaceutical companies. The authors also maintain that the task-media fit matrix can help both practitioners and researchers to either justify investments in e-collaboration tools or to evaluate ICT architectures in the field of e-collaboration.

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Virtual teams are an important work structure in software development projects. However, little is known about what constitutes effective virtual software team leadership, in particular, the amount of leader delegation that is appropriate in a virtual software-development environment. This study investigates virtual software team leader delegation and explores the impact of delegation strategies on virtual team performance mediated by team motivation, team flexibility and team satisfaction with the team leader. This research is a report of a pilot study run on student teams carried out to refine and test the research constructs and research model for a larger study run in corporations. The study found that virtual team leaders delegate more to competent virtual teams and that such delegation is positively correlated with team member satisfaction with their leader and with team member motivation. Overall, the work provides important information for software-based organizations interested in developing virtual team leadership skills.

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Information Technology and Diversification: How Their Relationship Affects Firm Performance 65
Namchul Shin, Pace University, USA

While the importance of IT coupled with organizational changes for business performance has been widely discussed in the information systems, IS literature, there has been little empirical research on the issue. This research examines empirically the relationship between IT and diversification by employing multiple diversification measures. It also examines empirically the relative impact on performance of IT and diversification. Results show that diversification coupled with increased IT spending improves firm performance when its strategic emphasis is on related diversification. The results also show that firms place strategic focus on related diversification when they increase IT spending, and that they require more IT when their strategic emphasis is tilted toward related diversification. The findings imply that by providing a better means of coordination, IT enables scope economies, efficient utilization of business resources and collaboration across individual business units, eventually leveraging the benefits of diversification.

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Ilsang Ko, Chonnam National University, Korea
Lorne Olfman, Claremont Graduate University, USA
Sujeong Choi, Chonnam National University, Korea

We assessed the effects of electronic collaboration using inter-organizational information systems (IOIS) on firm performance, particularly between dominant buyers and their suppliers. From the suppliers' perspective, we examined ways in which higher levels of performance can be achieved by increasing the extent that they proactively participate in business activities using IOIS. We defined electronic collaboration as consisting of two major activities: electronic information sharing (EIS) and electronic cooperation (ECo). We also evaluated the extent of EIS and ECo that suppliers contribute to their development of an information exploitation capability (IEC). This capability enables them to utilize internally both information and knowledge created from electronic collaboration. In addition, we assessed the effects of electronic collaboration activities and IEC on a firm performance. We collected surveys from 169 firms, and conducted a Structural Equation Model analysis. We also empirically tested the research model and five hypotheses. The results of the statistical analysis indicated that electronic information sharing exerts a clear effect on electronic cooperation. We determined that EIS and ECo are major sources for the development of IEC and that both ECo and IEC result in improved company performance. Both electronic information sharing and electronic cooperation substantially foster an information exploitation capability. We also determined that the information exploitation capability has a partial mediating effect between electronic information sharing and electronic cooperation on firm performance.

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Maria Madlberger, Vienna University of Economics and Business Administration, Austria

With growing use of interorganizational systems, the scope of interfirm collaboration has increased considerably, particularly in the supply chain context. An important prerequisite of interfirm collaboration is information sharing. Extant research suggests clear advantages of information sharing. The research at hand addresses antecedents of interorganizational information sharing. Based on findings from interorganizational systems adoption and interfirm collaboration research, a structural model is developed and validated by a quantitative survey among Austrian retailers and manufacturers in the fast-moving consumer-goods sector. The proposed model analyzes the effect of internal factors, commitment, information policy, and technical readiness, interorganizational factors, relationship, trust, power, and trading partners' technical readiness, and economic factors, perceived benefits and costs on information-sharing behavior. The results show the relevance of internal factors and perceived benefits. The study reveals particularities of information-sharing behavior and can help practitioners to understand what motivates their trading partners to share information.

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Understanding the Progressive Nature of Inter-Organizational Systems (IOS) Adoption 124
Mazen Ali, The University of Bahrain, Kingdom of Bahrain
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Robert B. Johnston, University of College Dublin, Ireland

Inter-organizational Systems (IOS) cannot be adopted by any organizations in isolation from their trading partner. Their adoption requires cooperation and collaboration between trading partners and, therefore, is reliant on the nature of relationships between the parties involved. For organizations to progress in their IOS adoption, improvement in relationships between trading partners is required before they can adopt a more sophisticated IOS. In addition, through IOS adoption, trading partners can actually improve their relationships overtime. There has been some research that investigates relationships and how organizations progress from one level to the next level of adoption. However, these studies do not clearly define the concepts of relationship, IOS adoption and IOS adoption maturity. Furthermore, they do not adequately justify the exclusion of other variables in defining the relevant concepts and are not theoretically based. This research extends the Kurnia and Johnston (2000) process model of IOS adoption by incorporating the notion of IOS adoption maturity and reducing the scope from a supply chain to a dyadic level to enable better evaluations of IOS adoption progression. We argue that with the proposed model, the dynamics of IOS adoption maturity can be better examined empirically.

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Satisfaction as a Function of Perceived Change in Likelihood of Goal Attainment: A Cross-Cultural Study 145
Bruce A. Reinig, San Diego State University, USA
Robert O. Briggs, University of Nebraska at Omaha, USA
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E-collaboration users tend to abandon their technology when they feel dissatisfied by their experience, even if they have been productive. It is therefore important to understand the causes of satisfaction so we can design and deploy e-collaboration in ways that make users both productive and satisfied. We advance a theory proposing satisfaction as a function of a perceived change in the likelihood of goal attainment, LGA. We test the theory in two countries, United States and The Netherlands that differ along Hofstede's, 1991 masculinity-femininity cultural dimension. Empirical findings support the theory in both countries among 367 knowledge workers using e-collaboration to address real organizational problems and issues. We discuss the implications for research and practice.

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Reference Architecture for Cross-Company Electronic Collaboration 158

Christoph Schroth, University of St. Gallen, Switzerland

Beat Schmid, University of St. Gallen, Switzerland

Cross-organizational electronic collaboration is about to gain significant momentum and facilitates the emergence of a globally networked information service economy. However, existing solutions for the realization of such business relationships still exhibit weaknesses with respect to both managerial and technological aspects. In this work, we propose a service-oriented reference architecture for electronic business media that overcomes the drawbacks of today's business-to-business, B2B software products and services. Based on the St. Gallen media reference model, this reference architecture incorporates the design principle of modularity that proved critical for the success of numerous artifacts in other more mature industries. In particular, we investigate and revisit the principle of modularity with respect to its role in the computer industry and transfer it to the context of organizing and implementing electronic cross-company collaboration. On the basis of a case study in the field of public administration in Switzerland, we show its real-world applicability and its improvement potential.

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E-Collaboration Systems: Identification of System Classes using Cluster Analysis 176

Kai Riemer, The University of Sydney, Australia

E-Collaboration systems have become the backbone infrastructure to support virtual work in and across organizations. Fuelled by recent technology trends the market today offers an abundance of systems that often support a wide range of communication and collaboration features. In this article I present a study that aims to shed light on the market for E-Collaboration systems by structuring the range of available systems into meaningful classes. To this end, a sample of 94 E-Collaboration systems were characterized using a classification approach. A cluster analysis led to the identification of five system classes and a range of sub classes. I describe the system classes and discuss trends of systems integration and convergence. The results should be equally helpful for researchers who deal with E-Collaboration systems as their objects of interest, as well as for business executives, who need to gather information to support buying decisions.

Chapter 12
A Framework Describing the Relationships among Social Technologies and Social Capital Formation in Electronic Entrepreneurial Networking 199
Kelly Burke, University of Hawaii at Hilo, USA
Jerry Calton, University of Hawaii at Hilo, USA

E-commerce technologies—including online exchanges—focus heavily on transaction support. They are designed primarily to reduce transaction costs between suppliers, producers, distributors, and customers. Entrepreneurs however are not likely to realize the full business potential of e-commerce unless the transaction technologies are simultaneously supported by technology-enabled social learning networks used to stimulate the formation of social capital in its three primary manifestations. Toward that end this article argues that a number of Internet-based social technologies, e.g., email, chat, blogs, wikis, podcasts, etc. can be used more effectively when it is understood that each technology offers different characteristics in support of the formation of different dimensions of social capital. This article presents a conceptual framework describing the capacities of various social technologies for supporting the formation of social capital. A primary thrust of the article is that alignment of a social technology infrastructure with the social capital requirements in entrepreneurial communities will facilitate the formation of electronic learning networks, enabling more collaborative and therefore more successful entrepreneurial communities.

Chapter 13
A Qualitative Study of Web-Based Knowledge Communities: Examining Success Factors 214
Hui Lin, DePaul University, USA
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Zhongju Zhang, University of Connecticut, USA

Web-based knowledge communities (WKCs) have become prevalent in recent years for individuals with similar interests to collectively engage in knowledge acquisition and exchange in a global context. The growing popularity of WKCs and their fast penetration into almost all aspects of life call for more research on this important area. In this study, we explore and examine success factors of WKCs. To accomplish this research objective, we conducted a qualitative study to uncover a list of success factors that would affect the success of WKCs. Through open and axial data coding techniques using a grounded theory approach, we identified four main success factors: information quality, system quality, community governance, and pro-sharing norms. We further categorized dimensions of information quality, system quality, and community governance. Based on the results, we proposed a conceptual framework to examine WKC success. Implications for research and practice are discussed.

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Use of Wikis for Enhancing E-Collaboration in Geographically-Dispersed Environments 233
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Rajiv Kishore, State University of New York at Buffalo, USA

Information technology has radically altered corporate structures and the way work is transacted in corporate organizations. Firms are seeking to enhance their efficiency by themselves becoming more

geographically dispersed and by availing of the benefits of outsourcing. Functional groups are becoming increasingly "virtual" and spatially dispersed; much of organizational interaction is now technology mediated. These trends in turn call for further technology innovations to facilitate communication and collaboration in such situations. Wiki-based systems are an emergent and promising platform for technology mediated interaction. In this study, we describe a Wiki-based system, delineate its major features, and compare it with other available communication technologies. We then examine how the use of Wiki-based systems can enhance communication and collaboration outcomes in the context of a collaborative task, requirements elicitation, chosen for this purpose since it is high value and demands intense interaction across functional domains. We present a model and develop an understanding of the manner in which specific Wiki features enhance three variables – media richness, contextual richness, and organizational memory – which in turn impact communication quality as well as requirements quality in terms of the clarity, completeness, and consistency of a requirements specification. We conclude with a discussion of the implications of our study and of possible future research in this area.

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Peter Rittgen, Vlerick Leuven Gent Management School, Belgium & University College of Borås, Sweden

The collaborative design of business and information systems touches a number of issues that lie within the realm of different research areas. It deals with design as such and in particular with design in and for groups. It is also concerned with socio-technical systems and hence with human-computer interaction as well as IT-mediated human-human interaction. This introduces collaboration issues. The significant complexity of the business and information systems that are in the focus of the design endeavor calls for modeling as an instrument for managing this complexity. This paper maps the terrain of collaborative design of business and information systems by surveying the contributions that are made by related areas of research.

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An Empirical Study of Building Social Relationships within Virtual Teams 271
Ying Chieh Liu, Choayang University of Technology, Taiwan

Although virtual teams have been widely utilized nowadays, social relationships are considered highly problematic within virtual teams. This study addresses social dimensions to provide suggestions for mangers to improve the performance and satisfaction of virtual teams. We build a model derived from a comprehensive literature review and conduct an experiment to validate it through Structural Equation Modeling. The results reveal: (1) communication has a direct positive impact on relationship building , but indirect positive effects on performance and satisfaction; (2) relationship building impacts directly with strong and positive impacts on cohesion and trust ,but indirectly with strong impacts on performance and satisfaction ; (3) cohesion has a direct, strong and positive impact on performance but a strong indirect impact on satisfaction; (4) trust has a positive direct impact on performance but an in-

direct positive impact on satisfaction; (5) performance has a strong and positive impact on satisfaction. In addition, this study confirms that relationship building is a vital mediator in the social relationship model. Managerial implications and future research directions are identified.

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Exploring Dialogue Games for Collaborative Modeling 292
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In our search for better understanding and support of the activities constituting collaborative modeling processes, we have developed a framework viewing them as enacted dialogue games. We have also developed and evaluated a number of experimental game-like procedures, exploring 'modeling as a game'. In this chapter, we present our generalized findings and experiences so far, discussing some key aspects underlying the analysis and design of collaborative modeling activities as dialogue games, with some emphasis on the support and guidance of novice modelers (as opposed to expert modelers).

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Collaborative Enterprise Architecture Design and Development with a Semantic Collaboration Tool 318
Frank Fuchs-Kittowski, Fraunhofer Institute for Software and Systems Engineering, Germany
Daniel Faust, Fraunhofer Institute for Software and Systems Engineering, Germany

The design and evolution of an enterprise architecture, EA is a challenging and complex task. A participative approach to collaborative EA management is needed to support the collaboration of all individuals involved in the process of EA design and evolution. This article presents our concept of a semantic collaboration tool for collaborative EA management. This includes the concept of a semantic, Wiki-like collaboration tool for collaborative EA management and an EA ontology as a formal representation of the EA. Additionally, the prototypical implementation of the semantic collaboration environment and its architecture are described and the benefits of the approach discussed.

Chapter 19

Participant-Driven Approach to Autonomously Cluster Brainstorming Ideas 332
Joel Helquist, Utah Valley University, USA
John Krus, MITRE Corporation, USA
Jay Nunamaker Jr., University of Arizona, USA

This chapter presents an exploratory examination of the impact of synchronicity and quantity of brainstorming ideas on the ability of a group to autonomously cluster brainstorming ideas. Groups were tasked with clustering brainstorming ideas through the use of a Group Support Systems (GSS) tool. The tool allowed each participant to create and modify categories to which individual brainstorming ideas could be aligned. No explicit means of coordination were available; each participant worked autonomously to cluster the brainstorming ideas. The results indicated that the groups working synchronously

displayed improved performance and satisfaction ratings. Likewise, groups categorizing the smallest quantity of brainstorming ideas performed better than the larger quantities.

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