

**ISR Special Issue Proposal:  
Virtual Organizations as Sociotechnical Systems**

Guest Editors: Nicholas Berente, James Howison, John Leslie King, Kalle Lyytinen  
February 6, 2012

*The Idea*

Wakes of digital innovation spread quickly and unevenly, producing cascading, sedimented arrangements that enable wakes of further innovation that enable yet other organizational landscapes (Boland, et al., 2007). The result is a “perennial gale” of technology-enabled change suggested by Schumpeter (1942). Digital technologies are enabling work that is distributed geographically and temporally. Such work is often encompassed by the term “virtual organization” because it lacks some characteristics of traditional organizations (e.g., done at the same time and/or in the same physical location) but retains other characteristics (e.g., the ordering and control of production). Research understanding of virtual organizations has lagged practice. We propose a special issue of ISR to encourage interdisciplinary insights about virtualized work and the evolution of organizations.

Management literature frequently focuses on organizational *form*, or *structure*, following the mid 20<sup>th</sup> Century insight that structure follows strategy (Chandler 1962). Yet, strategies, and by transitivity, organizations, evolve from the conduct of work through structuration or other mechanisms (*cf.* Jones and Karsten, 2008). Technologies of “virtualization” enable changes in work in the early 21<sup>st</sup> Century as surely as the technologies of the late industrial revolution enabled changes during the early 20<sup>th</sup> Century. Now, as then, practice moves faster than understanding. There is as yet only a limited and fractured theoretical understanding of virtual organization, and work is often conflated with other aspects of organization. It is time to begin sorting this out.

Many topics have been included under the banner of virtual organization. All are welcome for consideration in the proposed special issue. They include (but are not limited to):

- The changing nature of contemporary work, particularly with respect to the consequences of virtualization and material practices (Sotto, 1997; Robey, et al., 2003; Leonardi and Barley, 2008).
- The way groups collaborate in distributed, digitally-mediated “virtual teams” (DeSanctis and Monge, 1999; Jarvenpaa and Leidner, 1998; Child & McGrath, 2001; Powell, et al., 2004) and the effects on important team processes and outcomes such as awareness, trust and knowledge sharing.
- Alternative modes of structuring industry and organizations, including interorganizational arrangements made possible by digital technologies (Davidow and Malone, 1992; Handy, 1995; Chesbrough and Teece, 1996; Cascio, 2000).
- The unique features of broad digital infrastructures and the associated tensions between the local and global imperatives (Star and Ruhleder, 1996; Hanseth and Lyytinen, 2008; Edwards, et al., 2009; Tilson, et al., 2010).

- Specific technological phenomena and their impact on organizing, such as: increasing organizational leverage through three-dimensional “virtual” models of products (Baba and Nobeoka, 1998; Yoo, et al., 2006); metaverses and virtual worlds (Wasko, et al., 2011); and the implications of virtualization as seen in cloud computing (Ambrust, et al., 2010; Bichler, et al., 2010).

The study of virtual organization is inherently interdisciplinary, crossing boundaries of policy and scholarly inquiry. Approaches have included economic, organizational, anthropological, social, and psychological, not to mention more technical perspectives in engineering, computer science, and information systems. Yet published scholarship often stays within traditional disciplinary bounds, typically within three streams: effects of digital communication on virtual and/or distributed teams; the nature of the “virtual” as an embodiment of digital and material worlds in the context of sociomateriality; and web-based, coordinated activity (e.g., twittering, disaster response, citizen science, geo-caching, Wikipedia development, open source software development, design science).

We propose a special issue of *Information Systems Research* on ‘Virtual Organizations as Sociotechnical Systems’ that takes as its inspiration the journal’s March 1996 special issue on Information Technology and Organizational Transformation edited by John van Maanen and JoAnne Yates.<sup>1</sup> That special issue was interdisciplinary and innovative, and had high impact. Several of its papers became foundations for whole new vectors of research, and its contents were subsequently expanded and re-published as a book by Sage Publications in 2001 that is still frequently cited.

The proposed special issue has four distinguishing features in its effort to frame, influence, and direct the discourse around ‘virtual organizations’.

First, it examines virtual organizations as “sociotechnical systems,” reflecting the interaction of people and technology. This requires simultaneous understanding of both the social and the technical. Some research has focused on the organizational elements of virtual organizing and discounted the essential role of digital technologies (cf. the *Organization Science* special issue on Communication Processes for Virtual Organizations from 1999, DeSanctis and Monge, 1999) while other research has emphasized the technological elements of virtuality (cf. the *Management Information Systems Quarterly* special issue on New Ventures in Virtual Worlds from 2011, Wasko et al., 2011). These efforts contribute to our understanding of virtual organizations, but

---

<sup>1</sup> John Leslie King, Editor of *ISR* from 1992-1998, asked Van Maanen and Yates to edit the special issue. Papers published in the special issue: “The Role of IT in the Transformation of Work: A Comparison of Post-Industrial, Industrial, and Proto-Industrial Organization” by S.J. Winter and S.L. Taylor; “Information Technology and Organizational Change in the British Census, 1801-1911” by M. Campbell-Kelly; “Texas Politics and the Fax Revolution” by J. Coopersmith; “Information Technology in the Police Context: The ‘Sailor’ Phone” by P.K. Manning; “Improvising Organizational Transformation Over Time: A Situated Change Perspective” by W.J. Orlikowski; “Transforming Work Through Information Technology: A Comparative Case Study of Geographic Information Systems in County Government” by D. Robey and S. Sahay; and “Steps Toward an Ecology of Infrastructure: Design and Access for Large Information Spaces” by S.L. Star and K. Ruhleder.

there remains the need for a special issue of ISR that expressly encompasses digital artifacts and the organizational elements of distributed work in a balanced way.

Second, it addresses social and cultural factors that affect development, adoption, mutual-adaptation, and co-evolution of sociotechnical systems central to virtual organizations. We are less interested in discussion of how great virtual organizations are or will be, and more interested in the mechanisms of change by which virtual organizational activity comes to pass. The special issue will have a critical perspective on such change and mechanisms that underlie it.

Third, it will focus attention on knowledge-intensive work common to science, engineering, and system development. The IS field has concentrated on transaction and operational elements of enterprise, and not paid as much attention to “pre-competitive” work processes that frequently shape subsequent efforts of competitive enterprise. Knowledge-intensive work also has been an early test-bed for important IT innovations (e.g., e-mail was first widely adopted and used in the knowledge-intensive communities of the academy and technology development during the development of Internet). The effects of technology seen in this realm are often harbingers of things to come. This is not new: science has been recognized as inherently distributed since the 17<sup>th</sup> century. However, contemporary knowledge-intensive work often embodies important potential features for all future organizations, including time-limited collaborations, complex contracting and labor with high intrinsic motivation and mobility.

Fourth, it embraces issues of scalability. Much work on virtual organizations has been limited to study of virtual teams and micro level work. Much less is known about work at large scale that spans time and space. Little is known about the organizational arrangements that support such work, and whether “virtualization” can assist with such arrangements. There are some existence proofs that digital infrastructure can enable large-scale work. For example, collaboration technology has been used to support multiple projects at the Large Hadron Collider at CERN near Geneva, which has thousands of principal investigators from hundreds of institutions and organizations spread around the globe. Similarly, the automobile industry is using product life cycle management systems to “virtualize” global design and production processes for car design and manufacturing. There is, as yet, little *systematic* investigation of how scalability occurs.

### *What We Want*

We encourage submissions of high-risk, creative scholarship that include one or more of the following: strong theoretical contributions, attention to design, solid quantitative econometric and psychometric studies, qualitative case-based research, and attention to challenges of scale and diversity (of people, of artifacts, of world-views) relevant to the conduct of work through virtual organization. A wide variety of topics might be considered appropriate. Examples include:

- New, alternative, or evolving forms of virtual organization and related digital technologies
- Virtual organization for knowledge-intensive, technical fields such as science and engineering, software development, and product design and development
- Industrial transformation and digital infrastructures, platforms, and standards
- Innovative applications of digital technologies in virtual organizations
- Organizing large-scale virtual teams and related sociotechnical arrangements
- The interplay of institutional persistence and change in virtual organizations
- Roles of digital infrastructures in organizing
- Public policy and virtual organization
- Relationships between product and software architecture, and organizational and industrial structures
- Organizing for digital innovation: software development, product design and development, research and development, and scientific collaboration
- Organizational and technological governance for virtual organizations
- Relationships between virtual organizations and more traditional organizations

### *Production Plan*

Production of the special issue is part of a “Research Coordination Network” (RCN) grant from the U.S. National Science Foundation (NSF) Office of Cyberinfrastructure to Nicholas Berente of the University of Georgia and James Howison of the University of Texas at Austin (Grant # OCI- 1148996). This RCN grant is focused on the role of cyberinfrastructure in facilitating the development of virtual organizations that are increasingly important to the routine conduct of large scale science and engineering research and education. According to the NSF-OCI VOSS Program, “A virtual organization is a group of individuals whose members and resources may be dispersed geographically, but who function as a coherent unit through the use of cyberinfrastructure.” A workshop focusing on Virtual Organizations as Sociotechnical Systems will be held at the Weatherhead School of Business at Case-Western on May 8-9, 2012, co-directed by Kalle Lyytinen of CWRU and Nancy Wilkins-Diehr of San Diego Supercomputer Center/UCSD. Likely authors will be invited to that meeting, and asked to provide initial papers on the topic. Another workshop will take place at the University of Michigan in Ann Arbor in October, co-directed by John L. King of Michigan and Thomas Dunning of the National Center for Supercomputing Applications/UIUC. There will also be discussion of papers for the special issue at an ICIS workshop in Orlando in December of 2012.

The *tentative* production schedule is as follows:

April 1, 2012	Initial call for papers and explanation of May meeting
May 8-9, 2012	Workshop at Case-Western
July 31, 2012	First round papers due
September 30, 2012	First round reviews complete and returned to authors
October 23, 2012	Workshop at Michigan-Ann Arbor
December 15, 2012	Second round papers due

December 18, 2012	Workshop at ICIS 2012, Orlando
March 15, 2013	Second round reviews complete and returned to authors
May 15, 2013	Third round papers due
July 1, 2013	Decision on papers for inclusion

The guest editors are familiar with leading scholars on this topic. Participants invited to the May workshop will be encouraged but not obligated to produce a submission. All who produce initial papers that meet the threshold of promise set by the guest editors (that the papers have reasonable likelihood of acceptance after two rounds of review) will be invited to the workshop. Submissions can be rejected by the guest editors at any point. Papers that move toward publication will receive at least three reviews in the first or second rounds, at the discretion of the Guest Editors. Revisions after the third round are expected to be minor. The call for initial papers is open to all. The initial call for papers will be posted widely on-line and with direct email messages to possible contributors. All editorial work will be executed on-line.

*People who might be authors or be on the special issue editorial board:*

Soon Ang (Nanyang Business School)	Karim Lakhani (Harvard)
Diane Bailey (UT Austin)	Natalia Levina (NYU)
Steve Barley (Stanford)	Wayne Lutters (Maryland, Baltimore County)
Richard Boland (Case-Western )	M. Lynne Markus (Bentley)
Kevin Boudreau (London Business School)	David McDonald (Washington - Seattle)
Geof Bowker (UC Irvine)	Jacqueline Meszaros (NSF)
Brian Butler (Maryland – College Park)	Judith Olson (UC Irvine)
Nosh Contractor (Northwestern)	Wanda Orlikowski (MIT)
Kevin Crowston (Syracuse)	Ray Reagans (MIT)
Jonathon Cummings (Duke)	Lionel Robert (Michigan)
Paul Edwards (Michigan)	Joe Rubleske (Georgia)
Sue Fussell (Cornell)	Sundeeep Sahay (Oslo University)
James Gaskin (Brigham Young)	Steve Sawyer (Syracuse)
Les Gasser (Illinois, Urbana-Champaign)	Kjeld Schmidt (Copenhagen Business School)
Matt Germonprez (Wisconsin, Eau Claire)	Sandra Slaughter (Georgia Tech)
Sean Hansen (Rochester Institute of Tech.)	Chip Steinfield (Michigan State)
Ole Hanseth (University of Oslo)	Jason Owen Smith (Michigan)
James Herbsleb (Carnegie-Mellon University)	Susan Winter (NSF)
Pamela Hinds (Stanford)	Nancy Wilkins-Diehr (SDSC/UC San Diego)
Erik Johnston (Arizona State)	Amrit Tiwana (Georgia)
Sara Kiesler (Carnegie-Mellon)	JoAnne Yates (MIT)
Laurie Kirsch (University of Pittsburgh)	Youngjin Yoo (Temple)
Cory Knobel (UC Irvine)	Ann Zimmerman (Michigan)
Robert Kraut (Carnegie-Mellon)	

*References*

- Armbrust, M., Stoica, I., Zaharia, M., Fox, A., Griffith, R., Joseph, A. D., Katz, R., et al. (2010). A view of cloud computing. *Communications of the ACM*, 53(4), 50. doi:10.1145/1721654.1721672
- Baba, Y., and Nobeoka, K. (1998). Towards knowledge-based product development: the 3-D CAD model of knowledge creation. *Research Policy*, 26(6), 643-659.

- Bichler, M., Gupta, A. and Ketter, W. (2010) "Designing Smart Markets," *Information Systems Research*, 21 (4): 688-699.
- Boland, R. J., Lyytinen, K., and Yoo, Y. (2007). Wakes of Innovation in Project Networks: The Case of Digital 3-D Representations in Architecture, Engineering, and Construction. *Organization Science*, 18(4), 631 -647. doi:10.1287/orsc.1070.0304
- Cascio, W. F. (2000). Managing a virtual workplace. *Academy of management executive*, 14, 81-90.
- Chandler, A. (1962) *Strategy and Structure: Chapters in the History of the Industrial Enterprise*. Cambridge, MA: MIT Press.
- Chesbrough, H. W., and Teece, D. J. (1996). When is Virtual Virtuous? Organizing for Innovation. *Harvard Business Review*, 74(1), 65.
- Child, J., and McGrath, R. G. (2001). Organizations Unfettered: Organizational Form in an Information-Intensive Economy. *The Academy of Management Journal*, 44(6), 1135-1148. doi:10.2307/3069393
- Davidow, W. H., and Malone, M. S. (1992). *The virtual corporation: structuring and revitalizing the corporation for the 21st century*. HarperBusiness.
- DeSanctis, G., and Monge, P. (1999). Introduction to the Special Issue: Communication Processes for Virtual Organizations. *Organization Science*, 10(6), 693-703.
- Edwards, P. N., Bowker, G. C., Jackson, S. J., & Williams, R. (2009). Editorial Introduction: Special issue on "e-Infrastructures." *Journal of the Association for Information Systems*, 10(5).
- Handy, C. (1996). *Beyond Certainty: The Changing Worlds of Organizations*. Harvard Business Press.
- Hanseth, O., and Lyytinen, K. (2010). Design theory for dynamic complexity in information infrastructures: the case of building internet. *Journal of Information Technology*, 25(1), 1-19. doi:10.1057/jit.2009.19
- Jarvenpaa, S. L., and Leidner, D. E. (1999). Communication and Trust in Global Virtual Teams. *Organization Science*, 10(6), 791-815. doi:10.1287/orsc.10.6.791
- Jones, M. R., and Karsten, H. (2008). "Giddens's Structuration Theory and Information Systems Research," *MIS Quarterly* (32:1), pp. 127-157
- Leonardi, P., and Barley, S. (2008). Materiality and Change: Challenges to Building Better Theory about Technology and Organizing. *Information and Organization*, 18(3), 176.
- Powell, A., Piccoli, G., and Ives, B. (2004). Virtual Teams: A Review of Current Literature and Directions for Future Research. *Database for Advances in Information Systems*, 35(1), 6-36.
- Robey, D., Schwaig, K. S., and Jin, L. (2003). Intertwining material and virtual work. *Information and Organization*, 13(2), 111-129.
- Schumpeter, J.A. (1942) *Capitalism, Socialism, and Democracy*. New York, NY: Harper & Row.
- Sotto, R. (1997) "The virtual organization." *Accounting, Management, and Information Technologies*, 7(1), 37-51.
- Star, S. L., & Ruhleder, K. (1996). Steps Toward an Ecology of Infrastructure: Design and Access for Large Information Spaces. *Information Systems Research*, 7(1), 111-134. doi:10.1287/isre.7.1.111

- Tilson, D., Lyytinen, K., and Sørensen, C. (2010). Research Commentary—Digital Infrastructures: The Missing IS Research Agenda. *Information Systems Research*, 21(4), 748 -759. doi:10.1287/isre.1100.0318
- Wasko, M., Teigland, R., Leidner, D., and Jarvenpaa, S. (2011). Stepping into the Internet: New Ventures in Virtual Worlds. *Management Information Systems Quarterly*, 35(3), 645-652.
- Yates, J., and Maanen, J. V. (Eds.). (2000). *Information Technology and Organizational Transformation: History, Rhetoric and Preface* (1st ed.). Thousand Oaks, CA: Sage Publications, Inc.
- Yoo, Y., Boland, R.J., and Lyytinen, K. (2006) "From Organization Design to Organization Designing," *Organization Science* (17:2), p.215-229.