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# Beyond the organizational ‘container’: Conceptualizing 21st century sociotechnical work



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### ABSTRACT

The sociotechnical systems (STS) approach provides a framework that is well suited to grappling with many issues of work in organizations. By conceiving of work systems as mutually-shaping social and technological systems, the STS approach has provided decades of researchers and practitioners with robust analytical tools to consider both the social and the technical elements of organizational contexts. However, we identify two areas where the conceptualization of sociotechnical systems must be updated to reflect the role of information infrastructures as an enabler of trans-organizational work arrangements. First, with its view of nested systems, the STS approach *encapsulates* work and the infrastructure used to do it within organizations (either explicitly or implicitly) – often leading to a “container” view of organizations as the context of work and a venue for joint optimization of the social and the technical. Second, because work is generally treated as encapsulated within superordinate, nested systems, elements of that work are *inherited* from those superordinate systems. In this paper we characterize the limitations of industrial age assumptions of organizational encapsulation and inheritance that, rooted in the STS approach, underlie much of traditional information systems scholarship. We then theorize an updated sociotechnical framework (Neo-STS) and apply it to examples of contemporary work situations to highlight the importance and implications of trans-organizational information infrastructures and multidirectional inheritance.

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“The field of information systems ... formed from the nexus of computer science, management and organization theory, operations research, and accounting ... [None] of these areas or disciplines focused specifically on the application of computers in organizations. IS emerged as the field to do just that.” (Hirschheim & Klein, 2012, pg. 193).

## 1. Introduction

Information systems (IS) research typically focuses on the application of computers in organizational contexts. This organization-centric view can be traced back to the field's birth, and in many ways marks its unique identity. Foundational work in the IS field argued for the value of IS to be assessed in terms of their use in and impact on organizations such as businesses (Davis, 1974; Keen, 1980; Leavitt & Whisler, 1958) and the emergence of IS groups in organizations has been identified as the beginning of the 1st Era of IS (Hirschheim & Klein, 2012).<sup>1</sup>

Early information technologies were expensive and were primarily adopted by large organizations such as corporations and the U.S. military. Thus a path-dependent tradition of what constitutes appropriate IS scholarship was set in motion. Implicit in this tradition are important assumptions drawn from earlier approaches and matured in the economic and sociotechnical systems (STS) approach (Trist, 1981) that influences much of the IS discipline.<sup>2</sup> A fundamental tenet of STS is that technologies themselves are not deterministic, but rather their impacts arise from complex interactions with industrial and organizational contexts. Many studies of IS build on this approach, either implicitly or explicitly, assuming that organizations act as “containers”, encapsulating both the work that is done and the infrastructure used to do it rather than explicitly considering where and how information and work system boundaries could or should be drawn. Organizations are often assumed to provide overall goals, define work routines, and create technical systems to support those routines. Organizationally-created infrastructures are presumed to provide the context for work, constraining and enabling organizationally-designed work practices. Outcomes of IS implementations are considered in relation to organizational goals. These assumptions have informed interesting and useful STS research that has enabled IS scholarship and practice to thrive for decades (Hirschheim & Klein, 2012), but the organizational container perspective can also be problematic.<sup>3</sup>

There is an increasing awareness that many important work practices, routines, and digital artifacts occur outside of organizational containers; increasingly work is not cleanly encapsulated within a single organization's boundaries. For example:

- Generative platforms for innovation that are driven by, but not encapsulated within, an organization, such as Apple's iPod, iPad, iPhone, iTunes ecosystem of technical standards and developers in which governance of the ecology co-evolves and emerges with the technical platform (Tiwana, Konsynski, & Bush, 2010; Yoo, Henfridsson, & Lyytinen, 2010) spawning the Bring Your Own Device (BYOD) trend.
- Free and open source software (FOSS) communities that coalesce around a technology and add elements of organization only as required to manage its development (e.g., Howison & Crowston, 2014; O'Mahony & Lakhani, 2011; Shah, 2006).
- International research cyberinfrastructures (CI) (e.g., software, hardware, standards) for access to distributed resources (e.g. the Large Hadron collider, supercomputers, telescopes) funded, managed, and shared by diverse science enterprises (Hey & Trefethen, 2005; Tuertscher, Garud, & Kumaraswamy, 2014).

In all of these cases, information systems play a central role, but related scholarship is seen as a weak fit with the IS field because the technologies and work systems are not contained within or linking across an organizational boundary. The technology reaches beyond traditional local sociotechnical ensembles, across large numbers of organizations, and shapes industries, institutions, and society. These are not organizational

<sup>1</sup> The advent of the PC and end user computing characterize the 2nd era; Departmental Computing and CIOs characterize the 3rd era; modification of corporate strategy for the Internet and outsourcing characterizes the 4th era.

<sup>2</sup> Some argue that the STS tradition is the root of the IS discipline (see Beath, Berente, Gallivan, & Lyytinen, 2013; Bostrom, Gupta, & Thomas, 2009). We do not make such a strong assertion, but it is clear that the STS tradition is an important thread running through the field with many IS researchers implicitly accepting its central assumptions.

<sup>3</sup> To highlight where STS could be updated, our depiction of STS and of related IS scholarship focuses on essential elements at the expense of some of the nuance and complexity.

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