

Guest Editorial Preface

Special Issue on a Sociotechnical Approach to Organizational Transformation

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This special issue is devoted to Socio-Technical Systems approaches in practice. Innovative Information Systems will change the ways in which organizations function, and we must therefore redesign organizations in the context of the possibilities offered by IS. It is important that we recognize that IS are not simply applications of ICT but synergies supporting purposeful human activity. Sociotechnical, systemic approaches will ensure that new kinds of technical and organizational systems are built in harmony. There is a need to consider change as a process and as a system, and not merely to focus on management of its impacts. Multiple perspectives on organizational change from all engaged actors need to be considered. Events in the world around us make it impossible to ignore the impacts of innovative technologies, both positive and negative. From time to time we are reminded how much we depend upon clever technologies to support us in everything from transport to entertainment. However, we must avoid the double-edged sword of complex technologies going beyond human capacity to control, by ensuring that all our systems are designed from sociotechnical perspectives.

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EDITORIAL

Enid Mumford's socio-technical approach to work design is now many decades old. However, in the 21st Century, a new focus on organizational excellence has brought a resurgence of interest in approaches that consider social and technical aspects of organizational systems holistically. Many researchers have turned their attention to a fresh examination of this productive field.

Mumford's discussion in one of her last articles (2006) raised a number of important issues. She pointed out that an Open Systems perspective is needed if the benefits of socio-technical methods are to be realised. Interconnections with the wider system within which any particular work system is sited must be taken into account. Any organization subsists from moment to moment as an emergent property of the interactions among the people who are its members, creating systems that are not just open but dynamic. Considered in the context of networked organizations, dynamic complexity is not merely expanded but radically altered. The role of Information and Communication Technologies (ICTs) in a networked society is not simply to create connections between individuals and organizations, but to support transformations in organizational life as it is lived.

This Special Issue of the International Journal of Systems & Society includes contributions that highlight the benefits and effectiveness of adopting a socio-technical perspective to deal with this dynamic.

Participation in work system design from grass roots level is an important socio-technical principle that is not always realised in practice. However, limitations to participation may be damaging to the usefulness of any designed system, because the contextually-dependent knowledge of unique individuals will be lost in the design process. It has been suggested that the primary source of sustainable competitive advantage for a business is the 'know-how' of its employees (Prusak, 1996). It follows that their willing engagement in co-creating work systems will facilitate success. This can be demonstrated, for example, in a contemporary approach to design of both industrial and service systems known as Lean, which emphasises flexibility, flow and elimination of waste(s) through full participation of engaged actors in the system, bringing to bear their unique professional understandings to identify opportunities for continuous improvement. Whenever innovation is contemplated, individuals must be empowered to join in co-creation of their organizational systems. Failure to recognize this may be a primary reason why many fashionable techniques of the past thirty years have continued to disappoint, such as TQM, BPR.

The contributions in this issue is exploring how business and industrial systems are indivisibly socio-technical in their very nature. The issue comprises 10 papers, including an invited paper from eminent scholar Dr Eli Berniker, member of the Fulbright Specialist Roster at the Council for

International Exchange of Scholars, who sets out challenges for the future. The issue also includes book review of a book by Edgar Morin a French Philosopher and Sociologist. The review of the book "*On Complexity*", is written by Humberto Mariotti, who is himself a pioneer in the creation of Complexity Management as an academic discipline.

The remaining papers have been subject to a rigorous selection process, involving double-blind peer review by up to five academics in the field. Overall, 28 relevant and complete papers were submitted for review, eight of which were finally selected for inclusion in this special issue. The contributors are drawn from different parts of the world, from South America to Scandinavia and also a range of fields of academic inquiry. The papers here cover a wide range of topics, all closely tied to the themes of organizational transformation and socio-technical design. However, it is possible to identify some common ideas that permeate these differing contributions. First, there are issues of *power, ideology and trust* within organizational contexts, including the incidence of conflict. This political dimension has undoubtedly been the key to success or failure in numerous organizational transformation initiatives; and yet it is this feature that is rendered invisible in those approaches to design that focus primarily on technical matters, or indeed those that privilege management perspectives over those of other stakeholders. Secondly, an emphasis on *collaboration, co-evolution and co-design* is recurrent in a number of papers, although arising from different issues and challenges. Thirdly, and unsurprisingly, several authors focus attention on *work practices and work systems*, examining the interaction of human and technical factors in issues such as resilience, equilibrium and fulfilment of user expectations.

The paper by Barn and Barn [paper 1] deals directly with a perceived tension within design processes between incorporating stakeholder values and achieving system resilience. Values may include, for instance, desire for privacy, security and personal autonomy. However, these must be balanced with other desirable factors such as availability and reliability in a context of multiple threats and risks. The authors refer to examples in which trust by stakeholders is crucial to a successful implementation, and relate these challenges to principles set out in Ashby's Law of Requisite Variety (Ashby, 1991). They point out that values are likely to vary with different stakeholder contexts and over the life of any system. Drawing on the literature of Value-sensitive Design (VSD), they then go on to explore a case study of a system designed to support vulnerable young people, making a proposition that, by addressing value sensitive concerns in the design process, resilience as an outcome is more likely.

Cabitza, Simone and Storli [paper 2] take up issues of power, ideology and trust, by addressing empowerment of end-users of designed artifacts in order to enhance resilience – defined as flexibility and adaptability and achieved through openness and underspecification. These authors make use of the concepts of 'seams', 'scars' and 'sutures' in order to show how such a perspective on design might be achieved (see Weiser, 1994; Chalmers, 2003). 'Seams' are affordances created by designers of artifacts for end-users to intervene and 'tinker', in order to adapt interface or functionality to their contextual purposes. 'Scars', on the other hand, are indicators that such tinkering has occurred in the past by previous users, and that further adaptation is possible. Finally, 'sutures' are mechanisms that connect IT artifacts together in order to support data exchange for interoperability. The importance of these proposals for the authors lies in empowering end-users, minimizing the interventions of professional planners and designers who might introduce misunderstandings, bias and delays, and giving system ownership to users in order to support introduction of change.

Edwards and Horton [paper3] point to a phenomenon in which proposed deployments of new technologies are promoted through 'Utopian visions'. They explore how ideological framing is used by powerful stakeholder groups, both internal and external, to exert influence over organisational understandings and decision making. The authors point out that the influence of ideologies on dynamics of socio-technical relational processes in organisations has been under researched within the field of technology acceptance. The paper cites examples showing how Technology Action Framing

has been used to shape organizational discourse on ideologically-positive lines, even when the lived experience of stakeholders might suggest a negative response. In particular, the authors trace the historic trajectory of introduction of Mobile Learning Environments in Higher Education Institutions, exploring the impact of shifting and conflicting understandings on implementation.

Waring, Wainwright and Skoumpopoulou [paper 4] deal with perhaps the most politically-charged of IS initiatives - the integrated Enterprise System – adopting a critical stance. They point out that these complex, integrated systems clearly demand examination through a sociotechnical lens, and yet note that there is a dearth of research in this area. It is suggested that ES adoption is often related to redistribution of power and alteration of political structures within organizations, bringing about associated change in policies, strategic opportunities and threats. Work-based improvisation often follows introduction of these large-scale, pre-specified systems and this may, in turn, create new and unanticipated power relations, managerial roles and structures. The authors make use of the ‘circuits of power’ framework (Clegg, 1989; Silva, 2007) and relate this to an improvisational model of change, examining how anticipated change is affected by unintended change opportunities, to produce an emergent result.

Two further papers deal with the more formal political dimension. Pereira, Macadar and Testa [paper 5] focus on the potential of Information & Communication Technologies to improve the lives of individuals and their communities. They take up a human development agenda (RDH, 2009), which highlights expansion of real freedoms, considering what is important to people in communities in order to open up more choices and support achievement of happiness and fulfilment. The authors present a sociotechnical, conceptual model to promote understanding of governments’ implementation of ICT, using a capability approach to analyse its impact in human development.

Weilbach and Matthee [paper 6] also use a sociotechnical model to examine a particular instance of change within an educational context in South Africa. Using action research, the authors sought to gain an understanding of the change in a particular school, relating to the introduction of an e-textbook platform to replace printed books, and to make suggestions on how to manage the change. Use of the model revealed that the equilibrium of the socio-technical components of the work system was severely disrupted during the implementation. Teachers perceived that they and their pupils had received insufficient support and that the system was poorly adapted to the tasks of teaching and learning. The researchers suggested some stabilising interventions within the socio-technical work system, but have identified a need for further investigation using a variety of techniques.

Lindekilde and Bjørn [paper 7] have focused on one of the challenges to collaborative working, posed by the global nature of business organizations and networks. They make use of the concept of presence (Schultze, 2010) in order to explore the way individuals within a particular organizational setting thought about their interactions with colleagues around the globe. Using action research, they engaged organizational actors in reflection in order to identify ways to improve their work. Using a socio-technical approach, they argue that embodied experiences are more effective than discursive intervention alone in transforming quality of global collaboration.

Bednar, Welch and Milner [paper 8] discuss collaboration through benchmarking. They first give an example of non-competitive benchmarking where hospital staff collaborated with inter-alia formula 1 pit-teams as a vehicle for reflection upon design of critical hand-over processes in theatre. They go on to discuss templates based in current socio-technical practice to be used as part of a toolkit for reflective, contextual, socio-technical analysis.

The last word comes from Eli Berniker [paper 9], whose invited paper suggests that no single discipline can achieve practical competence in whole systems design; and indeed such complexity is beyond the cognitive capacity of any known organization. He uses the metaphor of a Design Table and poses questions “who is at the table?”, “what do they bring to the table?” pointing out that multiple disciplines must be engaged at the Design Table together, each bringing the uncertainties and challenges that emerge at the boundary of their discipline. He reviews work contributed by such people

as Mumford, Singer and Churchman and suggests that the Design Table can be seen as a collaborative forum. He concludes that we should understand whole organization design as a developing technology and evolving artform, rather than evoking inevitably incomplete methodologies.

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