

Preface

Technology would not exist without human beings. It is created by humans for the purposes of humans. It often has unintended and unexpected effects on humans and can be used for purposes other than originally planned. While technology cannot exist without humans, one can equally well argue that humans cannot exist without technology. This relationship touches on many fundamental questions of anthropology, ontology, and epistemology. Due to the complexity of the field of technology and human interaction, we cannot hope to do it justice in a single volume. The chapters in this current book are therefore focused on a sub-sector, namely the area of information and communication technology. They discuss different topics and angles on the way in which humans interact with ICT. The book reflects a variety of approaches and problems that researchers have investigated in this area. It is meant to be multi-disciplinary and demonstrate the richness of these studies. The reference disciplines that the authors draw upon reflect this multi- and trans-disciplinary nature. They include information systems, computer science, sociology, philosophy, gender studies, and even theology.

This book will provide the reader with a wide range of interesting and novel approaches to the relationship between technology and humans. It can be used for teaching as well as for research purposes, and it will contain insights that are of relevance for social and organisational use of ICT.

Chapter I, *Conducting Feminist Gender Research in the Information Systems Field* by Eileen M. Trauth, Lynette Kvasny, and Anita Greenhill, explores the methodological and epistemological implications of conducting feminist, gender research in the information systems field. These implications revolve around four core themes: (1) feminist research is situated in the margins; (2) current gender and IS research is not adequately problematized; (3) feminist research questions the legitimacy and appropriateness of positivist research; and (4) reflection on the personal characteristics of the researcher such as race, gender, sexuality, and class can inform feminist research. They propose four criteria for conducting feminist IS research:

(1) engaging in researcher reflexivity; (2) challenging the hegemonic dominance, legitimacy, and appropriateness of positivist epistemologies; (3) theorizing from the margins; and (4) problematizing gender.

Chapter II, *A Taxonomy of Stakeholders: Human Roles in System Development* by Ian F. Alexander, explores the question, “Who are the humans interacting with technology?” Systems engineers have often paid too little attention to the nature of the so-called “users” of products under development. They are better called stakeholders, as many roles are involved, and few of those are in direct contact with the developed products. A simple and robust conceptual framework for classifying development stakeholders—a taxonomy—is proposed. The taxonomy is product-centric, with concentric “circles” denoting broad categories of stakeholder. Within these, generic “slots” describe typical classes of a stakeholder; these are subdivided into “roles,” which are expected to vary at least in name with the domain. Examples are given, and a popular template is re-analysed using the framework. The taxonomy has immediate value in identifying and validating stakeholder roles in requirements’ elicitation. This helps to ensure that key viewpoints on requirements are not missed. That, in turn, reduces the risk of instability and failure during development.

Chapter III, *21st Century Religious Communities* by Susan E. George, takes a very different approach and investigates the relationship of ICT and religion. This chapter examines the development of 21st century virtual communities, focusing upon those communities which have emerged for virtual religion. It aims to: (1) raise awareness of the way in which technology is being used for religious purposes; (2) explain the ways that human interaction in religious communities is influenced by technology, in both supporting traditional modes of interaction and in enabling new, and the main, criticisms; and (3) provide evidence to support the benefit of such communities to religious bodies themselves by turning to the question of technological determinism and the crucial question of just how humanity is influenced by technology.

Chapter IV, *Protecting One’s Privacy: Insights into the Views and Nature of the Early Adopters of Privacy Services* by Sarah Spiekermann, addresses one of the central concerns many users have when interacting with ICT, namely privacy. Using privacy and security technology becomes increasingly important in many application areas, for companies as well as for consumers. However, the market for privacy enhancing technologies (PETs) is still small, especially in the private consumer segment. Due to the nature of the technology per se, little is known and can be learned about the views and motivation of those who carefully protect their transactions on the Internet. Are they a niche group? Or do they hold views and have traits that promise a wider-spread adoption of PETs in the long run? This chapter describes a large-scale survey of users of a German anonymity service and provides PET users’ demographic and psychographic traits as well as an insight into the thoughts, feelings, and motivations of PET users.

Chapter V, *A Practitioner-Centred Assessment of a User-Experience Framework* by Peter Wright, John McCarthy, and Lisa Meekison, touches on a central issue of

the commercial use of ICT. The chapter outlines a practitioner-oriented framework for analysing user experience. The framework depicts experience as compositional, emotional, spatio-temporal, and sensual, and as intimately bound up with a number of processes which allow us to make sense of experience. It was developed and assessed as part of a participative action research project involving interested practitioners. They report how these practitioners used the framework, what aspects of experience they felt it missed, and how useful they found it as a tool for evaluating Internet shopping experiences. A thematic content analysis of participants' reflections on their use of the framework as a tool to evaluate Internet shopping experiences revealed some strengths and some weaknesses. The framework also captured aspects of experience that relate to both the sequential structure of the activity and its subjective aspects.

Chapter VI, *Impacts of Behavior Modeling in Online Asynchronous Learning Environments* by Charlie C. Chen, Albert L. Harris, and Lorne Olfman, addresses another pivotal area where humans and technology interact, namely education, teaching, and learning. The continued and increasing use of online asynchronous learning (OAL) environments for training raises the question of whether behavior modeling, the most effective training method in live instruction, will prove to be effective in OAL environments. If it is, to what extent will it be effective? In this study, behavior modeling training was delivered in three modes: face-to-face, videotaped, and scripted. Each behavior modeling mode expresses social presence to a different degree and, therefore, could impact both learning performance and the willingness of students to take online asynchronous training. This study reports on the effect of behavior modeling modes on three variables in an OAL environment—perceived usefulness, near-knowledge, and far-knowledge transfer—when learning a software application. This research found that the face-to-face environment is not significantly more effective than an OAL environment. The impacts of social presence seem to be higher in face-to-face OAL environments. Although videotaped instruction and scripted instruction were lower than face-to-face instruction, they deliver the same degrees of social presence and lead to a similar satisfaction level.

Chapter VII, *The Sociotechnical Nature of Mobile Computing Work: Evidence from a Study of Policing in the United States* by Steve Sawyer and Andrea Tapia, uses the sociotechnical lens to investigate the use of ICT at work. This chapter discusses the sociotechnical nature of mobile computing as used by three policing agencies within the United States. Mobile devices, access, and service were provided via a third generation wireless network to a focal application, Pennsylvania's Justice NETwork (JNET), a secure Web-based portal connecting authorized users to a set of 23 federated criminal justice and law enforcement databases via a query-based interface. In this study, the authors conceptualize mobility and policing as a socio-technical ensemble which builds on the social-shaping of technology perspective and the tradition of sociotechnical theorizing focusing on the co-design of work practices and technologies to support work. Drawing from the social informatics tradition, the authors turn a critical, empirical, and contextual lens on the practices

of mobility and work. Their analysis of the data leads them to find that the social and the technical are still separate in this mobile work context. This simple view of social and technical as related but distinct often leads to problems with collecting and interpreting evidence of ICT-based system's design and use. The authors further note this over-simplification of sociotechnical action is likely to continue unless more viable analytic approaches are developed and the assumptions of the current techno-determinist approaches are challenged more explicitly.

Chapter VIII, *Rhetoric, Practice, and Context-Sensitivity in Sociotechnical Action: The Compass Case* by Giuseppina Pellegrino, uses a similar theoretical outlook as the preceding one to shed light on a different case. Sociotechnical action, as interpreted in this chapter, comprises a wide array of elements that shape technological artefacts as socio-material and linguistic devices. Concepts grounded in different theoretical streams are used to account for the ambiguous and multiple process of technology construction. Categories of "interpretative flexibility," "inscription," "work-around," "misunderstanding," are reviewed and used in this account. Starting from the implementation of an intranet-based knowledge management system in a 100-staff British firm, different courses of action in technology implementation and appropriation are analysed. Interpretations performed by different actors can raise misunderstanding, failure, and innovation in processes of negotiation and are strongly oriented by power issues. The gap between rhetoric of public discourse and practice situated in specific organizational contexts is argued to be crucial in framing expectations and patterns of sociotechnical action. Ambiguity and multiplicity of the knowledge management system studied (the Compass) illustrate how the mutual constitution of the social and the technical makes technology a "context-sensitive" artefact.

Chapter IX, *The Socio-Pragmatics of IT Artefacts: Reconciling the Pragmatic, Social, Semiotic, and Technical* by Göran Goldkuhl and Pär J. Ågerfalk, uses the sociotechnical lens to discuss issues of system failure. There are many attempts to explain success and failure in information systems. Many of these refer to a purported sociotechnical gap. In this chapter, the authors develop an alternative approach that does not impose such a strong dichotomy, but regards social and technical rather as dimensions along which to study work practices. The developed theory involves not only the "social" and "technical" constructs but also other generic ones, namely "instrumental," "semiotic," and "pragmatic." They call this theory socio-instrumental pragmatism. To illustrate the theoretical concepts introduced, the authors use an example brought from an extensive action research study including the development of an information system in eldercare, developed through a participatory design approach.

Chapter X, *Sociotechnical Spaces—Guiding Politics, Staging Design* by Christian Clausen and Yutaka Yoshinaka, is the fourth chapter to concentrate on the socio-technical approaches. This chapter addresses how insights from the social shaping tradition and political process theory may contribute to an understanding of the

sociotechnical design and implementation of change. This idea is pursued through the notion of “sociotechnical spaces” and its delineation, with respect to the analysis of two distinct cases, namely, business process reengineering (BPR) and magnetic resonance imaging (MRI) in the light of “film-less” radiological practice, respectively. The chapter elaborates on sociotechnical space as being an occasioning as well as a result of sociotechnical choices and processes, and points to how socio-material and discursive practices may render such spaces open to problematization and action. It is suggested that the notion of sociotechnical spaces helps generate a sensitising guide for researchers and practitioners, and thus may serve as a constructive means with which to localise potential political concerns in processes of change. This chapter tentatively points to some analytical implications and also to challenges and possibilities for the “bridging” between spaces, which may otherwise be rendered analytically distinct.

Chapter XI, *Concerns with “Mutual Constitution”: A Critical Realist Commentary* by Alistair Mutch, is the final chapter among those dealing with the sociotechnical approach, and it extends a critical realist perspective to it. The case for “analytical dualism” as a means of approaching sociotechnical action is presented as an alternative to accounts which tend to conflate agency, structure, and technology. This is based on the work of Margaret Archer, whose work is, in turn, located in the traditions of critical realism. Her commitment to analytical dualism, which stresses both the importance of time in analysis and the emergent properties of structure, is argued to give a firmer purchase on the notion of context than the alternatives based on, for example, the work of Giddens and Latour.

Chapter XII, *A Framework for Monitoring User Involvement and Participation in ERP Implementation Projects* by José Esteves, Joan Pastor, and Josep Casanovas, returns to another central issue in the relationship between technology and humans: the participations of users in the design of the technology. In this chapter, a framework for monitoring user involvement and participation within ERP implementation projects is proposed by using the goals/questions/metrics method. The results of this work are threefold. First, a literature review is presented on the topic of user involvement and participation as related with ERP implementation projects. Second, a framework for monitoring user involvement and participation in ERP implementation projects is proposed. And third, a goals/questions/metrics preliminary plan is proposed to monitor and control user involvement and participation within ERP implementation projects.

Chapter XIII, *Investigating the Interdependence of Organisations and Information Systems* by Laurence Brooks, Christopher J. Davis, and Mark Lycett, explores the interdependence of organisations and information systems using the personal construct theory (PCT) as an underlying conceptual frame. Changing business models and information technologies were investigated in two distinct work settings: in each case, the technique contributed substantial insight into the role of information systems in that context. The analysis shows that the techniques have matured to a

stage where they provide a basis for improved understanding of the organisational complexities related to information technologies. The techniques focus on the social construction of meaning by articulating and interpreting the discourse that surrounds the development, implementation, and use of information technology in organisations. This chapter concludes by drawing out the idea of the development of a conceptual model to act as a framework for the analysis of cognitive schema and shared understanding. In developing and participating in this shared understanding, both organisational and technological communities could increase their awareness of each other's issues and concerns, thereby enabling them to improve the conceptual agility of the organisation.

Chapter XIV, *USE IT to Create Patient Relation Management for Multiple Sclerosis Patients* by Margreet B. Michel-Verkerke, Roel W. Schuring, and Ton A. M. Spil, is the only one in the current volume to deal with another problem area of central importance for the interaction between technology and humans—the area of ICT in healthcare. Patients with Multiple Sclerosis (MS) visit various healthcare providers during the course of their disease. It was suggested that information and communication technology (ICT) might help to orchestrate their care provision. The authors have applied the USE IT-tool to get insight in the relevant problems, solutions, and constraints of the MS-care both in the organisational and the information technological area. There is hardly a chain of healthcare, but rather, a network in which informal communication plays an important role. This informal network worked reasonably effective but inefficient and slow. The MS patients-count is only small for most care providers. Patients thought that lack of experience caused their major problems: insufficient and inadequate care. To improve care, the authors proposed a solution that combines an “MS-protocol,” the introduction of a central coordinator of care, and a patient relation management (PRM) system. This is a simple Web-based application based on an agreement by the caregivers which will support routing, tracking, and tracing of an MS patient and supply the caregivers with professional guidelines.

Chapter XV, *Contextual Characteristics of Creativity: Effects on IT-Supported Organisational Brainstorming* by Dick Stenmark, looks at the effects technology has on human creativity. As a much needed quality in today's businesses, creativity is an important area of research. Creativity is a complex and multi-faceted concept and can thus be studied from a variety of perspectives. In this chapter, the author describes an attempt to support organisational creativity with information technology, in this case an electronic brainstorming device. While implementing and evaluating this prototype, it was noticed that the sheer presence of technology guarantees neither usage nor success. Contextual factors such as organisational culture and attitudes seem to have an equally important role, and this observation calls for a more focused analysis of the motivational aspects of creativity management. Based on the empirical data from the electronic brainstorming system evaluation and literature on organisational creativity, three general pieces of managerial advice to promote

corporate creativity are suggested: (1) reconsider the use of extrinsic rewards; (2) recognise creative initiatives; and (3) allow redundancy.

These 15 chapters show the breadth of research pertaining to the interaction of technology and human beings. The approaches taken and the phenomena observed differ vastly, but they are combined by a desire to better understand how humans and technology interact. Some of the findings are of direct managerial relevance whereas others are of more interest in other areas, be it not-for-profit organisations or public administration. What they have in common is that they will help us understand how humans use technology and what influence technology can have on humans. Such knowledge is of pivotal importance if we are to successfully address the challenges of the 21st century technical civilisation.