

Introduction

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The diversity of issues, levels and perspectives in contemporary studies of the roles, values and uses of information and communication technologies (ICT, or IT in short) raises important questions about the degree of integration between the fields of strategic management, the sociology of organizations and their underlying disciplines (i.e., economics, sociology, psychology, anthropology). For instance, to what extent is a coherent and cumulative body of theoretical knowledge on the roles and uses of IT in contemporary organizations emerging? As research continues to advance in each of the disciplinary areas concerned with the strategic impact, organizational, social and economic transformation enabled by information technology, it becomes increasingly important to consider areas of integration across disciplinary perspectives:

The "...diversity of perspectives need not lead to fragmentation and a lack of consensus, however. Indeed, multiple views are vital to scientific advancement and do not condemn the field to an excess of unsubstantiated assertions disguised as new theories. *What is required is an epistemology capable of encompassing diverse, even seemingly contradictory, approaches*"¹ (p. 23, emphasis added).

The aim of this handbook is, therefore, to promote interdisciplinary progress by publishing original review chapters that synthesise and conceptualise prior studies in relevant research themes. To achieve the high quality levels needed, the selection of expert authors, central and emerging topics and rigorous peer reviewing have been central criteria for this proceeding. The handbook's contents embrace multiple studies

and a broad range of theoretical perspectives. The handbook includes relevant work by scholars who are part of recognised international communities of researchers. Chapters have been evaluated by members of an international review and advisory board, and assessed for their substantial contribution to the development of theoretical understanding by synthesising prior research and providing a conceptual foundation for future research.

Prior published reviews have focused on the organizational implementation, integration and alignment of new information technologies at the individual, group, organization and market level of analysis^{2,3}. The theoretical and empirical issues of past reviews encompassed IT-enabled organizational change, and more recently, learning and knowledge management. There is, however, a growing number of empirical studies that are looking at converging issues such as strategies for creating value and processes of transformation in organizations and electronic markets. The scope of this handbook includes the impact and transformation related to the functioning of organizations and inter-organizational networks, and the transformation and dynamics of electronic markets. More specifically, the editors identified the strategic impact and transformation processes in organizations and electronic markets as the two major areas that encapsulate the growing number of empirical studies.

IT-Enabled Transformation in Organizations

The academic literature highlights the role of collaboration, knowledge sharing and learning in competitive strategies and innovation. The intensity and pace of innovation in knowledge-intensive and hypercompetitive industries has brought the need for organizations to exploit their collaborative networks to boost their own innovation capacity. There is strong evidence in the academic literature that firms are adopting new information technology both intra-organizationally and inter-organizationally. The implementation and exploitation of information technology enables the virtualization of social relations and work processes, which may span the traditional organizational boundaries of the firm. Recent literature highlights the relationship of

new technologies and new organizational forms, such as “virtual organizations” and “virtual inter-organizational networks”. The Internet is enabling the creation of inter-organizational networks, such as virtual customer-supplier communities^{4,5}. Large companies and specialist supply firms have grown to become virtual inter-organizational networks with their partners acting essentially as knowledge brokers in many of the value-creating relationships. A supplier can use the Internet in such a way that it can interconnect information systems across multiple sites in the value chain and let information flow across functional boundaries.

Competitive strategies can be enhanced by the implementation of virtual organizational forms based on complex, interdependent social networks and knowledge-sharing relations, which are in turn enabled by developments in information technologies such as web-based applications and electronic communication. This is a key driver for providing completely new products and services. Innovation can originate from enabling dialogue between stakeholders about their products and services^{4,5}.

IT-Enabled Transformation in Electronic Markets

The implementation and use of information technology is enabling electronic commerce and markets, which are characterized by multi-channel transactions and relational processes which may span different activities of the value chain. Research shows that firms are gradually moving in the direction of outsourcing most aspects of their value chain and relying heavily on strategic alliances and collaborations with specialist and intermediary companies to become more flexible and faster to market^{6,7,8}. Firms are merging at a rate of trillions of dollars per year. Firms are selling, spinning off, or outsourcing their non-core activities at a high rate. These developments are united by a single threat, and that is the role of economies of scale and scope, which can be enhanced by the use of information technologies. Firms are entering into increasingly wider alliances and evolving networks of firms through electronic means. This includes the emergence of firms whose business strategies and marketing, production and innovation activities

are essentially enabled by internet-based information technology infrastructures, applications and services^{6,7}.

Electronic markets have evolved into interconnected one-stop shops, providing specialized services with affiliate firms. Worldwide Internet Commerce, both Business-to-Business (B2B) and Business-to-Consumers (B2C), will reach \$12.8 trillion in 2006 as estimated by Forrester Research. Electronic business models have evolved from basic electronic procurement and electronic commerce into more complex electronic market “ecosystems”. These electronic market environments are characterised by rapid exchange of information within a virtual network of customers and suppliers working and evolving together to create and re-create value-added processes. Scholars have suggested that electronic businesses are not just members of certain industries but parts of an ecology that incorporates different industries, where the driving force is not pure competition but co-evolution⁸.

Overview of Chapters

In Chapter 1, Liu and Vijayaraman adopt the premise that we are entering a fourth generation of e-business. The focus of this fourth generation of e-business is on information integration. Two emerging e-business technologies, e-services and radio frequency identification (RFID), are discussed and their roles in cross-boundary information integration reviewed. This review includes the basic concepts of these technologies, a critical assessment of their current status, and a discussion of the challenges to their adoption.

In Chapter 2, Barrett reviews the contemporary conceptual positions regarding interplay between information and communication technologies (ICTs) and organizational change and the implications for new modes of organizing. This review includes key dimensions of intra-organizational and inter-organizational forms that can be facilitated by advances in ICTs, and the potential of the ICT to enable changing organizational forms. This review includes the technological imperative, structural approaches, and an extended discussion of the emerging perspective of “practice lens” approach.

In Chapter 3, Chudoba and Watson-Manheim focus on virtual work environments, as many of today's organizational designs require adaptive responses to overcome barriers to collaboration. Much of the research has focused on characterizations of explicit discontinuities in the virtual work environments (VWE). As understanding has increased, many have come to consider the VWE as a hybrid condition or as a continuum with varying degrees of virtuality. This suggests a more fluid conceptualization of discontinuities in the VWE, rather than a finite set of attributes. Drawing from our research in several Fortune 100 companies, all with a strong global presence, we found that the *process* of working in the VWE has a greater impact on performance than simply the presence of one or more discontinuities. By focusing on *how* work happens in the VWE, we highlight the adjustments and adaptations that those in the VWE make.

In Chapter 4, Johnson and Real address the role of human agency in brokering the integration of information technology in organizations involved in electronic markets. We review literature on organizational integration and implementation of information technologies and conclude there has not been much agreement about the types of integration that are possible or a synthetic framework that can be used to organize this literature. Organizational integration is defined in terms of its various types, and each of these types involves differing levels of alignment, organizational learning, skills, impacts on work processes, structural change, uncertainty management, resistance, transaction costs, and impacts on electronic markets. We address one key gap in current research by considering the differing brokerage roles in these types. We end this chapter by discussing implications for policy and everyday life in terms of transaction costs, human agency, and communication.

In Chapter 5, Loonam and McDonagh review the concepts and premises of enterprise systems. Enterprise systems are large software packages that promise to seamlessly integrate organizations' business processes. The chapter begins with an historical tour of the evolution of enterprise systems. This is followed by highlighting implementation trends for enterprise systems, before moving on to discuss factors deemed necessary for the successful implementation of these systems. A critique of critical success factors is provided, which clearly

demonstrates that empirical investigations must go deeper in order to fully explain the implementation of enterprise systems.

Through Chapter 6, Pateli and Giaglis review the impact of advanced information and communications technologies (e.g., ERPs, Internet Commerce, etc.) on the current way of doing business, which has raised the interest of researchers on describing and analyzing the new internet-enabled business logic. Early research in the area of information technology strategy and management has made it explicit that the introduction of advanced IT technologies is a complex issue, and as such it should be examined not only from the IT infrastructure viewpoint, but also in terms of organizational strategy, structure and operations. Drawing on a critical review of selected studies on business models, a multi-theoretical framework to examine research on business models under a set of established strategic, organizational, social and information system development and management perspectives is developed.

In Chapter 7, Seror develops a framework for analyzing the future development of virtual infrastructures in service delivery systems illustrated in the health care context. Market dynamics and control mechanisms define the logic of system structures, processes and ideologies. Ideology, defined as the integrated theories and values that constitute a coherent socio-political system, is expressed in patterns of stakeholders' participation in the financing, administration, and regulation of service delivery, including the roles of government, service providers, and consumers. Four configurations describe how telecommunications technologies, the Internet, and grid computing shape virtual infrastructures in the health care context. These configurations are motivated by professional, citizenship, consumer, and managerial values. The analysis further suggests that the open source software movement may influence the ideologies of service delivery systems, particularly through grid infrastructures.

In Chapter 8, Voelpel, Dous, Brenner and Kolbe illustrate Siemens' efforts to establish a sustainable, global knowledge-sharing system. This includes both the description of the technical platform used for the transfer of knowledge, and how Siemens addressed those crucial aspects

that are required to anchor a knowledge-sharing initiative within an organization. The case study culminates in six key learning aspects for Knowledge Management practitioners on how to support the global transfer of knowledge by establishing a knowledge culture within the organization.

In Chapter 9, Qureshi and Keen suggest that in order to mobilize knowledge where there is demand for it, it has to be activated. It considers the knowledge identity of the person whose knowledge is to be activated and uses these identities to analyze a case study in which highly distributed knowledge is activated. The analysis of a case study reveals “activation conditions” that delineate processes in which electronic collaboration technologies can be most effective. This has implications for the transformation of organizations and creation of collaborative work environments that enhance knowledge activation in organizations. The chapter concludes with implications and recommendations for activating knowledge in organizations.

In Chapter 10, Pentland, using organizational ecology as a starting point, outlines a framework for studying the ecology of inter-organizational routines in e-commerce. From this perspective, the adoption of e-commerce technology can be viewed as a population-level phenomenon, rather than a firm-level phenomenon. Net-based technologies are distinctive because they require integration with the systems of *other* organizations, as well as one’s own internal systems. It makes sense to study technology adoption at the firm-level for technologies whose impact is limited to the boundaries of the firm. But for technologies ranging from EDI to ebXML and beyond, the main goal is to facilitate inter-organizational relationships. For these kinds of technologies it is better understood as a *population*-level phenomenon. This chapter concludes with a framework for the study of populations of inter-organizational routines.

In Chapter 11, Roijackers, Duysters and Sadowski-Rasters identify insights from the communication literature and evaluate their relevance for improving our current understanding of inter-firm learning in international networks of knowledge-intensive companies. While the sharing of technical knowledge and effective inter-firm learning have

been related to general characteristics of knowledge networks, such as centrality and tie strength, very few researchers in the networking literature have studied learning in the context of the personal communication network underlying alliance networks. Their critical examination of the networking literature has shown that a number of important research questions that relate to CMC and strategic alliances have, until now, remained largely unanswered. They try to fill that gap by providing an integrated view of the use of CMC in international alliance networks.

In Chapter 12, Ash critically reviews different extant frameworks for strategic planning and outsourcing. The review highlights the objectives, benefits and limitations of the various frameworks, and summarises their strategic principles and assumptions. The conceptual frameworks used were chosen for their coverage of the topic of strategic sourcing, their historical and strong case-based development.

In Chapter 13, Kofinas develops two alternative ontological perspectives on IT-enabled innovation: the New Economy perspective and the a-modern perspective. In the former the role of IT in enabling innovation is paramount, while in the latter view IT is not important and what matters is how IT is utilized to bring about innovation. These two perspectives are utilised to analyse the challenges that multinational companies face in the global electronic markets. The resulting dialectic will illuminate the changes that are taking place within multinational companies (MNCs) and in their interactions with the broader international context.

In Chapter 14, Cassiman and Sieber focus on the roles of the Internet and new opportunities for value creation. The new technology simultaneously affects demand and costs structures leading to a radical transformation of existing market structures. Appropriation of any value created has, therefore, become more challenging. Furthermore, as the Internet impacts industries in several ways simultaneously, they find that simply analyzing the effect of Internet on pricing behavior and price dispersion misses the point of industries being transformed, which clearly affects the pricing power and possibilities of individual firms. In this paper they provide a conceptual model for analyzing the different

elements within the dynamics of industry transformation and understanding the impact of Internet on market structure. They further illustrate the different concepts with actual case examples.

In Chapter 15, McGill focuses on how IT has transformed relationships among firms in manufacturing, electronic commerce, and research intensive industry sectors, emphasizing a number of contextual factors that may either create or limit these transformations. The contribution of this chapter is to link the IT and strategic management literatures and to provide a starting point for future research that focuses on the intersection of IT and strategy. The chapter unfolds as follows. The next section examines theories of economics and management and their connection with IT-enabled transformation, followed by a selective review of industry sectors focused on manufacturing, electronic commerce, and research and development. The chapter concludes with a synthesis and discussion of IT-enabled transformation.

In Chapter 16, Cawood begins with a review of some key examples of those theories which seek to account for the role of ICTs and information in creating new forms of social structure. Here, the underlying issue of technological determinism will be addressed and a guide given to the differing perspectives and methodologies which have arisen from approaches such as post-modernism and post-industrialism. The second part of the chapter includes an examination of the theoretical models of social structures in the age of the Web and the growth of research into network culture, community and identity. In the last part of the chapter, the consumption of ICTs in households will be discussed in relation to changes in family structure and emergent patterns of home life.

In Chapter 17, Spender relates technologies to organizations, theorizing their interaction and the essential learning processes as people within organizations adopt technologies. Drawing from radical constructivism and central to this theoretical critique are three key fundamental distinctions: realist and interpretive, intellectual and practical, and rationality and creativity distinctions.

In Chapter 18, prompted by the emerging importance of information and communication technology in today's global political economy,

Jaros critically discusses the notion that “knowledge”, or more specifically, “learning processes” which leverage ICT, would serve as a better root metaphor for understanding the nature of value creation in contemporary capitalism. This proposal suggests that knowledge and learning systems, often embedded in non-human assets such as communication networks, workflow configurations, robots, and computer information systems, have usurped the role of production labour as the source of value in modern corporations. More specifically, Jaros re-evaluates evidence of the “correctness” of Jacques’s view that knowledge/ICT has largely replaced labor as the source of value in global capitalist production processes. He concludes that it has not, and therefore describes how they can be reconciled. Jaros then assesses the political utility of this reconciliation. In other words, what is the value of a theory of value that recognizes both knowledge and labor inputs? Speaking from a critical-political perspective: irrespective of the empirical correctness of the LTV or KTV or any theory of value, Jaros questions what is the value of using the KTV as a “metaphor” to describe global capitalism and advance the economic welfare of all employees, technical or manual?

In the concluding chapter, Salazar and Sawyer give a critical overview of selected representative studies focusing on IT-enabled transformation innovation at the level of the organization and markets. This overview provides key insights regarding the type of empirical issues scholars have traditionally focused on, including the theoretical lenses they have applied. This overview discusses existing strategic management theories applied to information technology studies, including the resource-based view and transaction cost economics, as well as more recent theoretical developments such as the relational and dynamic capabilities perspectives, organizational learning and knowledge management, neo-institutional theory, and adaptive structuring and practice perspective. This overview concludes with a discussion of the implications of remaining problematic areas for the possible extension and integration of current and emergent theories.

Table 1. Overview of Chapters

| | | | |
|----|---|----------------------|--|
| 1 | Liu and Vijayaraman | Review | E-commerce & information integration technologies |
| 2 | Barrett | Review | ICTs and organizational change |
| 3 | Chudoba and Watson-Manheim | Empirical | Virtual work environments |
| 4 | Johnson and Real | Review | Organizational integration and implementation of ICT |
| 5 | Loonam and McDonagh | Review | Enterprise systems' concepts and trends |
| 6 | Pateli and Giaglis | Review | IS and management perspectives |
| 7 | Seror | Framework | Virtual infrastructures in service delivery (in health care) |
| 8 | Voelpel, Dous, Brenner and Kolbe | Empirical | Knowledge management |
| 9 | Qureshi and Keen | Empirical | The mediating role of collaboration technologies in activating knowledge |
| 10 | Pentland | Framework | Ecology of inter-organizational routines in e-commerce |
| 11 | Roijakkers, Duysters and Sadowski-Rasters | Review | Inter-firm learning in knowledge-intensive networks of organizations |
| 12 | Ash | Framework | Strategic planning and outsourcing |
| 13 | Kofinas | Framework | Two models of IT-enabled innovation |
| 14 | Cassiman and Sieber | Framework | Dynamics of industry transformation and impact of Internet on market structure |
| 15 | McGill | Review | IT and transformation in various industry sectors |
| 16 | Cawood | Review | Contrasting theories of IT and use in home and family |
| 17 | Spender | Theoretical critique | Technology relationships with organizations |
| 18 | Jaros | Theoretical critique | Knowledge/ICT and labor as source of value in global capitalist production processes |
| 19 | Salazar and Sawyer | Review | IT-enabled transformation innovation at the level of the organization and markets |

References

1. Baum, J.A.C. and Rowley, T.J. Companion to Organizations: An Introduction. In Joel A.C. Baum (Ed.), *Companion to Organizations*, Blackwell Publishers, Oxford, 2002.
2. Dewett, T. and Jones, G.R. The role of information technology in the organization: a review, model and assessment, *Journal of Management*, 27, 2001, pp. 313-346.
3. Kauffman, R.J. and Walden, E.A. Economics and Electronic Commerce: Survey and Research Directions, *International Journal of Electronic Commerce*, 5(4), 2001, pp. 5-116.
4. Scott-Morton, Michael. *Information Technology and the Transformation of the Corporation in the 1990s*, Oxford University Press, 1991.
5. Brews, P. and Tucci, C.L. Exploring the Structural Effects of Internetworking, *Strategic Management Journal*, 25, 2004, pp. 429-451.
6. Mata, F.J., Fuerst, W.L. and Barney, J.B. Information Technology and Sustained Competitive Advantage, A Resource-Based Analysis, *MIS Quarterly*, 19, 1995, pp. 487-505.
7. Kim, E., Nam, D. and Stimpert, J.L. The Applicability of Porter's Generic Strategies in the Digital Age: Assumptions, Conjectures and Suggestions, *Journal of Management*, 30(5), 2004, pp. 569-589.
8. Salazar, A., Hackney, R. and Green, L. (Eds.) The Strategic Impact and Diffusion of Electronic Commerce Technologies and Services, Special Edition, *International Journal of Information Technology and Management*, 4(2/3/4), 2004, pp. 123-126.