

Discourses on Innovation and Development in Information Systems in Developing Countries' Research

Chrisanthi Avgerou
C.Avgerou@lse.ac.uk

London School of Economics

Discourses on Innovation and Development in Information Systems in Developing Countries' Research

INTRODUCTION

There is a fairly large literature on Information Systems in Developing Countries (ISDC) research¹. Being nurtured within the field of Information Systems, ISDC research tends to focus on the development and implementation of information technology applications and the organizational changes associated with them. Nevertheless ISDC research has extended the IS research domain to consider the broader socio-economic context of the organizations hosting new technologies. I will refer to this object of study of ISDC research as 'IS innovation' to convey the notion of novelty of experiences of IS implementation and the associated changes within the hosting organization and beyond it. The rationale for using the term innovation is that, even if the technologies implemented in an IS project are already common elsewhere and widespread, the local experience of technology implementation and socio-organizational change constitutes an innovation for the organization concerned and may well constitute innovation for its socio-economic context. Seeing IS implementation as innovation sensitizes the researcher to consider the effort of technology and organizational change and the value of such change in relation to an organization's context. As I argue in this chapter, this is particularly important in ISDC research.

ISDC research is premised on the potential of ICT to contribute to the improvement of socio-economic conditions in developing countries (Sahay 2001; Walsham et al. 2007). It aspires to the realization of perceptions of desirable world orders, such as Sen's theory of capabilities (Madon 2004) or the United Nations' Millennium Goal (Gilhooly 2005) vision of eradicating poverty. It is also guided by conceptual models of transformations happening in the contemporary world that necessitate ICT infrastructures, such as Castells' ideas of society and economy as networks (Braa et al. 2004). But beyond these very general premises and aspirations, every ISDC study makes also assumptions about the way IS innovation happens in the context of developing countries and about the notion and process of 'development' towards which IS innovation is intended to contribute.

The existence of alternative assumptions and theoretical perspectives regarding IS innovation are a feature of the epistemological state of IS research in general, and has been extensively discussed in the IS literature (Hirschheim and Klein 1989; Orlikowski and Baroudi 1991; Robey and Boudreau 1999). To some, this state of diversity of research questions, theoretical foundations and research method is a weakness that needs to be corrected with more strict 'disciplinary' mechanisms (Banville and Landry 1992; Benbasat and Weber 1996; Benbasat and Zmud 2003). But others have argued that that plurality in IS research stems from the nature of IS innovation as a social endeavour, and reflects deeper epistemological perspectives within the social sciences. Rather than seeking to eliminate alternative perspectives, IS research can strengthen its contributions by making explicit their underlying conceptual and theoretical differences (Hirschheim and Klein 1989; Robey 1996). I take this latter view and, in this chapter I seek to explore the different underlying perspectives regarding IS innovation within the broader socio-economic context of developing countries.

¹ For a review, see Avgerou, C. "Information systems in developing countries: a critical research review," *Journal of Information Technology* (23:3) 2008, pp 133-146.

Development is a contested notion too, and it has been subject to a long theoretical debate. Moreover, development policy and action are entangled with the conflicting interests and power relations in the contemporary global and national politics. The international agencies' policies for economic growth and institutional reform are widely contested in developing countries. Most ISDC studies avoid engaging with controversies on 'development' and tend not to discuss what constitutes development. However, some ISDC authors addressed the question of development more explicitly. For example, Thompson (2004) drew from Escobar's Foucauldian critiques of the discourse on development and voiced suspicion about the development policies IS innovation interventions are intended to support (Thompson 2004). Some authors have taken a critical stance to the currently prevailing development ideas that drive the discourse on digital divide and justifies IS innovation in terms of creating a country's competitiveness capabilities in a global free market (Wade 2004a; Warschauer 2003). Others pointed out the ongoing controversies about the validity of this theoretical position and suspicions on the motives of the agencies that promote them (Avgerou 2003b; Ciborra 2005; Heeks and Kenny 2002; Westrup and Al-Jaghoub forthcoming).

The combination of assumptions regarding the nature of IS innovation effort and development as the aim for IS innovation gives rise to different discourses in ISDC research. I use the term 'discourses' to refer to research approaches stemming from these assumptions on the fundamental nature and consequences of IS innovation. Approach is too vague a term, while 'discourse' indicates more specifically the research language of concepts, theories, and methods, through which researchers form the object of a research study and construct arguments about it.

My main literature sources for this chapter are the specialist journals on ISDC, namely *Information Technology for Development*, *Information Technologies and International Development*, and the *Electronic Journal of Information Systems in Developing Countries*; and the proceedings of the series of conferences on ICT in developing countries organized by the IFIP WG9.4, published in books and journal special issues (Avgerou and Walsham 2000; Bhatnagar and Bjørn-Andersen 1990; Bhatnagar and Odedra 1992; Krishna and Madon 2002; Krishna and Madon 2003; Odedra-Straub 1996; Roche and Blaine 1996; Sahay and Avgerou 2002). In addition, I reviewed articles on developing countries published in the general IS journals, some of them in special issues on ISDC research ².

In the next section I present two perspectives regarding the nature of the IS innovation process: as transfer and diffusion and as socially embedded action; I draw relevant examples from the literature on IS implementation and IS and culture to demonstrate them. In the following section I distinguish between two perspectives on the nature of development transformation towards which ICT is understood to contribute: progressive transformation and disruptive transformation. I draw examples from various research themes and, more specifically, from the literature on telecentres. I then discuss the four discourses formed by combining the perspectives on the nature of IS innovation process and on the nature of development transformation process, and demonstrate them with examples from the literature on software industries in developing countries. Finally, in the conclusions, I argue for the need to develop theoretical capabilities for studying IS innovation in relation to socio-economic contexts and to increase awareness and use of socio-economic development theory.

² See, *The Information Society*, vol 19, no.1, 2003; *Information Technology and People*, vol. 16, no.1, 2003; *MISQ*, vol 31, no 2, 2006.

IS INNOVATION IN DEVELOPING COUNTRIES

ISDC research has been shaped with acute awareness of the relentless ICT and organizational innovation taking place in advanced economies of the world - primarily North America and Europe - and of the increasing socio-economic interconnectedness of all countries and regions in the condition named globalization. With such awareness, an assumption permeating most ISDC research is that developing countries are in disadvantage in relation to the IS innovation experiences in the context of the origin of new technologies and related new organizational models. This sense of disadvantage is manifested in various ways. To begin with, emphasis has been given to the limited technology and skills available in developing countries or regions. This culminated in the notion of 'digital divide' signifying a new form of inequality and source of socio-economic disadvantage. Some research focused on the significance of this problem and sought to monitor progress in reducing it (Kenny 2000; Mbarika et al. 2003; Wresch 1998). Most ISDC research, though, tends to focus on the experiences and consequences of IS innovation, rather than the limitations of technical resources that inhibit it. Such research too tends to be grounded on the assumption that technological and institutional trends are set elsewhere and conveys a sense of urgency to engage with these trends. Difficulties met in following trends and standards of ICT-enabled globalization and in practicing IS innovation effectively feature frequently in research questions and findings of ISDC research, see for example (Heeks 2002).

Thus, invariably, research on how IS innovation happens in developing countries and with what consequences acknowledges and addresses distinctions of context. The context where a new technology artefact and business model first took shape (usually in an advanced economy) may be different from the context where this combined artefact and model are implemented as part of IS innovation practice in a developing country. Moreover, the socio-organizational settings of IS innovation within sectors, countries, or regions may differ substantially from each other – for example e-government is practiced differently and with different results in countries with different public administration sectors.

General IS research has rarely addressed explicitly questions of the socio-economic context of IS innovation and is weak in relevant theoretical guidance. Nevertheless two different orientations towards addressing issues of context are implied in the *universalistic* and *situated* research traditions of general IS research and influenced ISDC research (Avgerou 2002; Avgerou and Madon 2004). Universalistic perspectives elaborate on the value of ICT and information and on the processes of IS innovation through which such value can be realized in terms of general techno-economic reasoning, independently from the particular circumstances of the social actors involved. For example they look for 'best practice', or for the most suitable new organizational form for the information age (Fulk and DeSanctis 1999; Scott Morton 1991). They often acknowledge contextual contingencies, but assume an overriding rationality that determines universal goals of IS innovation and the logic of action towards their satisfaction (Porter and Millar 1984). In contrast, situated perspectives consider IS innovation as enacted by social actors and tend to place emphasis on meaning making and practice within the power dynamics of the *immediate setting* of the innovating organization (Orlikowski et al. 1996; Suchman 1994). These perspectives are discernible in two different ways of addressing issues of context in ISDC research, either in terms of *transfer and diffusion* processes or in terms of *socially embedded* processes.

TRANSFER AND DIFFUSION

The transfer and diffusion perspective examines IS innovation as the diffusion of IS knowledge transferred from advanced economies and adapted to the conditions of developing countries. This perspective assumes that the material/cognitive entities that comprise IS technologies and associated practices of organizing are adequately independent from the social circumstances that give rise to them to be transferable, more or less intact, into any other society. Consequently, subject to suitable adaptation, these entities can make a desirable impact. Such research, therefore, traces the particular factors that capture the differences of the recipient country and organization that are likely to affect the innovation process - such as economic conditions, technology competences, people's attitudes to IT, institutionalised work place habits. Consequently it designs modifications of the technologies and interventions in the recipient institutions to make them hospitable to the intended innovation.

In studies of IS development and implementation, authors following the transfer and diffusion approach assume and endeavour to show the relevance of general IS research knowledge and good practice models (methods, analytical approaches, or theories) in particular developing countries or regions and to work out adaptations appropriate for them. They often shape their research in the conceptual terms of the theories of technology diffusion and technology acceptance (Davis 1989; Rogers 1995). For example Rose and Straub (1998) and Al-Gahtani (2003) use Davis' technology acceptance model to study IT use in the Arab world, and identify empirically the particular factors of the social and organizational context of the Arab countries that affect their take up of ICT (Al-Gahtani 2003; Rose and Straub 1998).

Many studies have sought to transfer and adapt systems development methodologies to accommodate analyses of the socio-organizational conditions of developing countries (Bell and Wood-Harper 1990; Korpela 1996; Korpela et al. 2000; Mursu et al. 2003). Similar method adaptation efforts have addressed the implementation of ERP technologies and IS-driven organizational change (He 2004; Jarvenpaa and Leidner 1998). Such studies enrich IS implementation knowledge and professional practice by working out modifications appropriate to accommodate various local circumstances. They avoid an a-contextual 'best practice' view and adopt a notion of 'appropriate', context-specific practice (Avgerou and Land 1992; Bada 2002). They challenge the feasibility of 'transferring' generic technical know-how into developing countries organizations with the expectation of the same organizational practices and outcomes as in their context of origin (Avgerou 1996). Yet, they retain the general assumptions on the validity of purpose of the attempted innovation as well as the validity of the underlying objectives and rationality of the transferred methods in their new context of practice.

SOCIAL EMBEDDEDNESS

The *social embeddedness* perspective takes the view that IS innovation in developing countries is about constructing new techno-organizational structures within a given local social context. It focuses attention on the embeddedness of IS innovation in the social context of various organizational settings of developing countries. The socially embedded innovation research approach finds the assumption of the transfer and diffusion perspective about the nature of information systems oversimplifying and misleading. It has developed more elaborate ontologies of IS innovation as socially constructed entities, and therefore contingent in their perceived significance and their interplay with human actors and their social

institutions. The focal point of the research is the process of innovation *in situ*, thus tracing the cognitive, emotional, and political capacities that individuals nurtured in their local social institutions bring to bear on unfolding innovation attempts. Through this approach the socially embedded innovation discourse sheds light on what, regarding an attempted innovation, is locally meaningful, desirable, or controversial, and therefore how innovation emerges (or is retarded) from the local social dynamics. With attention to local concerns, situated meanings of ICT, and courses of reasonable action that often differ from the taken-for-granted rationality of IS innovation, ISDC studies reveal a much more complex picture of the IS innovation effort than the general IS field has constructed, see for example (Miscione 2007).

Studies of IS implementation that follow the social embeddedness approach see the purpose of innovation as arising from local problematizations and its course as being determined by the way local actors make sense of it and accommodate it in their lives (Avgerou 2002). To that end, this perspective found theoretical grounding in contemporary social theory, such as Actor Network Theory, structuration theory, organizational institutionalism. These provided insights and vocabularies to address conceptual relationships such as technology/society, agency/structure, technical reasoning/institutional dynamics. The main objective of contextualist ISDC studies has been the development of theoretical capacity for addressing questions concerning the way specific categories of technologies and social actors clusters are formed, shape each other, and construct particular socio-economic effects.

In comparison to situated studies in the general IS field, ISDC studies following the social embeddedness approach broadens research perspective beyond the particular circumstances of work within an organization - see for example (Ciborra and Associates. 2000; Orlikowski 1996; Orlikowski 2000). Early efforts to account for IS innovation in relation to its context built on Pettigrew's contextualist theory, which views particular instances of organizational interventions as processes unfolding through time in relation to layers of context: typically, the organizational setting and its national environment (Pettigrew 1985; Walsham 1993). Madon, for example, followed Pettigrew's contextualist analysis to study the introduction of computers for the management of a rural development programme in India's local administration districts. Her analysis encompassed work norms within the district bureaucracies as well as cultural aspects of the Indian rural setting within which the rural development initiative and its administration was embedded (Madon 1993). While Pettigrew's contextualist approach continues to be followed in ISDC studies (Braa et al. 2007a), several other theoretical approaches have been introduced to explore IS innovation in the developing countries' context, including neo-institutionalist and social constructionist analyses (Avgerou 2001; Avgerou 2003a; Miscione 2007; Silva 2007).

An example of research that takes such a socially embedded view of IS innovation is the series of publications on an extensive action research programme aiming to contribute to the development and implementation of healthcare information systems (HISP) in African, Asian, and Latin American countries (Braa et al. 2007a; Braa et al. 2004). Authors analysing the HISP efforts have used a variety of complementary socio-theoretical approaches – structuration, ANT, Castells networks of action model, complexity theory. They have not attempted to capture the healthcare context of developing countries in a best practice general model. Instead, they have aimed to develop a conceptual analytical capacity to guide context-specific sense making and practice in countries with different health care systems and practices. This has led them to consider a range of issues, including standards that are sensitive to the local context (Braa et al. 2007a), and multiple country collaboration across

north (technologically and economically advanced) and south (developing) regions (Braa et al. 2007b).

Another example of the social embeddedness perspective is a study of a 10-year effort to implement a data infrastructure for land administration in Guatemala by Silva (2007). His study traces the unfolding of power dynamics within the institutional context of the country and focuses on the historically formed lack of inter-institutional cooperation in the country that created conditions unfavourable to sharing data.

TRANSFER AND DIFFUSION AND SOCIAL EMBEDDEDNESS PERSPECTIVES IN RESEARCH ON IS AND CULTURE

In ISDC studies of culture the transfer and diffusion approach frames the relationship of IS and culture in terms of transferring ICT applications into a non-western national culture, which is usually seen as posing obstacles to innovation and as being a source of resistance (Struab et al. 2001). Hofstede's model of national culture variables and cultural difference (Hofstede 1984) is often used to analyse conflicts between values embedded into and behaviours required by ICT and the national culture of developing countries (Leidner and Kayworth 2006).

Such studies have been criticised as oversimplifying cultural difference, see for example (Myers and Tan 2002); they 'sweep the subtleties of cultural difference under the universal carpet' as Walsham put it in his extensive discussion of examples of ISDC studies of IS innovation and culture (Walsham 2001). In contrast, research taking the socially embedded and transformative perspective has led many authors to highlight distinct features of historically formed collective behaviour that require attention when designing appropriate ICT systems, or when organizing the innovation process, such as attitude to hierarchy, arranging action in time, sense of space and geography (Rohitratana 2000; Sahay 1998; Zakaria et al. 2003). It has also drawn attention to cross-cultural interactions. In effect, such studies avoid the juxtaposition of IS innovation - assumed to be inscribed with western culture - with DC culture - assumed to be bent to accommodate it (Walsham 2002).

Particularly promising is the research that suggests a concept of culture which is dynamic and emergent, 'constantly being maintained and changing', an ongoing accomplishment (Westrup et al. 2003). Such research transcends the ICT/culture fit or conflict. Neither ICT nor culture are taken to be uni-dimensional determinants of values and behaviours. ICT, seen as a hybrid network of artefacts, people, and institutions, is subject to negotiation and local IS innovation shaping. Cultural influence on IS innovation, seen as a historically formed disposition for a particular behaviour, may stem from the innovating organization, its national or regional environment, or the social class of individual actors. And rather than IS innovation fitting in or conflicting with the culture of its social context, of particular interest is the mutual re-constitution of IS innovation and the cultures that influence it.

THE QUESTION OF DEVELOPMENT IN ISDC RESEARCH

The main motivation for ISDC research is the belief that ICT has, potentially, the capacity to contribute towards the improvement of many different aspects of life, from alleviating poverty to strengthening the democratic polity. But not all IS research in developing countries engage explicitly with questions of 'development' as action to transform the socio-economic conditions that have been historically formed in the so-called 'developing countries'. In this chapter I am interested in the research that concerns developing countries and is conscious of

development as a purposeful and contested endeavour. Therefore, I examine that part of the literature that goes beyond a declaration of an assumption that ICT may serve good causes – e.g. the elimination of poverty – and at least implicitly takes a position regarding the socio-economic transformation process through which ICT will deliver its potential benefit.

Such transformative ISDC research often focuses on specific developmental aims, such as enhancement of livelihoods in rural areas (Duncombe and Heeks 2002), or improved government services (Krishna and Walsham 2005), and seeks to understand the effort it takes for IS innovation to take place successfully and deliver expected benefits. More often than not, though, ISDC research, confronted with the complex and highly political challenges of development endeavours, takes a critical stance to the role of ICT and development. I distinguish two perspectives of ICT-enabled development. The *progressive* perspective considers ICT as enabling transformations in multiple domains of human activities, but they can be accommodated within the existing international and local social order. The *disruptive* perspective is premised on the highly political and controversial nature of development, both as a concept and as an area of policy for international and local action, and reveal conflicts of interest and struggles of power as a necessary part of IS innovation in developing countries.

PROGRESSIVE TRANSFORMATION

The progressive transformation perspective in ISDC research reflects a much more widespread understanding of ICT as an instrument for economic and social gains that has been promoted since the mid 1990s by major international development agencies, including the World Bank (World Bank 1999), the United Nations Development Programme (United Nations Development Programme 2001), the World Economic Forum (Dutta and Mia 2009). UNDP's 2001 Human Development Report (United Nations Development Programme 2001, p. 29) is a good example of the association international organizations make between ICT and development, not least because this series of UNDP reports takes a broad view of development as a socio-economic condition that goes beyond a narrow consideration of economic growth. The 2001 UNDP report seeks to present a clear association between technology and desirable development effects, giving special attention to ICT – particularly the Internet. Indicatively, it quotes a World Bank study (Wang et al. 1999) that showed 'technical progress accounted for 40-50% of mortality reductions between 1960 and 1990 – making technology a more important source of gains than higher incomes or higher education levels among women' (United Nations Development Programme 2001, p. 29). It asserts that, '(c)ross-country studies suggest that technological change accounts for a large portion of differences in growth rates' (ibid.).

Central in this perspective is the view is that 'investment in ICT and effective use do matter for the economic development of a country' (Mann 2004), p. 67. It is acknowledged that other changes matter too, particularly because ICT needs to be accompanied by organizational restructuring to deliver productivity gains (Dedrick et al. 2003; Draca et al. 2007). Moreover, development requires effective government, and e-government is considered to be an important tool for achieving efficiency, transparency and responsiveness. International development agencies have emphasized also the potential of ICT to improve the performance of state institutions, the delivery of health and education services, as well as democratic participation (United Nations Development Programme 2001).

Some ISDC research has sought to corroborate this thesis on the economic significance of ICT for development (Mbarika et al. 2007; Ngwenyama et al. 2006), addressing concerns of sceptics who doubt the appropriateness of ICT for poor countries and point out their pressing

necessity to provide for the basic life needs of a large part of their population, alleviate extreme poverty, and fight endemic diseases and illiteracy. But on the whole ISDC research in the progressive transformation perspective tends to accept without testing the assumption that ICT potentially contributes to economic growth and to investigate the features of the ICT-based economy in particular countries or regions (Molla 2000) or the way ICT contributes to the competitiveness of organizations or regions (Goonatilake et al. 2000; Jarvenpaa and Leidner 1998; La Rovere 1996; La Rovere and Pereira 2000; Munkvold and Tundui 2005). Some research from the progressive transformation perspective elaborated on the conditions under which ICT mediated business models and practices, which are considered necessary for participating in the global economy are diffused or the conditions under which IT-enabled niche industries are fostered (Davis et al. 2002).

The progressive transformation perspective is discernible also in research studying IS innovation in non-commercial organizations, such as in the development of national health data infrastructures (Braa et al. 2007a). The fundamental assumption is that IS innovation in the institutions responsible for the provision of social services can empower them to improve their services and work conditions (Puri 2007).

DISRUPTIVE TRANSFORMATION

The disruptive transformation perspective considers development, including ICT-enabled development, as a contested endeavour or as involving action that affects differently different populations, and thus laden with conflict. Research taking this perspective often expresses doubts about the effectiveness and even the intentions of international or national policies regarding ICT and development. At the international level, analysis manifests suspicion of the developmental intentions of the so-called Washington Consensus as well as the effectiveness of the policies for development that comply with the institutions that comprise it – World Bank, IMF, WTO. At the local level they see the established social order as harbouring inequalities of wealth and power - for example in relation to castes, gender, or ethnic origin – and the ICT-enabled interventions as affecting differently categories of citizens.. This approach tends to draw from heterodox economic ideas and critics of globalization (Wade 2004b) and often applies critical theoretical analyses (Kanungo 2003). The researcher is not a neutral observer of the way IS innovation contributes to socio-economic transformations; s/he takes the side of a particular category of people (e.g. the poor, women, children of the world or of a particular developing region) who are weak and vulnerable in the socio-economic regimes of their milieu, and who are in risk to lose out (or at least not benefit) from IS innovation initiatives. Research from the disruptive transformation perspective reveals hidden intentions and power dynamics which maintain or worsen current unevenness of wealth and opportunities for fulfilled lives among countries and categories of people.

A good example of the disruptive transformation perspective is Ciborra's study of the computerization of driving licenses in Jordan (2005). In his analysis, Ciborra identifies an international socio-political significance of e-government interventions. Although the declared objectives of e-government projects, such as the computerization of the issuing of driving licenses, are improvements of efficiency of citizen services, Ciborra's study shows that such an innovation stumbles upon the complex network of state government controlling mechanisms. Indeed Ciborra, drawing from Heidegger's treatise on technology, points out the ordering character of information technology. The order sought in this case study, he argues, does not concern only the Jordanian government, but the world order at large. He traces the origin of the rationale of e-government in developing countries in the Washington Consensus

and the security interests of the US government (Ciborra 2005), thus critically revealing a disruptive logic of IS innovation.

PROGRESSIVE VS DISRUPTIVE TRANSFORMATION: PERSPECTIVES IN RESEARCH ON TELECENTRES

The difference between these two perspectives is manifested in the research on telecentres, most of which acknowledges and discusses developmental aims. The rationale for the creation of telecentres is that countries or regions which do not have access to internet-based services are ‘excluded’ not only from global economic opportunities but also from modern society’s information channels for education, health, and democratic participation. Poverty in many developing country areas, particularly the rural regions, prohibits the diffusion of ICT and telecommunication connectivity to any extent comparable to that of advanced economies. A solution appeared to be the development of community information services, often called telecentres, equipped with computers, internet connection, as well as fax machines. Many initiatives to introduce telecentres in poor rural communities in developing countries have been taken by international NGOs, such as the Canadian IDRC’s Acacia³ programme in Africa, or by country governments. Although their services vary, most of them run software applications of local interest, such as providing information on health, agricultural product prices, educational material or the issuing of government certificates.

Early research in the 1990s presented promising initiatives, highlighting the perceived potential of local empowerment through information and communication. Authors that heralded the developmental opportunities of telecentres gave examples of possibilities of overcoming extreme poverty or bureaucratic obstacles, of participating in public sector decisions and actions, and of overcoming corruption (Beilur 2007). Later, research indicated a more nuanced picture of some impressive cases of economic gain and social empowerment, widespread failure and closure, and increasing frustration among key actors such as the entrepreneurs who owned the telecentres, users/customers, and donors (Beilur 2007; Madon et al. 2007). Of interest to the discussion in this chapter is the researchers’ assumptions about the way telecentres are expected to contribute their developmental promise.

Much of the research on telecentres assumes that they are introduced in the existing socio-economic structures and practices of disadvantaged communities and can have a positive impact on lessening the gap between them and the advanced industrialised societies. A common expectation in the telecentres initiatives by many NGOs and governments, even in very poor communities, has been that, after investing some seed money, telecentres would form viable enterprises, able to cover the costs of their operations and to sustain a profitable business for local entrepreneurs (Harris et al. 2003). Consequently, research on telecentres attempts to fit and adapt the economic rationality of profitable business, even though, as research shows, there is not much potential for profit making from telecentre ‘customers’ who live in extreme poverty and most of whom have little appreciation of the benefits they may gain from using ICT services (Madon et al. 2007).

Some research who attempted to explain why so often telecentres prove unsustainable raised fundamental questions of effective mechanisms for development, such as public/private

³ For information about IDRC’s telecentre initiative, see <http://www.idrc.ca/acacia/index.html>. Other initiatives for the creation of community telecentres by international development organizations include ITU’s (<http://www.itu.int/ITU-D/index.html>); UNESCO’s (<http://www.unesco.org/websowlr/iip/#funding>) and the World Bank’s (http://worldbank.org/html/fpd/telecoms/subtelecom/selected_projects.htm).

partnership mechanism of governance for development (Madon 2005). Kanungo's (2003) analysis of the sustainability of an initiative that uses IT to create 'knowledge centers' in Indian villages places emphasis on the value of these centers 'in terms of a better informed and liberated society'. His Habermasian approach focuses on the disruptive mechanisms enabled by IT that may form a basis for empowerment for the rural poor.

FOUR DISCOURSES ON IS INNOVATION AND DEVELOPMENT

The combination of the two perspectives regarding the nature of the IS innovation process and the nature of the development transformation process give rise to distinctive discourses about ICT and development, see Figure 1. I don't mean that ISDC publications can be classified unambiguously on the four squares of a matrix. Indeed, some of the examples I draw from the ISDC literature could be positioned elsewhere on the plane of the matrix if a discussant chose to focus on some line of argument of a research article other than the one I chose to bring to the readers' attention. But my aim is not to classify existing research in rigid categories. It is to show the streams of argumentation about ICT and development that result from taking – most often in an unacknowledged way – these particular views about IS innovation and about development.

I find it easier to distinguish between the transfer and diffusion from the social embeddedness perspective of IS innovation and more difficult to do so for authors' perspectives regarding development. This is because ISDC research rarely adequately defines and discusses development perspectives and rarely draws from socio-economic development theory in its analysis. Moreover, quite frequently authors mix progressive transformation and disruptive transformation perspectives. For example, they may adopt the progressive transformation view of ICT and development at the global context by grounding their analysis on publications of indicator tables and policies of international agencies that follow neo-classical economic reasoning, and they may include a disruptive transformation view in their arguments that challenge existing power orders in domestic efforts of harnessing ICT (Brown and Brown 2009). Differences of perspective on the development process at different levels of context may indicate either complementarities or inconsistencies in the argumentation of an author. A point I wish to make in this chapter is that ISDC research can improve its contributions if authors extend the theoretical grounding of their research to draw from debates on development theory and policy.

ICT and development as socio-economic improvements through the transfer and diffusion of ICT and required institution.

This discourse is formed by intertwining the transfer and diffusion perspective of IS innovation with the progressive transformation perspective of development. It tends to take the form of technical rational techno-economic argumentation, presenting the adoption of ICT-based practices pioneered in advanced economies as a necessity for improving life conditions in developing countries. A great deal of emphasis is given to efficiency gains resulting from ICT. The discourse uses the 'catch up' metaphor: developing countries should adopt the technologies and institutions through which developed countries are understood to have achieved prosperity and improvements in health, education, political participation to close the gap that separates them. It is recognised that existing institutional conditions in most developing countries are not adequate to support such a vision, and therefore, the argument goes, adaptation is needed (Bada 2002; Struab et al. 2001). One size of ICT and organizational models does not fit all, but the same shape is thought to work for all and local institutions should be bent to match it.

ICT and development as socio-economic improvements through locally situated action.

This discourse is formed by the social embeddedness perspective of IS innovation with the progressive transformation perspective of development. It assumes the capacity of ICT to contribute towards improving life conditions, but sees the form and processes of improvements as primarily locally decided in accordance to historically shaped meanings and power relations. Its core argument is that socio-economic change should make sense to the local people, who should be comfortable with the processes of change. There may be obstacles in the harnessing of the developmental potential, stemming from historically developed social orders, such as over-centralised public administration and authoritarian hierarchies, but the belief expressed in this discourse is that these can be addressed with empowering democratic ICT policies and appropriate professional practices, such as allowing for user participation (Braa et al. 2004; Puri 2007; Sahay and Walsham 2005). This discourse acknowledges influences from global actors. It is cautious, but not confrontational about prevailing development ideologies and policies of international organizations. It often has a pragmatic character: technologies and methods transferred from technologically advanced societies do not work. Local improvisations are necessary to close the gap between theory and actual developing countries conditions. An example is Heeks' paper which suggests improvisations in systems development to avoid failure seen as caused by the inappropriateness of general IS design methods (Heeks 2002).

ICT does not necessarily result in development for all: the transfer and diffusion of ICT leads to uneven development.

This discourse combines the transfer and diffusion perspective of IS innovation with the disruptive transformation perspective of development. Its argumentation accepts the logic of ICT as a force for socio-economic change, but finds that it entails risks of reinforcing domination and inequality. Thus, it uncovers distorting effects of ICT and institutional transfer and diffusion, and interests in preserving historically formed privileges (Ciborra 2005; Wade 2004a). It tends to be confrontational, challenging the evidence on the generally seen as beneficial effects of development policies such as globalization, liberalization, ICT and productivity gains (Wade 2004b), and doubting the motives of powerful actors, such as the international development agencies, national policy makers, and corporate managers.

ICT does not necessarily result in development for all: it is subject to the power dynamics of IS innovation action.

This discourse intertwines the social embeddedness perspective of IS innovation with the progressive transformation perspective of development. It is a critical discourse in the sociological sense of critical theory, and is concerned with particular biases of power and inequalities in specific socio-economic conditions of a country or a community. The starting position is the local context, with its historically formed patterns of privileges, and may extend its analysis to the biased influences exerted from the power-laden inscriptions carried by particular technologies or institutional reform models and policies. In a study of the potential use of ICT by Egyptian craftswomen, Hassanin points out various structural challenges that inhibit their capacity to trade in global markets (Hassanin 2008). In effect, the socially embedded and disruptive discourse deconstructs the dominant view about ICT and development, juxtaposing it to the local interests and imaginaries of a better life. Its critiques question not only the effectiveness of ICT and development to lead to life improvements, but also the desirability of their projected visions (Stahl 2008; Thompson 2004).

THE FOUR DISCOURSES IN ISDC RESEARCH ON THE SOFTWARE INDUSTRY

Prominent amidst the ISDC literature is a stream of studies focusing on the software industries that emerged in a number of developing countries and compete at the global market, thus forming a substantial part of the ‘global outsourcing’ or ‘offshore outsourcing’ phenomenon (Carmel and Agarwal 2002). India is the most successful country in this business, and the efforts of its software firms have been studied within the ISDC subfield since its early days nearly 20 years ago (Heeks 1990; Nicholson and Sahay 2004; Sahay et al. 2003).

Most research on developing countries’ software industries argue about ICT and development as socio-economic improvements through the transfer and diffusion of ICT capabilities and required institutions. They see the developmental potential of these industries in their capability to compete in global markets. Their achievement lies in being able to master software production techniques and business models that allow them to compete. Thus, many such studies examined the factors that account for software industry success within the global market of services and products of IS innovation (Adelakum 2005; Carmel 2003a). Success factors include technology and project management skills, labour costs, telecommunications infrastructures, English language skills, copyright legislation, and government industrial policy. There are also ongoing studies that assess and compare the relative advantages among developing countries competing for the lucrative markets of industrialized countries (Carmel 2003c). For example, while India is so far considered the most successful DC software exporter, competition from China on the basis of lower salaries may erode its advantage in some important markets, such as Japan.

Some research has focused on the micro-societal processes that constitute the practices of global outsourcing services, highlighted the difficulties of cross-cultural collaboration and the surfacing of multiple political conflicts (Barrett and Walsham 1995; Nicholson and Sahay 2001) and emphasized the significance of organizational identity and the intrinsically tacit nature of the knowledge of software developers (Nicholson and Sahay 2004; Sahay et al. 2003). For example, Nicholson and Sahay’s study of the policy efforts of the Costa Rican government to promote an export oriented industry highlighted the implications of historically formed vested interests in the country, power structures and attitudes towards development (Nicholson and Sahay 2007). Nevertheless the discourse of such research does not challenge an implicit progressive transformation view of ICT as an enabler of economic development by participating competitively in the global free market.

Both these discourses – stemming from the transfer of skills and socially embedded practice perspectives - on the software industry in developing countries tend to focus on their capacity for export of software products and services, taking such exports to be an important source of income and of national prestige. Some comparative analyses of the software industries of major developing countries suggest that there may be trade-offs between efforts to foster an export oriented software industry and IS innovation in domestic organizations (Carmel 2003b; Commander 2005). For example, although successful in exporting software products and services, India’s software industry is much less successful in contributing to domestic organizations’ IS innovation. The ‘trickle down’ effect is too slow to make a difference for the rest of the economy so far.

Indeed there is research from the transfer and diffusion and disruptive transformation perspectives that engages in a critical discourse about the developmental role of the developing countries’ software industry. D’Costa discusses the Indian software sector as a

case of ‘uneven and combined development’, that is, as coexisting with stagnating sectors such as heavy industry and giving rise to tensions that stem from competing modes of production, inequality, and differential growth rates among different regions (D’Costa 2002). D’Costa’s argumentation leads to the suggestion of state action for a balanced development of the economy, by assisting the development of other sectors and thus minimising the social problems of uneven development.

Madon and Sahay focused on changes in the social fabric of the city of Bangalore caused by its booming software industry, and formed arguments from the social embeddedness and disruptive transformation perspectives (Madon and Sahay 2000). They point out that the city has not attracted only affluent professionals but also the very poor, seeking works at the margins of the official economy and living in slums at the borders of the city, and their research concern is how the lives of this section of the population can be improved.

CONCLUSIONS

ISDC has a lot to contribute by engaging with the ongoing research and debate regarding development that produce theoretical views about the role of ICT and underpin policy action, such as international political economy and institutional economics. To that end, empirical ISDC research needs to develop epistemological capacity to associate the study of IS innovation with the particular socio-economic rationale and policies of development that provide its underlying justification and targets.

If it does so, ISDC research faces two major challenges as a subfield of information systems. The first is methodological/theoretical and is related with its recognition of the significance of contextual contingency, that both the diffusion and the social embeddedness discourses share. ISDC studies need to identify the context that matters and develop theory capable of addressing the interrelationship of context with IS innovation. To my judgement the social embeddedness discourse is in a better position to do so. As it has been developed in close association with contemporary social theory, its elaborate socio-technical concepts address more effectively the dynamic interplay between the artefacts/cognitive constructs of IS innovation and the multiple and changing social dimensions in developing countries.

The second challenge is related with the legitimacy of discourses that openly address contemporary political issues. In particular, the disruptive transformation discourses of ISDC research have a kind of criticality that is unprecedented in the IS field. The literature that discusses the developmental potential of ICT and associates IS innovation initiatives with social, political, and economic change articulates critical views about the power relations within specific developing countries and the world at large. The IS field, though familiar with critical discourses, mainly regarding the organizational level politics of the work place (Howcroft and Trauth 2005), has rarely engaged with macro-political analyses regarding ICT and institutional change. ISDC studies that concern the role of ICT in the struggle for the transformation of the life conditions of the billions of poor – with implications for the lives of the affluent – inevitably come to refer to political ideologies of development (such as the ‘Washington consensus’ or ‘basic needs’ views), and to policies and actions of development institutions (such as the World Bank, the aid agencies of ‘Western’ countries, international NGOs). Analyses of the IS innovation context include controversial government policies, such as liberalization of telecommunications for extending connectivity, or the filtering of internet information by national governments.

This is where, I believe, theoretical strengthening is mostly needed. Without diligent theoretical grounding critical discourses on ICT and development run the risk of having a polemic character, unworthy of scholarly attention and unconvincing in policy circles. ISDC research has a great deal to gain from studying theories pertaining to argumentation of development in economics and political sciences, in a similar way that IS research gained strength in its argumentation about the nature of IS innovation from studying theories of technology in sociology.

REFERENCES

- Adelakum, O. "Offshore IT outsourcing to emerging economies - analysis of readiness vs attractiveness," in: *Proceedings of the 8th international working conference of IFIP WG9.4: Enhancing Human Resource Development through ICT*, A.O. Bada and A. Okunoye (eds.), Abuja - Nigeria, 2005.
- Al-Gahtani, S.S. "Computer technology adoption in Saudi Arabia: correlates of perceived innovation attributes," *Information Technology for Development* (10:1) 2003, pp 57-69.
- Avgerou, C. "Transferability of information technology and organisational practices," in: *Global Information Technology and Socio-Economic Development*, M. Odedra-Straub (ed.), Ivy League, Nashua, New Hampshire, 1996, pp. 106-115.
- Avgerou, C. "The significance of context in information systems and organisational change," *Information Systems Journal* 2001.
- Avgerou, C. *Information Systems and Global Diversity* Oxford University Press, Oxford, 2002.
- Avgerou, C. "IT as an institutional actor in developing countries," in: *The Digital Challenge: Information Technology in the Development Context*, S. Krishna and S. Madon (eds.), Ashgate, Aldershot, 2003a, pp. 46-62.
- Avgerou, C. "The link between ICT and economic growth in the discourse of development," in: *Organizational Information Systems in the Context of Globalization*, M. Korpela, R. Montealegro and A. Poulymenakou (eds.), Kluwer, Dordrecht, 2003b, pp. 373-386.
- Avgerou, C. "Information systems in developing countries: a critical research review," *Journal of Information Technology* (23:3) 2008, pp 133-146.
- Avgerou, C., and Land, F. "Examining the appropriateness of information technology," in: *Social Implications of Computers in Developing Countries*, S. Bhatnagar and M. Odedra (eds.), Tata McGraw-Hill, New Delhi, 1992, pp. 26-42.
- Avgerou, C., and Madon, S. "Framing IS studies: understanding the social context of IS innovation," in: *The Social Study of Information and Communication Technology: Innovation, Actors, and Contexts*, C. Avgerou, C. Ciborra and F. Land (eds.), Oxford University Press, Oxford, 2004, pp. 162-182.
- Avgerou, C., and Walsham, G. (eds.) *Information Technology in Context: Studies from the Perspective of Developing Countries*. Ashgate, London, 2000.
- Bada, A.O. "Local adaptations to global trends: a study of an IT-based organizational change programme in a Nigerian bank," *The Information Society* (18:2) 2002, pp 77-86.
- Banville, C., and Landry, M. "Can the field of MIS be disciplined?," in: *Information Systems Research*, R. Galliers (ed.), Blackwell, Oxford, 1992, pp. 61-88.
- Barrett, M., and Walsham, G. "Managing IT for business innovation: issues of culture, learning, and leadership in a Jamaican insurance company," *Journal of Global Information Management* (3:3) 1995, pp 25-33.
- Beilur, S. "Using stakeholder theory to analyze telecenter projects," *Information Technologies and International Development* (3:3) 2007, pp 61-80.

- Bell, S., and Wood-Harper, A.T. "Information Systems Development for Developing Countries," in: *Information Technology in Developing Countries*, S.C. Bhatnagar and N. Bjørn-Andersen (eds.), North-Holland, Amsterdam, 1990, pp. 23-40.
- Benbasat, I., and Weber, R. "Rethinking "diversity" in information systems research," *Information Systems Research* (7:4) 1996, pp 369-399.
- Benbasat, I., and Zmud, R.W. "The identity crisis within the IS discipline: Defining and communicating the discipline's core properties," *MIS Quarterly* (27:2) 2003, pp 183-194.
- Bhatnagar, S.C., and Bjørn-Andersen, N. (eds.) *Information Technology in Developing Countries*. North-Holland, Amsterdam, 1990.
- Bhatnagar, S.C., and Odedra, M. (eds.) *Social Implications of Computers in Developing Countries*. Tata McGraw-Hill, New Delhi, 1992.
- Braa, J., Hanseth, O., Heywood, A., Mohammed, W., and Shaw, V. "Developing health information systems in developing countries: the flexible standards strategy," *MIS Quarterly* (31:2) 2007a, pp 381-402.
- Braa, J., Monteiro, E., and Sahay, S. "Networks of action: Sustainable health information systems across developing countries," *MIS Quarterly* (28:3) 2004, pp 337-362.
- Braa, J., Monteiro, E., Sahay, S., Staring, K., and O.H., T. "Scaling up local learning - experiences from South-South-North networks of shared software development," IFIP WG9.4 9th international conference 'Taking Stock of E-Development', Sao Paulo, 2007b.
- Brown, W., and Brown, I. "Towards a research framework for a human development-based "bottom of the pyramid" ICT development strategy in South Africa," ECIS, Verona, Italy, 2009.
- Carmel, E. "The globalization of software outsourcing to dozens of nations: a preliminary analysis of the emergence of 3rd and 4th tier software exporting nations," in: *The Digital Challenge: Information Technology in the Development Context*, S. Krishna and S. Madon (eds.), Ashgate, Aldershot, 2003a, pp. 359-367.
- Carmel, E. "The new software exporting nations: impacts on national well being resulting from their software exporting industries," *Electronic Journal on Information Systems in Developing Countries* (13:3) 2003b.
- Carmel, E. "Taxonomy of new software exporting nations," *Electronic Journal on Information Systems in Developing Countries* (13:2) 2003c.
- Carmel, E., and Agarwal, R. "The maturation of offshore sourcing of Information technology work," *MIS Quarterly Executive* (1:2) 2002.
- Ciborra, C. "Interpreting e-government and development: efficiency, transparency or governance at a distance?," *Information Technology & People* (18:3) 2005, pp 260-279.
- Ciborra, C.U., and Associates. (eds.) *From Control to Drift*. Oxford University Press, Oxford, 2000.
- Commander, S. *The Software Industry in Emerging Markets* Edward Elgar, Cheltenham, 2005.
- D'Costa, A.P. "Uneven and combined development: Understanding India's software exports," *World Development* (31:1) 2002, pp 211-226.
- Davis, C., McMaster, J., and Nowak, J. "IT-enabled services as development drivers in low-income countries: the case of Fiji," *Electronic Journal on Information Systems in Developing Countries* (9) 2002.
- Davis, F.D. "Perceived usefulness, perceived ease of use, and user acceptance of information technology," *MIS Quarterly* (13:3) 1989, pp 319-340.

- Dedrick, J., Gurbaxani, V., and Kraemer, K.L. "Information technology and economic performance: a critical review of the empirical evidence," *ACM Computing Surveys* (35:1) 2003, pp 1-28.
- Draca, M., Sadun, R., and Van Reenen, J. "Productivity and ICTs: a review of the evidence," in: *The Oxford Handbook of Information and Communication Technologies*, R. Mansell, C. Avgerou, D. Quah and R. Silverstone (eds.), Oxford University Press, Oxford, 2007, pp. 100-147.
- Duncombe, R.A., and Heeks, R.B. "Entreprise across the digital divide: information systems and rural micro-enterprise in Botswana," *Journal of International Development* (14:1) 2002, pp 61-74.
- Dutta, S., and Mia, I. "The Global Information technology Report 2008-2009: mobility in a networked world," World Economic Forum.
- Fulk, J., and DeSanctis, G. "Articulation of Communication Technology and Organizational Form," in: *Shaping Organization Form: Communication, Connection, and Community*, G. DeSanctis and J. Fulk (eds.), Sage, Thousand Oaks, California, 1999, pp. 5-32.
- Gilhooly, D. "Innovation and investment: Information and Communication Technologies and the Millennium Development Goals," The United Nations Millennium Project.
- Goonatilake, L., Maizza-Neto, O., and Jayawardene, P. "Enhancing enterprise competitiveness in developing countries through the promotion of management information and benchmarking tools," in: *Proceedings of the 6th International Working Conference of IFIP WG 9.4: Information Flows, Local Improvisations and Work Practices*, S. Sahay, J. Miller and D. Roode (eds.), STS Conferences, Cape Town, 2000.
- Harris, R.W., Kumar, A., and Balaji, V. "Sustainable telecentres? two cases from India," in: *The Digital Challenge: Information Technology in the Development Context*, S. Krishna and S. Madon (eds.), Ashgate, Aldershot, 2003, pp. 124-135.
- Hassanin, L. "Egyptian women artisans: ICTs are not the entry to modern markets," in: *Social Dimensions of Information and Communication Technology Policy*, C. Avgerou, M.L. Smith and P. Van den Besselaar (eds.), Springer, New York, 2008.
- He, X. "The ERP challenge in China: a resource-based perspective," *Information Systems Journal* (14) 2004, pp 153-167.
- Heeks, R. "Fourth generation languages (4GLs) and the Indian Software Industry," in: *Information Technology in Developing Countries*, S.C. Bhatnagar and N. Bjørn-Andersen (eds.), North-Holland, Amsterdam, 1990, pp. 251-264.
- Heeks, R. "Information systems and developing countries: Failure, success and local improvisations," *The Information Society* (18:2) 2002, pp 101-112.
- Heeks, R., and Kenny, C. "ICTs and development: convergence or divergence for developing countries?," *Information and Communication Technologies and Development: New Opportunities, Perspectives and Challenges*, Bangalore, 2002, pp. 29-44.
- Hirschheim, R., and Klein, H.K. "Four paradigms of information systems development," *Communications of the ACM* (32:10) 1989, pp 1199-1216.
- Hofstede, G. *Culture's Consequences: International Differences in Work Related Values* Sage, London, 1984.
- Howcroft, D., and Trauth, E.M. (eds.) *Handbook of Critical Information Systems Research*. Edward Elgar, Cheltenham, 2005.
- Jarvenpaa, S.L., and Leidner, D.E. "An Information Company in Mexico: Extending the Resource-Based View of the Firm to a Developing Country Context," *Information Systems Research* (9:4) 1998, pp 342-361.

- Kanungo, S. "Information village: bridging the digital divide in rural India," in: *The Digital Challenge: Information Technology in the Development Context*, S. Krishna and S. Madon (eds.), Ashgate, Aldershot, 2003, pp. 104-123.
- Kenny, C.J. "Expanding Internet access to the rural poor in Africa," *Information Technology for Development* (9:1) 2000, pp 25-32.
- Korpela, M. "Computer systems development for "delinking" in Nigeria," in: *Global Information Technology and Socio-Economic Development*, M. Odedra-Straub (ed.), Ivy League, Nashua, New Hampshire, 1996, pp. 116-129.
- Korpela, M., Soriyan, H.A., Olufokunbi, K.C., and Mursu, A. "Made-in-Nigeria systems development methodologies: an action research project in the Health sector," in: *Information Technology in Context: Studies from the perspective of developing countries*, C. Avgerou and G. Walsham (eds.), Ashgate, Aldershot, 2000, pp. 113-133.
- Krishna, S., and Madon, S. "Information & Communication Technologies and Development: New opportunities, perspectives & challenges," Seventh International Working Conference of IFIP WG 9.4, Indian Institute of Management Bangalore, Bangalore, 2002.
- Krishna, S., and Madon, S. (eds.) *The Digital Challenge: Information Technology in the Development Context*. Ashgate, Aldershot, 2003.
- Krishna, S., and Walsham, G. "Implementing public information systems in developing countries: Learning from a success story," *Information Technology for Development* (11:2) 2005, pp 1-18.
- La Rovere, R. "Diffusion of IT and the competitiveness of Brazilian banking," in: *Information Technology, Development and Policy*, E.M. Roche and M.J. Blaine (eds.), Avebury, Aldershot, 1996, pp. 95-112.
- La Rovere, R.L., and Pereira, M.V.R. "Adoption of ICT and competitiveness in the tourism sector: the case of Brazilian travel agencies," in: *Proceedings of the 6th International Working Conference of IFIP WG 9.4: Information Flows, Local Improvisations and Work Practices*, S. Sahay, J. Miller and D. Roode (eds.), SBS Conferences, Cape Town, 2000.
- Leidner, D.E., and Kayworth, T. "A review of culture in information systems research: toward a theory of information technology culture," *MIS Quarterly* (30:2) 2006, pp 357-399.
- Madon, S. "Introducing administrative reform through the application of computer-based information systems: A case study in India," *Public Administration and Development* (13) 1993, pp 37-48.
- Madon, S. "Evaluating the developmental impact of e-governance initiatives: an exploratory framework," *Electronic Journal on Information Systems in Developing Countries* (20:5) 2004, pp 1-13.
- Madon, S. "Governance lessons from the experience of telecentres in Kerala," *European Journal of Information Systems* (14:4) 2005, pp 401-416.
- Madon, S., Reinhard, N., Roode, D., and Walsham, G. "Digital Inclusion projects in developing countries: processes of institutionalisation," IFIP WG9.4 9th international conference 'Taking Stock of E-Development', Sao Paulo, 2007.
- Madon, S., and Sahay, S. "Democratic governance and information flows: a case study in Bangalore," *Information Communication and Society* (3:2) 2000.
- Mann, C.L. "Information technologies and international development: conceptual clarity in the search for commonality and diversity," *Information Technologies and International Development* (1:2) 2004, pp 67-79.

- Mbarika, V.W., Kah, M.M.O., Musa, P.H., Meso, P., and Warren, J. "Predictors of growth of teledensity in developing countries: a focus on middle and low-income countries," *Electronic Journal on Information Systems in Developing Countries* (12:1) 2003, pp 1-16.
- Mbarika, V.W., Payton, F.C., Kvasny, L., and Amadi, A. "IT education and workforce participation: a new era for women in Kenya?," *The Information Society* (23:1) 2007, pp 1-18.
- Miscione, G. "Telemedicine in the Upper Amazon: Interplay with local health care practices," *MIS Quarterly* (31:2) 2007, pp 403-425.
- Molla, A. "Downloading or uploading? The information economy and Africa's current status," *Information Technology for Development* (9) 2000, pp 205-221.
- Munkvold, B.E., and Tundui, H.P. "The role of IT in supporting women entrepreneurs in urban Tanzania," in: *Proceedings of the 8th international working conference of IFIP WG9.4: Enhancing Human Resource Development through ICT*, A.O. Bada and A. Okunoye (eds.), Abuja-Nigeria, 2005.
- Mursu, A., Soriyan, H.A., and Korpela, M. "Risky business: a case study on information systems development in Nigeria," in: *The Digital Challenge: Information Technology in the Development Context*, S. Krishna and S. Madon (eds.), Ashgate, Aldershot, 2003, pp. 318-339.
- Myers, M.D., and Tan, F.B. "Beyond models of national culture in information systems research," *Journal of Global Information Management* (10:1) 2002, pp 24-32.
- Ngwenyama, O., Andoh-Baidoo, F.K., Bollou, F., and Morawczynski, O. "Is there a relationship between ICT, health, education and development? An empirical analysis of five West African countries from 1997-2003," *Electronic Journal on Information Systems in Developing Countries* (23:5) 2006.
- Nicholson, B., and Sahay, S. "Some political and cultural issues in the globalisation of software development: case experience from Britain and India," *Information and Organization* (11) 2001, pp 25-43.
- Nicholson, B., and Sahay, S. "Embedded knowledge and offshore software development," *Information and Organization* (14) 2004, pp 329-365.
- Nicholson, B., and Sahay, S. "Software exports development in Costa Rica: contradictions and the potential for change," IFIP WG9.4 9th international conference 'Taking Stock of E-Development', Sao Paulo, 2007.
- Odedra-Straub, M. (ed.) *Global Information Technology and Socio-economic Development*. Ivy League, Nashua, New Hampshire, 1996.
- Orlikowski, W.J. "Improvising organizational transformation over time: A situated change perspective," *Information Systems Research* (7:1) 1996, pp 63-92.
- Orlikowski, W.J. "Using technology and constituting structures: A practice lens for studying technology in organizations," *Organization Science* (11:4) 2000, pp 404-428.
- Orlikowski, W.J., and Baroudi, J.J. "Studying Information Technology in Organizations: Research Approaches and Assumptions," *Information Systems Research* (2:1) 1991, pp 1-28.
- Orlikowski, W.J., Walsham, G., Jones, M.R., and DeGross, J.I. (eds.) *Information Technology and Changes in Organizational Work*. Chapman & Hall, London, 1996.
- Pettigrew, A.M. "Contextualist research and the study of organisational change processes," in: *Research Methods in Information Systems*, E. Mumford, R. Hirschheim, G. Fitzgerald and A.T. Wood-Harper (eds.), North -Holland, Amsterdam, 1985, pp. 53-78.
- Porter, M., and Millar, V. "How information gives you competitive advantage," *Harvard Business Review* (63:4) 1984, pp 149-160.

- Puri, S.K. "Integrating scientific with indigenous knowledge: constructing knowledge alliances for land management in India," *MIS Quarterly* (forthcoming) 2007.
- Robey, D. "Diversity in information systems research: threat, promise and responsibility," *Information Systems Research* (7:4) 1996, pp 400-408.
- Robey, D., and Boudreau, M.C. "Accounting for the contradictory organizational consequences of information technology: Theoretical directions and methodological implications," *Information Systems Research* (10:2), June 1999, pp 167-185.
- Roche, E.M., and Blaine, M.J. (eds.) *Information Technology, Development and Policy*. Avebury, Aldershot, 1996.
- Rogers, E.M. *Diffusion of Innovations*, (fourth edition ed.) The Free Press, New York, 1995.
- Rohitratana, K. "The role of Thai values in managing information systems: a case study of implementing an MRP system," in: *Information Technology in Context: Implementing Systems in the Developing World*, C. Avgerou and G. Walsham (eds.), Ashgate, Aldershot, 2000, pp. 23-39.
- Rose, G., and Straub, D. "Predicting general IT use: Applying TAM to the Arabic world," *Journal of Global Information Management* (6) 1998, pp 39-46.
- Sahay, S. "Implementing GIS technology in India: some issues of time and space," *Accounting, Management and Information Technologies* (8) 1998, pp 147-188.
- Sahay, S. "Introduction to the special issue on "IT and Health Care in Developing Countries"," *Electronic Journal on Information Systems in Developing Countries* (5:0) 2001, pp 1-6.
- Sahay, S., and Avgerou, C. "Special issue on IS in developing countries," in: *The Information Society*, 2002.
- Sahay, S., Nicholson, B., and Krishna, S. *Global IT Outsourcing: Software Development across Borders* Cambridge University Press, Cambridge, 2003.
- Sahay, S., and Walsham, G. "Scaling of health information systems in India: challenges and approaches," *Enhancing Human Resource Development through ICT, IFIP WG9.4, Abuja-Nigeria*, 2005.
- Scott Morton, M.S. *The Corporation of the 1990s: Information Technology and Organizational Transformation* Oxford University Press, New York, 1991.
- Silva, L. "Institutionalization does not occur by decree: institutional obstacles in implementing a land administration system in a developing country," *Information Technology for Development* 2007.
- Stahl, B.C. "Empowerment through ICT: A critical discourse analysis of the Egyptian ICT policy," in: *Social Dimensions of Information and Communication Technology Policy*, C. Avgerou, M.L. Smith and P. Van den Besselaar (eds.), Springer, New York, 2008.
- Struab, D., Loch, K.D., and Hill, C.E. "Transfer of information technology to the Arab world: a test of cultural influence modeling," *Journal of Global Information Management* (9:4) 2001, pp 6-48.
- Suchman, L. "Working relations of technology production and use," *Computer Supported Cooperative Work* (2) 1994, pp 21-39.
- Thompson, M.P.A. "ICT, Power, and Developmental Discourse: a critical analysis," *Electronic Journal on Information Systems in Developing Countries* (20:4) 2004, pp 1-26.
- United Nations Development Programme "Making new technologies work for human development," UNDP, New York.
- Wade, R. "Bridging the digital divide: new route to development or new form of dependency?," in: *The Social Study of Information and Communication Technology: Innovation, Actions, and Contexts*, C. Avgerou, C. Ciborra and F. Land (eds.), Oxford University Press, Oxford, 2004a, pp. 185-206.

- Wade, R.H. "Is globalization reducing poverty and inequality?," *World Development* (32:4) 2004b, pp 567-589.
- Walsham, G. *Interpreting Information Systems in Organizations* John Wiley, Chichester, 1993.
- Walsham, G. *Making a World of Difference: IT in a Global Context* John Wiley, Chichester, 2001.
- Walsham, G. "Cross-cultural software production and use: a structural analysis," *MIS quarterly* (26:4) 2002, pp 359-380.
- Walsham, G., Robey, D., and Sahay, S. "Foreword: Special issue on information systems in developing countries," *MIS Quarterly* (31:2) 2007, pp 317-326.
- Wang, J., Jamison, D.T., Bos, E., Preker, A., and Peabody, J. "Measuring country performance on health: selected indicators for 115 countries," World Bank, Washington, DC.
- Warschauer, M. "Dissecting the "Digital Divide": a case study in Egypt," *The Information Society* (19:4) 2003, pp 297-304.
- Westrup, C., and Al-Jaghoub, S. "Nation states and networks of flows: the role of the state in Jordan's ICT enabled development.,") forthcoming.
- Westrup, C., Liu, W., El Sayed, H., and Al Jaghoub, S. "Taking culture seriously: ICTs, cultures and Development," in: *The Digital Challenge: Information Technology in the Development Context*, S. Madon and S. Krishna (eds.), Ashgate, Hampshire, 2003.
- World Bank *World Bank Development Report: Knowledge for Development* Oxford University Press, New York, 1999.
- Wresch, W. "Information access in Africa: Problems with every channel," *The Information Society* (14:4) 1998, pp 295-300.
- Zakaria, N., Stanton, J.M., and Sarker-Barney, S.T.M. "Designing and implementing culturally-sensitive IT applications: the interaction of culture values and privacy issues in the Middle East," *Information Technology & People* (16:1) 2003, pp 49-75.

