Research Article

Discourses on ICT and Development

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Abstract

Research on ICT and development (ICTD) involves assumptions concerning the nature of ICT innovation and the way such innovation contributes to development. In this article, I review the multidisciplinary literature on ICTD and identify two perspectives regarding the nature of the ICT innovation process in developing countries—as transfer and diffusion and as socially embedded action—and two perspectives on the development transformation toward which ICT is understood to contribute—progressive transformation and disruptive transformation. I then discuss the four discourses formed by combining the perspectives on the nature of IS innovation and on the development transformation. My review suggests that ICTD research, despite its remarkable theoretical capabilities to study technology innovation in relation to socioeconomic context, remains weak in forming convincing arguments about IT-enabled socioeconomic development.

Introduction[1]

Research on the developmental potential and impact of information and communication technology (ICT) is a multidisciplinary field. Contributing disciplines include information systems (IS) (Walsham et al., 2007), human-computer interaction (HCI) (Dearden, 2008), communication studies (Mansell, 2002), and to a lesser extent, development studies (Wade, 2002). Invariably, ICT and development (ICTD) studies are based on the premise that ICT can contribute to the improvement of socioeconomic conditions in developing countries (Mann, 2004; Sahay, 2001; Walsham et al., 2007). They all aspire to the realization of perceptions of desirable world orders, such as Sen's theory of capabilities (Kleine, 2009; Madon, 2004; Zheng, 2009) or the United Nations' Millennium Goal vision of eradicating poverty (Gilhooly, 2005). Nevertheless, more often than not, the development potential of ICT is taken for granted, an implicit assumption for particular research objectives, which range from the construction of technology applications suitable for developing countries[2] to the facilitation of the spread of technologies (Kraemer et al., 2009) to understanding the institutional changes required for a developing community to benefit from ICT's developmental potential (Ma et al., 2005). But even if not explicitly acknowledged, every ICTD study makes specific assumptions about the way IT innovation happens in the context of developing countries, and about the meaning and the nature of the process of "development," toward which such innovation is intended to contribute.

Theoretical perspectives regarding the process of ICT innovation natu-

1. This paper draws extensively from two earlier publications: Avgerou (2008) and Avgerou (in press).
2. See, for example, the posters section of http://www.ictd2009.org/documents/ICTD2009Proceedings.pdf

rally vary among disciplines, according to their focal interests. For example, HCI experts tend to elaborate on the process of design of technology artifacts, while IS researchers are concerned with the intertwined processes of technology development and organizational change. And while all ICTD research places emphasis on the socioeconomic context of ICT innovation as a source of influence on the shaping of technologies and their consequences, there are significant epistemological differences regarding the nature of the process of technology construction and use that permeate disciplinary boundaries. Such variation of underlying research perspectives regarding ICT innovation within the broader socioeconomic context of developing countries is one focal point of this article. The other is the process of development.

Development is a contested notion, too, and it has been subject to a long theoretical debate. Moreover, development policy and action are entangled with conflicting interests and power relations in contemporary global and national politics, and the international development agencies' policies for economic growth and institutional reform are widely contested in developing countries. Most ICTD studies avoid engaging with controversies on "development." They tend not to discuss what constitutes development. There are, however, some noticeable exceptions. Thompson (2004) draws from Escobar's Foucauldian critique of the discourse on development and voices concern about the development policies that IS innovation interventions are intended to support. Some authors have taken a critical stance against the currently prevailing view of development that drives 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 point out the ongoing controversies regarding development, development policy, and the role attributed to IT in various development policies (Avgerou, 2003; Ciborra, 2005).

The combination of assumptions regarding the nature of IS innovation effort and development as the aim or outcome of IS innovation gives rise to different discourses in ICTD research. I use the term "discourses" to refer to the research approaches stemming from different 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 paper are the specialist journals on ICTD, namely *Information Technology for Development, Information Technologies & International Development,* and *Electronic Journal of Information Systems in Developing Countries;* the proceedings of the series of conferences on ICT in developing countries organized by the IFIP WG9.4 (Avgerou & Walsham, 2000; Bhatnagar & Bjørn-Andersen, 1990; Bhatnagar & Odedra, 1992; Krishna & Madon, 2002, 2003; Odedra-Straub, 1996; Roche & Blaine, 1996; Sahay & Avgerou, 2002); and the proceedings of the series of IEEE/ACM International Conferences on Information and Communication Technologies for Development.[3] In addition, I reviewed articles on developing countries published in the general IS journals, some of them in special issues on IS in developing countries research.[4]

In the next section, I present two perspectives regarding the nature of the ICT innovation process in developing countries: as transfer and diffusion, and as socially embedded action. I demonstrate these two perspectives with examples from the ICTD literature that elaborates on the role of culture in ICT innovation. In the following section, I distinguish between two perspectives on the nature of the development transformation toward which ICT is understood to contribute—progressive transformation and disruptive transformation—and I illustrate them with examples drawn from the literature on telecenters. I then discuss the four discourses formed by combining the perspectives on the nature of IS innovation, as well as on the nature of development transformation, and demonstrate them with examples from the literature on software industries in developing countries. Finally, in the conclusion, I argue for the development of theoretical capabilities for studying IS innovation in relation to socioeco-

3. http://itidjournal.org/itid/article/viewDownloadInterstitial/240/110 and http://www.ictd2009.org/documents/ICTD2009Proceedings.pdf

4. See The Information Society, 19(1), 2003; Information Technology and People, 16*(1), 2003;* MISQ, 31*(2), 2006.*

nomic contexts and the need to theorize IT-enabled socioeconomic development.

ICT Innovation in Developing Countries

ICTD research has been shaped with 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 socioeconomic interconnectedness of all countries and regions in the condition referred to as globalization. Thus, a common assumption in ICTD research is that developing countries are at a disadvantage in relation to the ICT innovation experiences in the context of origin of new technologies. This culminated in the notion of a "digital divide" signifying a new form of inequality. A great deal of 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 ICTD research, though, tends to focus on the experiences and consequences of ICT development and use, rather than the limitations of technical resources that inhibit it. Such research, too, tends to make the assumption that technological and institutional trends are set elsewhere, and that available ICT artifacts, as well as business models deemed necessary for their use, may not be meeting developing countries' needs. Thus, difficulties faced in following trends and standards of ICT-enabled globalization, and in practicing ICT innovation effectively, feature frequently in research questions and findings of ICTD research (see, for example, Heeks, 2002).

Framed in juxtaposition to innovation originating elsewhere, research on ICT in developing countries acknowledges and addresses distinctions of context. The context where a new technology artifact and business model first took shape (usually in an advanced economy) may be different from the context where this combined artifact and model are implemented as part of IS innovation practice in a developing country. Moreover, the socioorganizational settings of ICT development and use 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 traditions.

Two orientations toward addressing issues of context are discernible in the *universalistic* and *situated* research streams of IS and HCI research and similarly influenced ICTD research (Avgerou & Madon, 2004; Dourish, 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 technoeconomic reasoning, independent 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 & DeSanctis, 1999; Scott Morton, 1991). They often acknowledge contextual contingencies, but assume an overriding rationality that determines universal goals of ICT innovation and a single logic of action toward their satisfaction (Porter & 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 *immediate setting* of the innovating organization (Orlikowski et al., 1996; Suchman, 1994). The universalistic and situated perspectives are discernible in two ways of addressing issues of context in ICT in developing countries research, either in terms of *transfer and diffusion* processes, or in terms of *socially embedded* processes.

Transfer and Diffusion

This perspective considers ICT innovation in developing countries as a process of diffusion of knowledge, which is transferred from advanced economies and adapted to the conditions of a developing country. It 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. Subject to suitable adaptation, these entities can make a desirable developmental impact. Such research, therefore, traces the particular factors that capture the differences of the recipient country and organization that are likely to affect the process of technology development and use—such as economic conditions, technology competencies, people's attitudes to IT, and institutionalized work habits.

Authors 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's technology acceptance model to study ICT use in the Arab world, and they identify empirically the particular factors of the social and organizational context of the Arab countries that affect their take-up of ICT.

In studies of IS development and implementation, authors following the transfer and diffusion approach endeavor 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. A stream of publications presents studies seeking to transfer and adapt systems development methodologies to accommodate analyses of the socioorganizational conditions of developing countries (Bell & 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 & Leidner, 1998). Such studies enrich IS implementation knowledge and professional practice by working out modifications to accommodate various local circumstances. They avoid an a-contextual, universalist "best practice" view and adopt a notion of "appropriate," context-specific practice (Avgerou & 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 about the validity of purpose of the attempted innovation—for example, to improve efficiency or competitiveness—as well as about the validity of the underlying rationality of the transferred methods in their new context of practice.

Social Embeddedness

The *social embeddedness* perspective takes the view that the development and use of ICT artifacts in developing countries concern the construction of new techno-organizational arrangements in the local context of a developing country. It focuses attention on the embeddedness of ICT innovation in the social context of various organizational settings. The socially embedded innovation research approach finds the assumption of the transfer and diffusion perspective about the nature of information systems to be overly simplified and misleading. It has developed more elaborate ontologies of IS innovation as socially constructed entities. The focal point of such research is the process of innovation in situ. It traces the cognitive, emotional, and political capacities that individuals who are nurtured in their local social institutions bring to bear on the unfolding of innovation efforts. Through this approach, the socially embedded innovation discourse sheds light on what is locally meaningful, desirable, or controversial, and therefore, on how technology innovation and organizational change emerge (or are retarded) amid the local social dynamics.

Studies of IS implementation that follow the social embeddedness approach see the purpose of ICT innovation as arising from local problematizations, and its course as being shaped by the way local actors make sense of it and accommodate it in their lives (Avgerou, 2002). They are theoretically grounded in social theory, such as actor network theory (ANT), structuration theory, and organizational institutionalism, which provides insights and vocabularies to address conceptual relationships, such as technology/society, agency/structure, and technical reasoning/institutional dynamics. The main objective of such 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 lead to particular socioeconomic outcomes.

IS in developing countries studies that follow the social embeddedness approach tend to broaden the research perspective beyond the particular circumstances of work within an organization. Early efforts to account for ICT 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 use of computers to manage a rural development program in India's state district administration. 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 were embedded (Madon, 1993). While Pettigrew's contextualist approach continues to be followed in IS in developing countries studies (Braa et al., 2007a), several

other theoretical approaches have been introduced to explore ICT innovation in the developing countries context, including neo-institutionalist and social constructionist analyses (Avgerou, 2001; Miscione, 2007; Silva, 2007).

An example of the socially embedded view of IS innovation is the extensive action research program 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 analyzing the HISP efforts have used a variety of complementary socio-theoretical approaches—structuration, ANT, Castells' networks of action model, complexity theory, etc. Rather than developing a best-practice or contingency model for the healthcare context of developing countries, these researchers have aimed to develop a conceptual analytical capacity to guide context-specific sense-making and practice in countries with different healthcare systems and practices. They have followed this approach to study 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).

Transfer and Diffusion and Social Embeddedness Perspectives in Research on IS and Culture

One of the issues that is frequently discussed in ICTD studies is the role of culture in ICT innovation. The transfer and diffusion approach frames the relationship of ICT and culture in terms of transferring ICT applications into a non-Western national culture which, more often than not, is seen as posing obstacles to innovation, and as being a source of resistance (Straub et al., 2001). Hofstede's model of national culture variables and cultural difference (Hofstede, 1984) is frequently used to analyze conflicts between values embedded into, behaviors required by ICT and the national cultures of developing countries (Leidner & Kayworth, 2006).

Such studies have been criticized as oversimplifying cultural difference (see, for example, Myers & Tan, 2002); they "sweep the subtleties of cultural difference under the universal carpet," as Walsham put it in his extensive discussion of examples of IS innovation and culture research in developing countries (Walsham, 2001). In contrast, research taking the socially embedded and transformative perspective has highlighted distinctive features of historically formed collective behavior 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). Such research has also drawn attention to cross-cultural interactions. In effect, socially embedded studies avoid the juxtaposition of IS innovation (assumed to be inscribed with Western culture) with developing countries 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 behaviors. Information systems, seen as hybrid networks of artifacts, people, and institutions, are subject to negotiation and local shaping. Cultural influence, seen as a historically formed disposition for a particular behavior, may stem from the innovating organization, its national or regional environment, or the social class of individual actors. And rather than focusing on IS innovation as 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 ICTD Research

ICTD research is based on the belief that ICT has, potentially, the capacity to contribute to the improvement of various aspects of life, from alleviating poverty to strengthening the democratic polity. But not all IS research in developing countries engages explicitly with questions of "development" as action to transform the socioeconomic conditions. In this paper, I am interested in the research that concerns developing countries and is conscious of development as a purposeful and contested endeavor. 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 socioeconomic transforma-

tion process through which ICT will deliver its potential benefit.

Such transformative ICTD research often focuses on specific developmental aims, such as the enhancement of livelihoods in rural areas (Duncombe & Heeks, 2002) or improved government services (Krishna & Walsham, 2005), and seeks to understand the effort required for ICT development and concomitant organizational change to take place successfully and deliver expected benefits. Sometimes, though, ICTD research, confronted with the complex and highly political challenges of development endeavors, takes a critical stance on the role of ICT and development. I distinguish between two perspectives of ICT-enabled development. The *progressive* perspective considers ICT as an enabler of transformations in multiple domains of human activities. ICT-enabled developmental transformations are assumed to be achieved 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. It reveals conflicts of interest and struggles for power as a necessary part of ICT innovation in developing countries.

Progressive Transformation

The progressive transformation perspective in ICTD research reflects a 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), and the World Economic Forum (Dutta & Mia, 2009). UNDP's 2001 Human Development Report 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 change of socioeconomic conditions, rather than as 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 that "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 that "investment in ICT and effective use do matter for the economic development of a country" (Mann, 2004, p. 67). It is acknowledged that 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 also emphasized the potential of ICT to improve the performance of state organizations, the delivery of health and education services, and democratic participation (United Nations Development Programme, 2001).

Some ICTD research has sought to corroborate this thesis on the economic and social significance of ICT for development (Mbarika et al., 2007; Ngwenyama et al., 2006), addressing concerns of skeptics 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, to alleviate extreme poverty, and to fight endemic diseases and illiteracy. But on the whole, ICTD research in the progressive transformation perspective tends to accept, without testing, the assumption that ICT potentially contributes to economic growth, investigating 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 & Leidner, 1998; La Rovere, 1996; La Rovere & Pereira, 2000; Munkvold & Tundui, 2005). Some research from the progressive transformation perspective has 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 on 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 noncommercial organizations, such as in the development of national health data infrastructures (Braa et al., 2007a). The fundamental assumption is that

IS innovation in existing institutions responsible for the provision of social services can empower them to improve their services and work conditions (Puri, 2007). ICT-enabled improvements can be achieved without challenging the political economy of a country's social welfare provision.

Disruptive Transformation

The disruptive transformation perspective considers development, including ICT-enabled development, as a contested endeavor, or as involving action with unequal effects on different categories of population, and thus, as 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, analyses often manifest suspicion of the developmental intentions of the so-called Washington Consensus, as well as of the effectiveness of the policies for development that comply with the institutions that comprise it—World Bank, IMF, WTO. At the local level of the developing countries, analysts often see the established social order as harboring inequalities of wealth and power—in relation to castes, gender, or ethnic origin, for example—and point out that ICT-enabled interventions have varying effects on different categories of citizens. This approach tends to draw from heterodox economic ideas (Harvey & Garnett, 2008) and critiques of globalization (Wade, 2004b), and it often applies critical sociotheoretical analyses (Kanungo, 2003). In such studies, the researcher is not a neutral observer of the way IS innovation contributes to socioeconomic transformations; he or she takes the side of a particular category of people (e.g., the poor, women, children of the world, or a particular developing region) who are weak and vulnerable in the socioeconomic regimes of their milieu, and who are at risk to lose out (or at least not benefit) from ICT development initiatives.

Some research from the disruptive transformation perspective reveals hidden intentions and power dynamics that maintain or worsen current unevenness of wealth and opportunities for fulfilled lives among countries and categories of people. A good example of this is Ciborra's study of the computerization of drivers' licenses in Jordan (2005). In his analysis, Ciborra identifies an international sociopolitical significance attributed to e-government interventions. Although the declared objectives of e-government projects, such as the computerization of drivers' license issuance, are improvements of efficiency of citizen services, Ciborra's study shows that such an innovation stumbles on the complex network of state government control 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 country of Jordan, 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 U.S. government, thus critically revealing a logic for promoting the use of ICTs in developing countries that originates in the interests of the world's powerful rather than the concerns for development.

Progressive vs. Disruptive Transformation Perspectives in Research on Telecenters

The difference between these two perspectives is manifested in the research on telecenters, most of which acknowledges and discusses developmental aims. The rationale for the creation of telecenters is that countries or regions that lack 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 telecenters, equipped with computers, an Internet connection, and fax machines. Many initiatives to introduce telecenters in poor rural communities in developing countries have been undertaken by international NGOs, such as the Canadian IDRC's Acacia[5] program in Africa, or by national governments. Although their services vary, most of them run software applications of local interest, providing information on health, agricul-

5. For information about IDRC's telecenter initiative, see http://www.idrc.ca/acacia/index.html. Other initiatives for the creation of community telecenters 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).

tural product prices, educational material, or the issuance of government certificates.

Early research in the 1990s presented promising initiatives, highlighting the perceived potential of local empowerment through information and communication. Authors who heralded the developmental opportunities of telecenters gave examples of possibilities of overcoming extreme poverty or bureaucratic obstacles, of participating in public sector decisions and actions, and of overcoming corruption (Bailur, 2007). Later, research indicated a more nuanced picture of the developmental contribution of telecenters, which includes some impressive cases of economic gain and social empowerment, but also widespread failure and closure of telecenters, and increasing frustration among key actors, including the entrepreneurs who owned them, users/customers, and donors (Bailur, 2007; Best & Kumar, 2008; Madon et al., 2007; Parkinson & Lauzon, 2008). Of interest to the discussion in this paper is the researchers' assumptions about the way telecenters are expected to contribute their developmental promise.

Much of the research on telecenters assumes that they are introduced in the existing socioeconomic structures and practices of disadvantaged communities, and that they can have a positive impact on lessening the gap between the host community and the advanced, industrialized societies. A common expectation in the telecenters' initiatives by many NGOs and governments, even in very poor communities, has been that, after investing some seed money, telecenters would form viable enterprises, able to cover the costs of their operations and sustain a profitable business for local entrepreneurs (Harris et al., 2003). Consequently, research on telecenters 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 telecenter "customers" who live in extreme poverty, most of whom have little appreciation for the benefits they may gain from using ICT services (Madon et al., 2007).

Some research which attempts to explain why, so often, telecenters prove unsustainable leans toward a disruptive transformation perspective and raises fundamental questions about the effectiveness of recommended mechanisms for development, such as the public/private partnership mechanism of governance for development (Madon, 2005). Madon's review of telecenter initiatives as part of e-governance projects in India (2009) found, indeed, a tendency for "kiosks to be owned and staffed by private entrepreneurs." Madon argues that, contrary to initial objectives to assist in the socioeconomic development of the rural poorest of the poor, financial sustainability concerns led some telecenters to develop services of interest to more prosperous villagers, pointing out that her review did not find any direct evidence linking the telecenters to improvement of the living conditions of the communities they were intended to assist. Madon sheds doubt on the prudence of commercial and technological bias in current policy regarding rural poverty alleviation and, in effect, she questions the feasibility of the general techno-economic principles of the dominant development perspective of major international development agencies to serve poverty-alleviation purposes.

Another example that suggests a disruptive transformation position is Kanungo's (2003) analysis of the sustainability of an initiative that used ICT to create "knowledge centers" in Indian villages and placed emphasis on the value of these centers "in terms of a better informed and liberated society." In a positive attitude, Kanungo's Habermasian approach reveals disruptive mechanisms enabled by ICT 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 ICT 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 ICTD publications can be classified unambiguously on the four squares of a matrix. Indeed, some of the examples I draw from the ICTD literature could be positioned elsewhere on the plane of the matrix if a discussant chose to focus on some line of the authors' argument other than the one I chose to bring to the readers' attention. My aim is not to classify existing research in rigid categories, but to show the streams of argumentation about ICT and development that result from taking—most often in an unacknowledged way—the particular views about ICT innovation and development that I discuss in this article.

I find it easier to distinguish between transfer

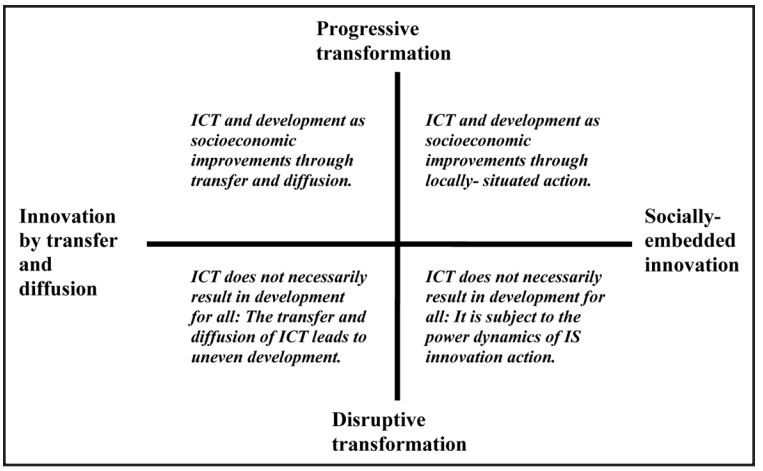

Figure 1. Four Discourses on ICTD.

and diffusion from the social embeddedness perspective, and more difficult to determine authors' perspectives regarding development. This is because ICTD research rarely adequately defines and discusses development perspectives and rarely draws from socioeconomic development theory in its analysis. Moreover, quite frequently, authors mix progressive transformation and disruptive transformation perspectives. For example, authors 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, but they may also include a disruptive transformation view in their arguments that challenge existing power orders in domestic efforts to harness ICT (Brown & 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 article is that ICTD research can improve its contributions if authors extend the theoretical grounding of their research to draw from ongoing debates on development theory and policy.

ICT and Development as Socioeconomic Improvements Through the Transfer and Diffusion of ICT and Required Institutions

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 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 often 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, and political participation, so as to close the gap that separates them. It is recognized that existing institutional conditions in most developing countries are inadequate to support such a vision, and therefore, the argument goes, adaptation is needed (Bada, 2002; Straub et al., 2001). One size of ICT and organizational models does not fit all, but the same techno-organizational logic of efficiency and competitiveness are thought to be best adopted by all, and it is thought that local organizations should be bent to achieve them.

ICT and Development as Socioeconomic Improvements Through Locally Situated Action

This discourse is formed by combining the social embeddedness perspective of ICT innovation and organizational change with the progressive transformation perspective of development. It assumes the capacity of ICT to contribute to improving life conditions, but sees the form and processes of improvements as being worked out primarily locally, in accordance to historically shaped meanings and power relations. Its core argument is that socioeconomic change should make sense to the local people, so they feel 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-centralized 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 user participation (Braa et al., 2004; Puri, 2007; Sahay & Walsham, 2005). This dis-

course acknowledges influences from global actors. It is cautious about, but not confrontational with, 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' article (2002), which suggests improvisations in systems development to avoid failure seen as caused by the inappropriateness of general IS design methods.

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 ICT innovation with the disruptive transformation perspective of development. Its argumentation accepts the logic of ICT as a force for socioeconomic change, but it finds that ICT intervention entails risks of reinforcing domination and inequality. Thus, it uncovers distorting effects of ICT and institutional transfer and diffusion and reveals interests in preserving historically-formed privileges (Ciborra, 2005; Wade, 2004a). It challenges the evidence on the generally seen as beneficial effects of development policies, such as globalization, liberalization, ICT, and productivity gains, and it sometimes doubts 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 ICT and organizational change with the disruptive transformation perspective of development. It is a critical discourse in the sociological sense of critical theory, and it is concerned with particular biases of power and inequalities in specific socioeconomic conditions of a country or a community. The starting position is the local context, with its historically formed patterns of privileges, and analysis may be extended to the biased influences exerted by the power-laden inscriptions carried by particular technologies or institutional reform models and policies. For example, 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 (2008). In effect, the socially embedded and disruptive discourse deconstructs the dominant view about ICT and development, juxtaposing it with the local interests, imaginaries, and realization potential for 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 ICTD Research on the Software Industry

A prominent stream of ICTD literature concerns the software industries that have emerged in a number of developing countries, and achieved the ability to compete in the global market, thus forming a substantial part of the "global outsourcing" or "offshore outsourcing" phenomenon (Carmel & Agarwal, 2002). India is the most successful country in this business, and the efforts of its software firms have been studied within the ICTD subfield since its early days, nearly 20 years ago (Heeks, 1990; Nicholson & Sahay, 2004; Sahay et al., 2003).

Most research on developing countries' software industries view ICT and development as a matter of socioeconomic improvements created through the transfer and diffusion of ICT capabilities and required institutions. They tend to see the developmental potential of these industries in their capability to compete in global markets, and thus, to export services and products. Their achievement lies in being able to master software production techniques and business models that allow them to compete globally. Many such studies examine 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, labor costs, telecommunications infrastructures, English language skills, copyright legislation, and government industrial policy. Ongoing studies assess and compare the relative advantages among developing countries competing for the lucrative markets of industrialized countries (Carmel, 2003c). For example, while India is thus far considered the most successful developing country software exporter, concern is raised that 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 & Walsham, 1995; Nicholson & Sahay, 2001), and emphasized the intrinsically tacit nature of the knowledge of software developers (Nicholson & Sahay, 2004; Sahay et al., 2003). For example, Nicholson and Sahay's study (2007) 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, of power structures, and attitudes toward development. 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—the two stemming from the transfer of skills and the socially embedded practice perspectives—on the software industry in developing countries tend to focus on achieving capacity for export of software products and services, taking such exports to be an important source of both income and 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, until about 2006, India's software industry was much less successful in contributing to domestic organizations' IS innovation. The "trickle down" effect has been too slow to make a difference for the rest of the economy.

Some research from the transfer and diffusion and disruptive transformation perspectives engages in a critical discourse about the developmental role of the developing countries' software industries. D'Costa (2002) 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 as giving rise to tensions that stem from competing modes of production, inequality, and differential growth rates among different regions. D'Costa's argument challenges the dominant view of international NGOs about market-led policies for economic development and suggests state action for assisting the development of other sectors in order to minimize the socioeconomic problems of uneven development.

Madon and Sahay (2002) focus on changes in the social fabric of the city of Bangalore that were caused by its booming software industry, and form arguments from the social embeddedness and disruptive transformation perspectives. They point out that the city has not attracted only affluent professionals, but also the very poor, who are seeking work at the margins of the official economy and living in slums at the borders of the city.

Conclusions

ICTD research has produced a substantial body of knowledge on the efforts made in developing countries to exploit the potential of the never-ending advances of ICT. My review suggests that our research in this area faces two immediate theoretical challenges. The first is related with the recognition of the significance of contextual contingency that both the diffusion and the social embeddedness ICTD discourses share. ICTD studies need to develop theory capable of addressing the interrelationship of ICT innovation with its cognitive and sociopolitical context. Established categories, such as nations, industries, and formal organizations, which are taken as "context" in most ICTD research, may not, on their own, provide appropriate framing for understanding the ideas and actions that constitute incidents of ICT innovation. Assumptions of stereotypical behavior associated with "local culture" are unlikely to adequately explain encounters with new technologies and interactions among the multiple actors involved in ICT projects, much less their consequences. Theory is needed to identify what is relevant context for each case of ICT innovation, and how it matters.

The social embeddedness perspective is in a better position than the transfer and development perspective to do so. Its institutionalist epistemology (Berger & Luckmann, 1967) is fundamentally contextualist. It brings into research attention issues related with meaning—the meaning of the developmental capacity of ICT within the context of an innovation effort—and associates people's actions with the frameworks of interpretation sustained by

the cultures of their context. As it has been developed in close association with contemporary social theory, the social embeddedness perspective and its sociotechnical concepts address more effectively the dynamic interplay between the artifacts/cognitive constructs of innovation and the multiple and changing social dimensions in developing countries. Yet, studies that follow concepts and theories from the socially embedded perspective have not, thus far, produced a coherent theoretical basis to guide contextualist research in developing countries. More systematic theorizing efforts are needed to understand how the socioeconomic context enables or constrains meanings and actions of ICT innovation that contribute to life improvements in developing countries, as well as to test the explanatory capacity of such theory.

The second theoretical challenge is the strengthening of the field's capacity to associate ICT innovation with socioeconomic development (Heeks, 2006; Thompson, 2008). ICTD 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 implicate political ideologies of development (such as the "Washington Consensus" or "basic needs" views), as well as the policies and actions of development institutions (such as the World Bank, the aid agencies of "Western" countries, and international NGOs). Analyses of the ICT innovation context include controversial government policies, such as the liberalization of telecommunications for extending connectivity, or the filtering of Internet information by national governments. Without diligent grounding on theory regarding development processes, studies of the developmental potential of ICT lack analytical bearings and rely on common sense or popular assumptions about what desirable developmental effects are and how they can be achieved. Critical discourses on ICT and development run the risk of having a polemic or moralizing character, of little scholarly value and unconvincing in policy circles. ICTD research has a great deal to gain from engaging with current theoretical and policy debates on development in economics and the social sciences, similar to the way that IS research gained strength in its argumentation about the nature of IS innovation from studying theories of technology in sociology.

We should work toward developing a theoretical basis for the analysis of the political economy and the sociology of ICT-enabled development. We need studies of the political actors and institutions through which economic models and technological potential are translated into industries, information infrastructures, and "empowered" societies. We need to engage with ongoing scholarly debates on the articulation of local political economies with global political and economic trends.

One further challenge is to bring together these two types of theory: the theories on contextualist ICT innovation and the theories on ICT-enabled development. This is no easy task. For example, the contextualist socially embedded theory that I advocate above has been a powerful analytical device for micro-level processes, while the political economy of development deals mostly with macro-level processes involving aggregates of individuals' actions, collective actors, and institutions. Research that spans micro-macro analytical domains in the social sciences is notoriously difficult.

Empirical research plays a major role in addressing theoretical challenges. In this respect, ICTD is becoming an increasingly richer research domain. Quantitative data on ICT and development may not be as abundant in developing countries as in industrialized countries, but with concerted efforts by international development agencies tracking poverty alleviation, economic growth, and various human development indicators, quantitative ICTD studies that set out to reveal patterns and correlations become feasible. Qualitative researchers have ample opportunities for insightful ICTD research. There is scarcely any region or community that does not have interesting experiences with ICT innovation. Initiatives to promote ICTs are widespread, and they now have a history of adequate length to reveal the influences from various institutions and the effectiveness of various policies, as well as the formation of meanings and capacities for action. Unpredicted success cases, such as the emergence of the globally competitive software industry in India or the phenomenal diffusion and innovative uses of mobile phones in Africa, are particularly important for building theoretical underpinnings for the ramifications and complexities of ICT and development.

Perhaps the primary motivation for ICTD researchers is their appreciation of the potential of ICT innovation to contribute to the improvement of human condition. However, we are also the first to

witness in our research the falsity of widely held technology-deterministic expectations that ICT, by virtue of its technical properties, will have this or that development effect. Our task is to understand what it takes for ICT to contribute to improving the life conditions of people who need such improvement the most, and it is this end that the theoretical efforts I suggest in concluding my review of the field are intended to serve. ■

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