

ROLE OF INFORMATION SYSTEM IN INDIA

SYED AZEEM

MBA Ist Year

Sphoorthy Engineering College
Nadargul, Telangana.

ABSTRACT

In this paper I review the Information Systems (IS) research on how developing countries have attempted to benefit from information and communication technologies (ICTs). First I identify three discourses on IS implementation and associated organizational and social change that coexist in information systems in developing countries (ISDC) research, namely as a process of technology and knowledge transfer and adaptation to local social conditions; as a process of socially embedded action; and as a process of transformative techno-organizational intervention associated with global politics and economics. I then point out the distinctive research agenda that has been formed in ISDC studies, both in the more familiar IS themes – failure, outsourcing, and strategic value of ICT – and also in studies of themes relevant specifically to the context of developing countries, such as the development of community ICT and information resources. Finally, I call the reader's attention to the potentially significant theoretical contributions of ISDC research for understanding IS innovation in relation to social context and in relation to socio-economic development theories and policies.

KEYWORDS: *Developing countries, information system, innovation, development, discourses.*

INTRODUCTION

The pace and direction of information and communication technology (ICT) innovation and concomitant organizational change, which comprise the object of study of the information systems (IS) field, are undoubtedly set by the advanced economies of the world, primarily in North America and Europe. Nevertheless, the international IS literature includes an increasing number of studies of IS innovation experiences in other regions of the world, mainly the developing countries of Asia, Africa, and Latin America. Such studies considerably expand the empirical basis that informs IS research findings. More significantly they expand the domain of research of the IS field by addressing new themes, such as the provision of ICT resources for a community and by highlighting dimensions of the process of IS innovation that so far have received relatively little attention in mainstream IS research, such as national culture or global politics. Most research concerning IS innovation in developing countries is published in specialist conferences and journals. A valuable literature resource has been formed by 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. The journals Information Technology for Development, Information Technologies and International Development, and the Electronic Journal of Information Systems in Developing Countries (EJISDC) are dedicated to this area of research, and the Journal of Global Information Technology Management frequently publishes papers on developing countries. Increasingly general IS conferences acknowledge this research subfield and include panel and paper sessions on developing countries, often within tracks on the theme of globalization. Similarly, general IS journals occasionally publish papers on research in developing countries and some of them have produced special issues in this area.

Nevertheless the research stream of information systems in developing countries (ISDC), the nature of its research concerns and ongoing debates are poorly understood beyond a circle of specialists. Reviewers of IS journals require ISDC authors to justify their research questions in relation to the IS literature and compare their findings with general IS knowledge. These are valid requirements for the creation of links between what is commonly known in a research field and the particularities of its subfields. However, some understanding of the research in developing countries by the wider IS research community is necessary in order to proceed from basic to more elaborate and in-depth research accounts of IS phenomena not only in developing countries but also in the world at large in the era of globalization. As IS transcend organizational and national boundaries and support global economic and political activities, knowledge of the conditions and the processes of socio-technical change in developing countries acquires general significance for IS research and practice. My aim in this article is to contribute towards an understanding of the nature, contributions, and potential of the ongoing research on IS in developing countries. Having the general IS scholars and practitioners in mind, I review the ISDC research in juxtaposition to the collective IS research and its general body of knowledge. My task, therefore, in this paper is different from reviews intended to guide researchers in the subfield, such as while I comment on epistemological approaches in the subfield, my main objective is to inform the broader IS research community on substantive ISDC research concerns and contributions. I have taken an interest in ISDC research ever since its emergence in the late 1980s and followed its shaping closely ever since. Therefore I started writing this review with an 'insider's' confidence of understanding the unfolding of this research area and its literature. As an interpretive researcher my effort aims to present the way I make sense of ISDC research, and to substantiate the validity of my descriptions and arguments with references to and discussion of its body of literature. I have taken care to avoid two pitfalls: vulgar eclecticism and 'inbreeding'. The former concerns the *ad hoc* selection of ideas – lifting them out of epistemologically cohesive theoretical streams that gave rise to them – and their loose combination as a 'body' of knowledge. The latter refers to focusing too narrowly on the work of a small number of researchers with whom I am similarly minded, in a self-referential way, that is, without positioning their research arguments within the broader and more diverse opinions of the ISDC field. To that end, although the initial impetus for doing this review stemmed from my existing knowledge of the field, the crafting of the presentation of the field in terms of the categories of research I discuss, the contributions I highlight, and my arguments of their significance and limitations, necessitated an almost exhaustive reading – with a large amount of re-reading – of articles and chapters in the sources I identified above as its publication outlets. I have excluded from this review publications that present particular technologies or IS innovation initiatives in developing countries, or case studies elaborating on the experience of an organization or country without attempting to form and substantiate theoretically analytical claims about the nature of the narrated experience. There is a lot of such literature in ISDC, providing a useful source of information on the kind of innovation taking place in developing countries and the challenges faced by practitioners, but it plays a marginal role in the analysis of the academic subfield that I am undertaking here. Throughout this paper I use the term 'IS innovation' to refer to the development and implementation of ICT systems and concomitant organizational change. That IS implementation comprises technology development and organizational change does not require explanation for the readers of an IS journal. But it is, perhaps, somewhat unusual in the IS literature to see such socio-technical change as 'innovation'. I chose this term to convey the notion of novelty and open-endedness of the effort and experience of IS implementation and of

the associated changes within the hosting organization and beyond it. Even if the technologies implemented in an IS project are common and widespread, the local IS implementation experience constitutes an innovation for the organization undertaking it and may well constitute innovation for its socio-economic context. The paper is structured as follows. In the next section, I present three discernible discourses in ISDC research. The first one considers IS innovation in terms of transferring ICT and organizational practices from advanced economies and adapting them to the context of particular developing countries. The second discourse considers IS innovation as a process embedded in local conditions of a developing country. The third discourse addresses IS innovation as a transformative intervention and associates it with aspirations and policies for socio-economic development. I use examples from the ISDC literature on IS implementation and organizational change to clarify these three discourses. In the following section I discuss ISDC research in terms of the distinctiveness of its research agenda, examining the themes and issues it addresses. I discuss the main issues addressed in studies of some of the common themes of the IS research, namely on IS failure, on outsourcing, and on the strategic value of IS innovation. Also I discuss the research on telecentres, as a topic that emerged in the context of developing countries. I then discuss the potential of new theory building in ISDC research. I discern such potential in contextual analyses of IS innovation, and in studies of the developmental role of ICT within alternative socio-economic development policies. Finally, in Conclusions, I comment on the contributions of ISDC research, pointing out the new intellectual ground the transformative ISDC discourse is opening for the IS field.

Agencies that developed MIS/web portal of the Scheme

Scheme	Department/Ministry	Who developed the MIS
PMGSY	Rural Development (MoRD)	Online Management, Monitoring & Accounting System (OMMAS) has been developed by the Centre for Development of Advanced Computing (C-DAC), Pune for PMGSY.
MGNREGS	Rural Development (MoRD)	National Informatics Centre (NIC)
NRDWP	Drinking Water & Sanitation (MoRD)	NIC
TSC	Drinking Water & Sanitation (MoRD)	NIC
RGVY	Ministry of Power	NIC and Rural Electrification Corporation
IAY	Rural Development (MoRD)	NIC
NRHM	Ministry of Health & Family Welfare	Vayam Technologies Ltd
SSA	School Education & Literacy (MHRD)	Educational Consultants India Limited (Ed.CIL)
JNNURM	Ministry of Urban Development	NIC
ICDS	Ministry of Women & Child Development	NIC
MDMS	School Education & Literacy (MHRD)	NIC
Rural Telephony	Telecommunications (MoC & IT)	NIC
Irrigation	Ministry of Water Resources	NIC

In the President's Address to the Parliament on 4th June, 2009, it was announced that a Delivery Monitoring Unit (DMU) will be constituted in PMO and it was commenced by the Prime Minister on 6th September, 2009 as an oversight mechanism for monitoring the arrangements, delivery of output and transparency ensuring smooth performance of the selected programmes through steady monitoring of outputs stated by the concerned ministry, collectively at one point. Earlier, only the sponsoring departments/ministries had information on the progress of the scheme.

RESULTS & ANALYSIS

Computer systems analysts help companies or other organizations use computer technology effectively and efficiently. They incorporate new technology into current systems after doing cost-benefit analyses to determine whether it is financially sound and will serve the entity well. There are three types of computer systems analysts. Systems designers or architects find technical solutions that match the long-term goals of companies or organizations. Software quality assurance (QA) analysts test and diagnose problems in computer systems. Programmer analysts develop and write code for software that meets their employers' or clients' needs. A system analyst is a very important person within a company. Although some companies may have different views to what a system analyst's role is, the companies still look for the same desirable skills and qualities. The most desirable skill are: Patience – this is one thing that many people lack and it is crucial that a system analyst has this as many projects fail and also programmes will crash (they fail most of the time) and the system analyst will have to try and revert the problem which takes time and if you don't have patience then you are in trouble! This is by far the number one desired quality many companies will look for in a systems analyst. People skills – you must be able to work with a different variety of people and also be able to work on a team. According to Jamie Hoag “You should be an assertive person”. Problem solving – as said above under patience the system analyst will have to be able to understand why a programme failed and figure out how to fix it as soon as possible because it could have some bad consequences for the company if they are relying on it. Excellent communication abilities – as the system analyst will be working with a variety of people they will have to have very strong communication skills. With the increasing burden of the fiscal deficit of the Central and State Governments (combined at 10 percent of the GDP in 2010-11), there is a greater need than ever before to ensure that inputs are converted to outputs. The sponsoring ministries/departments and the implementing agency or organizations are under constant pressure to show better results and achievements of the scheme. Active participation of the community, especially of the elected representatives, increasing role of the Non-Governmental Organizations (NGOs), media and civil society groups are compelling the implementing agency or organizations to perform better in order to improve the achievements of the scheme. The Government has realized the need for output and outcome monitoring of the plan schemes (Economic Survey, 2007-08). The Eleventh Five Year Plan also underscored the deficiencies in the existing accounting system of the plan schemes and its inability to support informed planning, budgeting and effective monitoring of

these schemes (Planning Commission, 2008). There exists a hierarchical chain of implementing agencies through which Central Government funds flow to the grassroots level where 3 bulk of the actual expenditure is carried out at the block/panchayat level in most of the schemes (Nigam and Sengupta, 2009).

Budgetary Allocation for Flagship Programmes of the Central Government, 2011-12

Sl. No	Name of the Scheme	Allocation (Rs. Crores)
A	Bharat Nirman	58,000
1	Rural Roads: Pradhan Mantri Gram Sadak Yojana (PMGSY)	20,000
2	Low Cost Housing: Indira Awaas Yojana (IAY)	10,000
3	Water Supply: National Rural Drinking Water Programme (NRDWP)	9,350
4	Irrigation	10,550
5	Rural Telephony	2,100
6	Rural Electrification: Rajiv Gandhi Grameem Vidyut Yojana (RGGVY)	6,000
B	Other Schemes	1,13,582
7	Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS)	40,000
8	Sarva Shiksha Abhiyan (SSA)	21,000
9	Mid Day Meal Scheme (MDMS)	10,380
10	Integrated Child Development Scheme (ICDS)	10,330
11	National Rural Health Mission (NRHM)	18,172
12	Jawaharlal Nehru National Urban Renewable Mission (JNNURM)	13,700
13	Total Sanitation Campaign (TSC)	1,650
Grand Total (A+B)		1,71,582

Eleventh Five Year Plan (2007-12) Documents, Planning Commission

CONCLUSION

A panel at the International Conference on Information Systems (ICIS) in 1997 discussed the question 'why should IS academics and professionals devote attention to developing countries?' The answer the panelists mostly elaborated on was that developing countries are a huge and yet untapped market. In contrast, Walsham has repeatedly pointed out the ethical significance of researching the way ICT may come to bear on improving the life conditions of the vast majority of people who are born in non-affluent regions of the contemporary world. These views demonstrate the varying motives of researchers from Western countries. But, with an increasing number of IS researchers from developing countries and an increasing number of IS professionals working on global IS infrastructures that include DCs, ISDC research is in less need of justification as a field of enquiry concerned with the way ICT may benefit 'others'. The value of this research area can be judged in terms of its contribution to understanding IS innovation and its socio-economic consequences across an increasingly interlinked world. To

that end, I conclude this outline of ISDC research with some comments on the knowledge it has added, or can potentially add to the IS field. First I summarize the contributions made through the diffusion and social embeddedness discourses, and highlight their potential for developing further analytical capacity to understand IS innovation in the contemporary development context. Then I discuss the potential of the transformative discourse, which, although the least developed in comparison to the diffusion and social embeddedness, I believe is the most novel and challenging for the IS field. Both the diffusion and the socially embedded discourses are well established in the general IS research. The ISDC studies have enriched them substantially. At the very least they have increased awareness that in different countries and regions the circumstances of IS innovation are different. This is demonstrated by the particular issues and new themes that came to comprise the ISDC research agenda. In different parts of the contemporary world IS innovation is found to be associated with different hopes and expectations, concerns and fears, observed behaviors and reflections. And both the diffusion/adaptation and the social embeddedness discourses share the assumption that these differences matter, they do not disappear by the force of technology or managerial logic alone. But their approach to understanding and acting upon the differences of the IS innovation context differs. The diffusion discourse does so by further assuming that the material/cognitive entities that comprise ICT and associated best 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, institutionalized work place habits. Consequently, it designs modifications of the technologies and interventions in the recipient institutions to make them hospitable to the intended innovation.

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