



**IFIP WG9.4**  
**Abuja, Nigeria**  
**May 26 - 28, 2005**

**IFIP**  
**INTERNATIONAL FEDERATION FOR INFORMATION PROCESSING**

**8<sup>th</sup> International Working Conference of IFIP Working Group (WG) 9.4**

*Theme: Enhancing Human Resource Development  
through ICT*

**ABSTRACTS**

May 26 – 28, 2005  
at the  
NICON HILTON, ABUJA-NIGERIA

## **From Digital Divides to Digital Societies**

**Chris Westrup**

University of Manchester, Oxford Road, Manchester M13 9QH, United Kingdom  
Email: [Chris.Westrup@manchester.ac.uk](mailto:Chris.Westrup@manchester.ac.uk)

**Saheer Al-Jaghoub**

Al-Ahliyya Amman University, Amman 11196, Hashemite Kingdom of Jordan  
Email: saheer\_aljaghoub@hotmail.com

### **ABSTRACT**

Though discussions of a digital divide in terms of technological access are important, this paper has two other aims. Firstly, the paper looks at the notion of the digital divide and argues that it is being used as a means for mobilising action by national governments, international agencies and public/private consortia. Secondly the paper considers the digital future that is argued to be inherent in the notion of a digital divide and suggests research is needed to follow the processes of constructing knowledge/digital societies. Research in progress in Jordan is used to illustrate these themes.

## **Reconsidering ICT for Development Research: Critical Realism, Empowerment, and the Limitations of Current Research**

**Matthew Longshore Smith**

Department of Information Systems  
London School of Economics and Political Science  
M.L.SMITH1@lse.ac.uk

### **ABSTRACT**

This paper argues that the ability to enhance human resources through Information and Communication Technologies (ICT) can only come about through an understanding of the causal linkages between the application of ICT and particular outcomes. For example, just knowing that there is a relationship between ICT and employee empowerment is not enough. We need to know why and how the relationship works. However, understanding these links is as contentious as it is important. The current state of ICT for development research has come up against philosophical impasses that limit constructive and critical research. To move past these limitations, a healthy re-examination of their underlying ontological assumptions is in order. This article offers one such reconsideration. It proposes that critical realism, specifically as developed by Bhaskar in A Realist Theory of Science and The Possibility of Naturalism, offers a viable and appropriate philosophical underpinning for ICT for development research. Critical realism does so through a coherent response to post-positivistic epistemic skepticism by providing a qualified (non-positivist) naturalist approach for the social sciences. This paper proceeds in three stages. The first stage describes the nature of the researcher's dilemma. The second stage provides an introductory description of some of the more salient aspects of critical realism as a philosophy of science that provides one route to overcome current research difficulties outlined in stage one. The final stage applies critical realist assumptions to IS research in the development context. To clarify the discussion and render it more relevant to human resource development this section includes a realist conceptualization of the relationship between ICT and employee empowerment and what this means for research. This example shows how critical realism effectively dissolves debates such as the dystopian/utopian argument over IS and empowerment and provides a new conceptual apparatus that will improve human development research and practice in the future.

## **Scaling Of Health Information Systems In India: Challenges And Approaches**

**Sundeep Sahay<sup>1</sup> and Geoff Walsham<sup>2</sup>**

<sup>1</sup> Dept. of Informatics at the University of Oslo, Norway, [sundeeps@ifi.uio.no](mailto:sundeeps@ifi.uio.no).

<sup>2</sup> Judge Institute of Management Studies, Cambridge University, UK.

### **ABSTRACT**

This paper addresses the issue of scaling of information systems (IS) in both theoretical and empirical terms. Scaling is an important issue in IS, especially in the contemporary context of globalization, as attempts are ongoing to expand IS in the same context as well as take it into other contexts. Theoretically, an information infrastructure (II) perspective is drawn on to analyze the challenge of scaling, viewing it not merely as a technical problem, but as a socio-technical one involving a heterogeneous network constituted of technology, people, processes, and the institutional context. Empirically, scaling is analyzed based on experiences from an ongoing project to implement health information systems within the Primary Health Care sector in India. The theoretically informed empirical analysis leads to some preliminary insights relating to the questions of “what is being scaled?” and “how is it being scaled?” Some conclusions are drawn on theoretical and practical challenges related to scaling.

## **Offshore IT Outsourcing To Emerging Economies – Analysis of Readiness Vs. Attractiveness**

**Olayele Adedokun**

DEPAUL UNIVERSITY, School of Computer Science, Chicago, Illinois 60604-2301

### **ABSTRACT**

This paper investigates offshore IT outsourcing readiness and attractiveness to economically emerging countries. Offshore of IT software development to low cost development regions is gaining increased popularity in the US and Western Europe. Previous researches have addressed key success factors. Through a literature review 32 critical success factors were identified, that were divided into five factor groups. The first two factor groups (technical infrastructure, and business infrastructure) were identified to determine readiness and the other three factor groups (people factors, societal interface, and regulatory interface) were identified to determine attractiveness. One major finding was that cost, an important attractive factor, is not the most important factor when US companies are selecting an offshore IT location. The paper concludes with a discussion on the implications of these findings to outsourcers in economically emerging countries.

## **Implementation of Free and Open Source Software within a developing country context: The Cuban Case**

**Amit Mitra**

Information Systems Institute, University of Salford, Salford UK

Email: [a.mitra@salford.ac.uk](mailto:a.mitra@salford.ac.uk)

**Alexeis Garcia**

Information Systems Institute, University of Salford, Salford, UK

Email: [a.garcia@salford.ac.uk](mailto:a.garcia@salford.ac.uk)

### **ABSTRACT**

Many developing countries around the world are frequently confronted with a dual problem of developing infrastructure as well as implementing software solutions. Retrospective experience of licensing regulations and viral attacks are likely to indicate that part of the problem is a consequence of dependencies created by the use of proprietary software within the economy. Recent prominence of Free and Open Source Software (FOSS) has conjured up various alternative scenarios to replace the need for acquiring proprietary software within countries with limited resources. Cuba is no exception. However, there is an interesting background to the obtaining reality of software use within Cuba that makes it unique among several less developed countries. The present paper firstly delineates some of this background and then looks at the inherent advantages of using FOSS. This paper looks at the obtaining conditions in Cuba within which FOSS is

being integrated into organisations and argues that there needs to be stronger political will to reduce gaps between goals and implementation for realising intrinsic advantages of FOSS use.

### **Towards E-Government in Nigeria: Shortcomings, Successes, Swish or Sink**

**Princely Ifinedo**

Department of Computer Science and Information Systems, University of Jyväskylä, Finland

**Charles Uwadia**

Department of Computer Science, University of Lagos, Nigeria

Emails: [couwadia@yahoo.com](mailto:couwadia@yahoo.com); [couwadia@unilag.edu](mailto:couwadia@unilag.edu); [premifin@cc.jyu.fi](mailto:premifin@cc.jyu.fi)

#### **ABSTRACT**

Governments all over the world have embraced one form of e-government initiative or another as they march towards digital governance in the new Information Age. The developing world is not totally left behind in this new race. To that end, this paper presents the move of one developing country - Nigeria - towards embracing e-government. The article discusses the problems, practices, and prospect of e-government in the country. The paper concludes by highlighting the need for Nigeria to step up its effort with regard to a changing world on the digital front. In addition, some recommendations relating to use of information and communication technologies (ICT), its adoption and diffusion in the country as well as its human resource development implications, are succinctly discussed.

### **Generalisations from an Interpretive Study: The Case of a South African Community-Based Health Information System**

**Elaine Byrne<sup>1</sup> and Sundeep Sahay<sup>2</sup>**

<sup>1</sup>.School of Public Health, University of the Western Cape, South Africa,

<sup>2</sup>.Dept. of Informatics, University of Oslo, Norway

Email: [sundeeps@ifi.uio.no](mailto:sundeeps@ifi.uio.no); Email: [elainebyrne@telkomsa.net](mailto:elainebyrne@telkomsa.net)

#### **ABSTRACT**

This paper explores the making of generalisations from interpretive research by examining the process of developing a community-based information system (IS) in a rural area in South Africa. Baskerville and Lee's (1999) framework of four categories, and Walsham's four types of generalisations form a framework that is used in this case study. The generalisations made include the reconceptualisation of participation and the development of a communication framework which extends Habermas' criteria for the 'Ideal Speech Situation'. The main argument of this paper, using the generalisations made from this single case study, is that generalisations from interpretive research can be made and that much valuable contribution in the IS field is lost because IS researchers fail to make these generalisations. Though, we conclude that there is no set recipe or methodologies for the development of a community-based IS, the human resource development of researchers can use the generalisations made and the documentation of such rich experiences to orient themselves to the necessary competencies to conduct similar work.

### **Challenges of User Participation in the Design of a Computer Based System: The Possibility of Participatory Customisation in Low Income Countries**

**Honest C. Kimaro, Ola Hodne Titlestad**

University of Oslo, Department of Informatics, Norway. [honestck@ifi.uio.no](mailto:honestck@ifi.uio.no), [olati@ifi.uio.no](mailto:olati@ifi.uio.no)

#### **ABSTRACT**

Participatory design is generally regarded as an effective approach in systems development to overcome challenges such as changing contexts, difficulties of capturing users' needs and problems of achieving systems' acceptance. However, user participation is associated with certain contextual assumptions or

beliefs from its origin in the West that are not always applicable in the context of Low Income Countries (LICs). The initial technical capability of users, motivation and desire to participate, availability of resources and long-term support mechanisms are often taken for granted in the West, but in many cases not present in the context of LICs. In the Western setting, due to favourable socio-economic and political conditions and the presence of skilled users, an approach to design of systems from scratch with user participation tend to give quality systems. However, in a LIC setting where the intended users have limited computer skills, there is a need to put an extra effort into training and to find alternative approaches to achieve participation in system design. In such a setting, we argue that participatory customisation, a process where the users in collaboration with the developers adapt an already developed or partly developed system to meet the needs of their own workplace, can be a better approach. In this paper we approach participatory customisation in LICs by looking in detail at the customisation of the District Health Information Software (DHIS) in two pilot health districts in Tanzania. The Tanzanian project is part of a global research initiative (the HISP), and in order to put forward more general approaches for LICs, we compare our findings from Tanzania with similar customisation processes in Cuba, India, Mozambique and South Africa.

### **Justifying the Modification of Technology Acceptance Model to Match Realities in Developing Countries**

**Philip F. Musa**

School of Business, The University of Alabama at Birmingham

**Peter Meso**

College of Business, Georgia State University

**Victor W. Mbarika**

College of Business, Southern University and A&M College, Baton Rouge, LA 70813

E-mail: [victor@mbarika.com](mailto:victor@mbarika.com); [musa@uab.edu](mailto:musa@uab.edu); [pmeso@cis.gsu.edu](mailto:pmeso@cis.gsu.edu)

#### **ABSTRACT**

Given the globalization of the world economy, Sub-Saharan Africa is expected to play greater roles than it has in the past. The motivation for this paper is to enhance our understanding of the interactions that come to bear between some socio-economic development needs and factors generally innate to sub-Sahara Africa and other developing countries; these manifest to impede technological adoption in the regions. This research is an extension of the influence of perceived user resource, which in turn was developed from the original TAM literature; it also extends ideas espoused in Information Technology literature on socio-economic development. We validate the model by analyzing survey data gathered in two representative Sub-Saharan African countries. We offer some diagnostics and prescriptions for how to effect a sustainable technological adoption and development across the region. We believe that our presentation would bring Sub-Saharan Africa and other developing regions that are almost non-existent in mainstream MIS research into focus.

#### **Paradigms of ICT in Development**

**Maung K. Sein**

Agder University College, Servicebox 422, N-4604 Kristiansand, Norway

e-mail: [Maung.K.Sein@hia.no](mailto:Maung.K.Sein@hia.no)

#### **Abstract**

While the role of ICT in development is generally agreed to be important, the actual process through which ICT influences development is not clear. A growing body of literature has delved into conceptual and theoretical aspects of ICT in development in order to understand this process. The contextual nature of ICT and the situated organizational analysis of such interventions are examples of this stream. However, the ideologies and logic behind the behaviour of the actors have received less attention. In this paper, I argue that ICT is not neutral and that the paradigmatic premises of the ICT intervention affect the outcome. This has implications for specific aspects of development initiatives such as IT education and thus development

of human resources. Borrowing from the IS literature, I distinguish between four different paradigms of ICT in development: functionalism, social relativism, radical structuralism and neo-humanism. I discuss the implications these paradigms have on the manner in which the ICT intervention plays out in a developmental context.

**Systems for the Production of Plagiarists: Developing countries and use of plagiarism detection systems in UK universities**

**Niall Hayes and Lucas Introna**

Centre for the Study of Technology and Organisation, Lancaster University Management School,  
Lancaster University, UK, [n.hayes@lancaster.ac.uk](mailto:n.hayes@lancaster.ac.uk); [l.introna@lancaster.ac.uk](mailto:l.introna@lancaster.ac.uk)

**ABSTRACT**

This paper argues that the inappropriate framing and implementation of plagiarism detection systems in UK universities can unwittingly construct students from developing countries as ‘plagiarists’. It argues that these systems are often implemented with inappropriate assumptions about plagiarism and the way in which new members of a community of practice develop the skills to become full members of that community. Drawing on the literature and some primary data it shows how expectations, norms and practices become translated and negotiated in such a way that legitimate attempts to conform with the expectations of the community of practice often become identified as plagiarism and illegitimate attempts at cheating often become obscured from view. It argues that this inappropriate framing and implementation of plagiarism detection systems may make academic integrity more illusive rather than less. It argues that in its current framing—as systems for ‘detection and discipline’—plagiarism detection systems may become a new micro-politics of power with devastating consequences for those excluded.

**Rural Community and Human Development through Information Technology Education: Empirical Evidence from Western Nigeria**

**Adekunle Okunoye & Nancy Bertaux**

Xavier University, Cincinnati Ohio, USA, [okunoye@xavier.edu](mailto:okunoye@xavier.edu); [bertaux@xavier.edu](mailto:bertaux@xavier.edu)

**Muraina Oyelami,**

Obatala Center for Creative Art, Iragbiji, [chief@oyelami.com](mailto:chief@oyelami.com)

**ABSTRACT**

In developing countries, IT education is associated with high cost and is not typically available outside urban areas. Seeking IT education might not be on the priority list of countries battling numerous problems that related to health care, housing, nutrition and other basic needs of life, but globally, IT education is undeniably an increasingly important aspect of human resource development, which is in turn crucial to economic development. This paper presents a case where the provision of IT education does not follow conventional thinking that associates IT education with urban dwellers. We discuss the case of Summit Computers in a rural community in Nigeria. The analysis of the case suggests that for developing countries to benefit from advances in IT, the following factors can be helpful: awareness among the real users (irrespective of the urban or rural residence and income status); convenient, affordable IT education in rural and urban settings; and consideration of how IT training can meet the needs of local employers. We also find that IT education can be effectively championed by a member of the local community, and the primary motive of IT education should be for development. This case suggests that government should consider encouraging community-based IT education initiatives in a bottom-up approach as contrasted with the current top-down approach that may be hindering the delivery and acquisition of IT education.

**Institutions and ICTs in Makerere University: Bridging Digital Divide or Spreading Donor Dependence?**

**Alemayehu Molla**

IDPM, The University of Manchester, Manchester M139QH, UK, [Alemayehu.Molla@manchester.ac.uk](mailto:Alemayehu.Molla@manchester.ac.uk)

**Matia K. Kabuye**

Makerere University, P.O. Box 7062, Kampala, Uganda, [mkkabuye@pdd.mak.ac.ug](mailto:mkkabuye@pdd.mak.ac.ug)

**Savita Bailur**

IDPM, The University of Manchester, Manchester M139QH, UK, [Savita.Bailur@manchester.ac.uk](mailto:Savita.Bailur@manchester.ac.uk)

**ABSTRACT**

Effective use of information and communications technologies (ICTs) by universities and other higher education institutions of developing countries can play a crucial role in developing their capacity as gatekeepers of knowledge-creation, distribution and use. Several governmental and non-governmental institutions support this. However, there is a need to identify what constitutes an appropriate role for these institutions and the impact of their intervention on developing and sustaining the ICT capacity of their recipients. This paper contributes to this debate by presenting the role and impact of institutional intervention in the Makerere University's ICT capacity and its contribution to human resources development.

**Re-inventing Higher Learning Institutions Communication Media: The case of University of Dar es Salaam Student Information System**

**Juma H. Lungo**

Department of Computer Science, University of Dar es Salaam

P. O. Box 35062, Dar es Salaam, Email: [jlungo@udsm.ac.tz](mailto:jlungo@udsm.ac.tz)

**ABSTRACT**

The traditional higher learning institutions communication media in most developing countries remain the notice boards, building walls, and chalk prepared black boards. Higher learning institutions use these traditional media to communicate information from announcements, student nominal rolls, examination results, teaching schedules, memos, and the likes. While it is cheap and does not require any skills to use, limitations of the traditional media hamper higher learning institutions communities. At the end of 1990s, the University of Dar es Salaam has put in place several ICT related projects including the University Student Accommodation System Database. This paper discusses common limitations of traditional communication media and analyzes the potentials of ICT tools adoption in higher learning institutions by presenting the University of Dar es Salaam Student Information System.

**ICTs and Capacity Building through Apprenticeship and Participatory Methods  
Applied to an ICT-based agricultural water management system**

**Jacques Panchard**

Ecole Polytechnique Fédérale de Lausanne, Switzerland ; [jacques.panchard@epfl.ch](mailto:jacques.panchard@epfl.ch)

**Alexander Osterwalder**

University of Lausanne, Switzerland; [alexander.osterwalder@hec.unil.ch](mailto:alexander.osterwalder@hec.unil.ch)

**ABSTRACT**

This paper describes the COMMON-Sense Net project, a research in progress and joint development between the Swiss Federal Institute of Technology, Lausanne (EPFL) and the Indian Institute of Science (IISc) in Bangalore. The project concerns the design and implementation of an Information and Communication Technologies (ICT) system for agricultural management in a rural community of

Karnataka (Southern India). It is unusual in the sense that it focuses on Environment-to-Person Information Systems (EPISs) rather than on Person-to-Person Information Systems (PPISs). Beyond its mere engineering value, we analyze the potential that such a project can unleash for ICT capacity building in the local context of the village. In particular, we study the correspondence between capacity building and knowledge creation, and we describe how a design science approach can foster this kind of capacity building if it is integrated in the project methodology in an iterative and participatory way.

### **Internationalization of Information Infrastructures and Control: Cases from Mozambique and Norway**

**Petter Nielsen**

University of Oslo, Department of Informatics, Gaustadalléen 23, Blindern, NO-0316 Oslo, Norway

Email: [pnielsen@ifi.uio.no](mailto:pnielsen@ifi.uio.no)

**José Leopoldo Nhamossa**

University of Oslo, Department of Informatics, Email: [leopoldo@ifi.uio.no](mailto:leopoldo@ifi.uio.no)

#### **Abstract**

Based on the growing interest in internationalization in the information systems (IS) domain, this paper examines two attempts of internationalization. The first relates to a health information system for developing countries and the second concerns a telecommunication platform for premium rated SMS services. Discussing the experiences from these cases we use concepts from information infrastructure (II) as our theoretical and analytical lens. This analysis leads us to the articulation of an extended framework for theorizing and understanding the processes of internationalization. Our discussion engages with the inherent challenges of internationalizing IS, in particular the tensions related to control. Throughout the paper we will show that internationalization processes are highly contingent upon the IIs it is growing out from and into. The discussion will in particular concern the nature of standards and relations between the global and the local as well as the choice of a process or a product approach towards internationalization.

### **Gender Differences in Mobile ICT Use: An Empirical Investigation in Two Developing Countries**

**Peter Meso**

J. Mack Robinson College of Business, Georgia State University; [Pmeso@cis.gsu.edu](mailto:Pmeso@cis.gsu.edu)

**Victor Mbarika**

College of Business, Southern University and A&M College

Baton Rouge, LA, [victor@mbarika.com](mailto:victor@mbarika.com)

**Philip Musa**

School of Business, University of Alabama at Birmingham, Birmingham,

Email: [musa@uab.edu](mailto:musa@uab.edu)

#### **ABSTRACT**

Gender and technology studies have found that men and women adopt technology differently. Men's decisions to use technology are more strongly influenced by their perception of usefulness, while women's decisions are based more on perceptions of the technology's ease of use. Women and men differ in their perceptions of, but not their use of, email technology. Further, men and women may view the same mode of communication differently. This being the case, we chose to examine if indeed there are gender differences in the perceptions of the factors that influence technology acceptance, especially within a developing region context as provided by Sub-Saharan Africa (SSA). Results indicate that, for the most part, the factors that influence use of mobile ICTs in SSA are robust of gender.

## **Internet Cafés – Venues for Learning in Developing Countries**

**Bjørn Furuholt**

Department of Information Systems, Agder University College, Kristiansand, Norway  
[Bjorn.Furuholt@hia.no](mailto:Bjorn.Furuholt@hia.no)

**Stein Kristiansen**

Department of Economics, Agder University College, Kristiansand, Norway  
E-mail: [Stein.Kristiansen@hia.no](mailto:Stein.Kristiansen@hia.no)

### **ABSTRACT**

This paper examines the use of Internet cafés as venues for learning in two developing countries, Indonesia and Tanzania. The aim is to find contextual explanations of differences in use patterns between various user groups. The research is based on surveys in the two countries, supported by in-depth interviews. The findings suggest that Internet cafés are suitable arenas for human resource development for a wide range of users. Access speed, price and spare time are the three most important obstacles to increased use. More research is needed to see how Internet cafés can attract new groups of users, to help reducing the digital divide within a developing country.

## **Challenges and Opportunities of Implementing District-based Health Information System in Ethiopia: A case study from Benishangul-Gumuz Region**

**Shegaw Anagaw Mengiste**

University of Oslo, Department of Informatics, Oslo, Norway  
e-mail: [mengisa@ifi.uio.no](mailto:mengisa@ifi.uio.no)

### **ABSTRACT**

This paper has analyzed the challenges of sustainability and scalability of HIS. The empirical analysis was conducted in a backward and disadvantaged region of Ethiopia. An ongoing process of HISP (Health Information System Program) was addressed and the main challenges in the implementation of sustainable and scalable district-based health information system in the context of Primary Health Care (PHC) sector in Ethiopia were identified. Human resource, infrastructure, and HIS related problems are the main challenges hindering the implementation of sustainable and scalable district-based health information systems in the region.

## **Enhancing Managerial Quality in Government ICT Projects: Lessons from Gujarat**

**Shirin Madon**

Department of Information Systems, Houghton Street, London WC2A 2AE.  
E-mail: [S.Madon@lse.ac.uk](mailto:S.Madon@lse.ac.uk)

### **ABSTRACT**

Investment in human resource development is recognised as one of the most fundamental prerequisites for socio-economic development and the importance of improving managerial quality in government has recently been emphasised by international agencies. In this paper, we draw on over ten years of fieldwork in Gujarat, India during which time the author has been studying developments in IT usage for district level planning and administration. Our findings indicate that prominent components of managerial quality need to be nurtured within the district administration in order for decentralised ICT projects to make any noticeable impact on the performance of development programmes.

## **Understanding the interplay between actors involved in the development of an organisation for telecentre network management: The E-citizenship project of the City of São Paulo (Brazil)**

**Marie Anne Macadar**

School of Economics, University of São Paulo, São Paulo-SP-Brazil  
Email: [macadar@via-rs.net](mailto:macadar@via-rs.net),

**Nicolau Reinhard**

School of Economics, University of São Paulo, São Paulo-SP-Brazil

### **ABSTRACT**

The search for effective management of telecentre initiatives is one of the main concerns pointed out by ICT researchers, although it is still underresearched (Roman and Colle, 2001; Williams, 2001). This paper aims to fill the gap by studying the interplay between several actors involved in developing an organisation for telecentre network management network in São Paulo City - Brazil. The provision of equitable ICT-access in developing countries, through telecentres in poor urban areas, requires improving the management view in telecentres' movement. The paper uses Actor-Network Theory (ANT) to study the relationship among public and private agents in the implementation of telecentre network initiatives in the City of São Paulo. Our findings demonstrate the importance of individual agents' goals, the organisational learning and political dimensions in the process and its importance for user training, participation and citizenship development. The results provide useful insights for the management of digital inclusion programs in a developing country.

## **Expert Assessments of E-Business in Developing Countries: A Theoretical Model of National Infrastructure**

**Chitu Okoli**

John Molson School of Business, Concordia University, Montréal, Canada  
[chitu@okoli.org](mailto:chitu@okoli.org), Montréal, Canada

**Victor W. A. Mbarika**

Department of Information Systems Decision Sciences, Louisiana State University, Baton Rouge, LA  
USA

[victor@mbarika.com](mailto:victor@mbarika.com),

### **ABSTRACT**

This study investigates experts' assessments of the pertinent factors affecting e-business in developing countries from a national infrastructure perspective. We design and conduct a survey that empirically solicits information from experts in e-business in Sub-Saharan Africa (SSA) in the first phase (completed and reported here), and in Latin America in the second phase (currently in progress). Our initial results for SSA using PLS analysis show that experts believe that non-specific general information and communication technology (ICT) policies are not very influential, while policies targeted specifically towards e-business are important in affecting e-business capabilities and in obtaining value from e-business, as well as ICT infrastructure. ICT infrastructure only affects e-business capabilities, but not its value. Experts believe that national governance institutions positively affect e-business value, but not capabilities. They do not believe that commercial infrastructure significantly affects e-business outcomes. This study theoretically and empirically distinguishes between two different dimensions of e-business outcomes: specific capabilities and value derived from e-business. It operationalizes the effects of national governance institutions and commercial infrastructure on e-business outcomes and empirically tests for their effects. The study provides empirical support for conceptual arguments for the need of ICT policies specific to the needs of e-business. It is the first study that conducts a quantitative, broad-based survey on factors that contribute toward e-business in the Sub-Saharan Africa and Latin America regions.

## **Discussion of the Representation of Relationships under the Aspect of Hierarchic Structure and Power in a Computer Project in South-western Uganda**

**Raphael Schneeberger  
Gerald Steinhardt**

Institute of Design and Assessment of Technology  
Vienna University of Technology  
Argentinierstr. 8/187  
A-1040 Wien, Austria

[rs@pernau.at](mailto:rs@pernau.at); [G.Steinhardt@tuwien.ac.at](mailto:G.Steinhardt@tuwien.ac.at)

### **ABSTRACT**

In the last few years ICT projects in DCs have gained tremendously on importance. Since the late seventies conferences on Information and Communication Technology (ICT) in developing countries (DCs) have been held and literature about projects configuration and implementation has been published. Nevertheless there has been a lack of case studies in general and especially of case studies dealing with teaching computing in least developed countries. So far there has been no case study performed by scientist with practical experiences in computer projects. This case study describes a computer project that was undertaken at a primary school in South-western Uganda, in the year 2002. During the project implementation one of the authors encountered - in parallel to technical problems - several misunderstandings related to culture. It became apparent that the participating people from that region approach new technology differently than we do (in the mind of members of different cultural backgrounds) and therefore integrate knowledge in a different way. This research will outline the social function of computers among the regions' population and discusses the social interrelationship between computers, teachers, donors and pupils and the reigning hierarchic positions. The overall goal of this research is the development of guidelines for a successful and sustainable technology transfer. The basis of this research project was laid during a further stay at the school in July 2003, where systematic data was collected and material was gathered. This empirical part was conducted with a view to qualitative research in the field of intercultural studies social semiotics and socio-scientific hermeneutics. Geertz's guidelines will be used for the interpretation of the participant observation and other relevant meta-documents about the project. All this empirical data enables the authors' systematic analysis done with Witzel's method of interpretation and the means of semiotic analysis. Up to the current state of analysis the cultural expectations towards gaining control over technology, such as computers, were seen as to be represented in a non explorative way of teaching. This led to the assumption that the external instructors were causing a cultural break by applying explorative teaching methods. It is to be assumed that the strong hierarchic position of teachers and parents hinder the pupils eagerness to explore new technology on their own, as they have to expect sanctions like payments and/or corporal punishment, when mistakes are done. After the examination of the Ugandan case study, the further research will concentrate on comparative studies dealing with similar projects both in the near surrounding as of Congo and/or Tanzania and in different continents like India or Ecuador. By doing so, possible similarities and differences shall be revealed and posted.

### **Small Island Developing States as Emerging Software Exporting Nations: The Case of Mauritius**

**Savita Bailur**

Information Systems, IDPM, University of Manchester, Manchester, M13 9QH.

E-mail: [savita.bailur@man.ac.uk](mailto:savita.bailur@man.ac.uk).

**Baljinder Sharma**

Director, C-DAC School of Advanced Computing, University of Mauritius Campus, Reduit, Mauritius.

Email: [nexus@intnet.mu](mailto:nexus@intnet.mu).

### **ABSTRACT**

Small Island Developing States (SIDS) have traditionally relied on a few sources of income, namely natural resources and/or tourism. Many SIDS were protected under GATT (General Agreement on Tariffs and Trade) and able to compete in a global economy. However, with the dissolution of GATT and several preferential trade agreements as well as recognition of over-reliance on select sources of income, SIDS are seeking to diversify their economies. This paper analyzes the case of Mauritius, a member of the Alliance

of Small Island States, which has built up four “pillars” of the economy – sugar, textiles, tourism, and the offshore financial sector but is now looking to add a fifth pillar – IT and IT Enabled Services industries. This paper first reviews the challenges facing SIDS in today’s world, and uses the case of Mauritius to see how feasible it is for SIDS to develop IT and ITeS industries. Carmel’s (2003) ten factor framework which assesses new entrants to software exporting is used to assess feasibility. The key finding here is that - if the case of Mauritius can be generalized - SIDS do have the potential to develop IT and ITeS industries, although they will need to develop niche markets. For this to emerge, governments, universities and the private sector have to produce a joint and prioritized vision, and a corresponding human resource development strategy.

**Push-Pull Factors in Routine Health Management Information Systems: Towards a Conceptual Framework to Evaluate, Plan and Improve the Capacity and Influence of RHMIS Actors in Developing Countries**

**Marius Gouws**

School of Public Health, University of the Western Cape  
Private Bag X 17, Bellville, Cape Town, South Africa

e-mail: [mggouws@mweb.co.za](mailto:mggouws@mweb.co.za)

**Judith Gregory**

Department of Informatics, University of Oslo, POB 1080 Blindern, N-0316 Oslo, Norway

e-mail: [judithg@ifi.uio.no](mailto:judithg@ifi.uio.no)

**ABSTRACT**

This is a research-in-progress paper that reports from experiences in longitudinal efforts to introduce and enhance Routine Health Management Information Systems (RHMIS) in South Africa and other developing countries since 1994, from the combined basis of a Department of Public Health university programme, at the University of the Western Cape, and the Health Information System Programme (HISP) Network, an international collaboration that includes Norway, South Africa, Mozambique, Tanzania, Malawi, Ethiopia, India and other developing countries. The authors propose a minimum infrastructural package for the viable establishment of RHMIS in developing country contexts, and a conceptual framework that draws on principles of public administration planning to evaluate, plan and improve RHMIS over time. These proposals are informed by consideration of the social nature of IS and the challenges for engendering ‘a culture of information for action.’ This paper proposes a minimum infrastructural package that is necessary to operate a RHMIS successfully in a developing country. The minimum package would serve as a framework for basic assessments and evaluations of RHMIS in the context of particular developing countries. The fundamental elements of the framework are proposed herein. The paper addresses themes of the conference regarding policies on human resource development in the critical arena of public health, training to address skills gaps, strengthening the role of the public health sector, and major social and technical infrastructural problems faced by institutions in developing countries.

**Implications of (non) Participation of Users in Implementation of the Health Information System Project (HISP) in Andhra Pradesh: Practical Experiences**

**Zubeeda Quraishy**

Health Information System Project (HISP)-India, Department of Informatics  
University of Oslo, POB 1080 Blindern, N-0316 Oslo, Norway

e-mail: [zubeedaq@ifi.uio.no](mailto:zubeedaq@ifi.uio.no)

**Judith Gregory**

Information Systems Research Group, Department of Informatics  
University of Oslo, POB 1080 Blindern, N-0316 Oslo, Norway

e-mail: [judithg@ifi.uio.no](mailto:judithg@ifi.uio.no)

## **ABSTRACT**

The paper problematises the participation of users in the development and use of health information systems, in the context of on-going implementation and action research within the Health Information System Project (HISP) in Andhra Pradesh, India. The case study presents the ongoing research related to the implementation of information systems for improved local control and use of information at district and sub-district levels in the health sector in Andhra Pradesh, and highlights in particular the (non)participation of users in the implementation of HIS and the implications that arise from (non)participation.

## **Contextual issues impacting the appropriateness of ICT: Setting the stage for socio-technical research in Africa**

**Anja Mursu**

Department of Computer Science, University of Kuopio, Finland; anja.mursu@uku.fi

**Tuija Tiihonen, Mikko Korpela**

HIS R&D Unit, University of Kuopio, Finland; tuija.tiihonen@uku.fi

## **ABSTRACT**

Information and communication technologies (ICT) can greatly contribute to information management in African organizations, like they have contributed to organizations in western countries. ICT can provide possibilities for growth in the global economy. However, using ICT with an expected impact is both social and technological an issue. We can broadly define social issues to include human, organizational, societal, economical and cultural aspects, which are still difficult to manage and consider. These aspects should be studied already when developing usable ICTs. This paper presents our plans to study how social, political, historical, and economical issues can be addressed in information systems development process in Africa. The research project presented in this paper, INDEHELA-Context, is a continuation to the previous INDEHELA-Methods project. The main overall research question of the INDEHELA (Informatics Development for Health in Africa) program is how African healthcare facilities and healthcare management can get software applications that enable them to use ICT to provide better healthcare services for the people. This question includes the challenge to develop the required human resources as well. The research partners in this research in progress come from Nigeria, Mozambique, South Africa and Finland. This is a research-in-progress paper, aiming at describing the initial research plans of the Finnish research group within the INDEHELA programme. The main focus is on contextual issues – the socio-economic impact, sustainability and affordability in information systems development.

## **Using ICT to Develop Botswana: An Analysis of Government Proposals and Recommendations for Action**

**Dipak Khakhar**

Department of Informatics, University of Lund, Sweden  
dipak.khakhar@ics.lu.se

**Dewald Roode**

Department of Information Systems  
University of Cape Town, South Africa  
jdr@inbekon.com

## **ABSTRACT**

The paper briefly describes various initiatives undertaken or to be undertaken by the Government of Botswana, and which may be looked upon as “Information Society” initiatives. These initiatives are critically analysed and conclusions are drawn from our analysis. Based on the conclusions we make certain recommendations regarding the implementation of the initiatives. We also conclude that apart from the Information Society initiatives, the Government should have in place a National Human Resource Development Concord. Such a Concord is seen to be indispensable as a foundation for the successful implementation of the initiatives, when adapted as recommended.

## **Maximising the Benefits of B2B E-Commerce by SMEs in Developing Countries: The Cluster Model Alternative**

**Dili Ojukwu & Elli Georgiadou**

School of Computing Science, Middlesex University, Tottenham Campus, London N17 8HR, UK  
[d.ojukwu@mdx.ac.uk](mailto:d.ojukwu@mdx.ac.uk)

### **ABSTRACT**

The inception of the Internet, coupled with recent developments in multi-media applications and technologies, have brought with them electronic commerce practices which have greatly transformed the ways businesses are conducted globally. The result is that electronic commerce, particularly business-to-business (B2B) e-commerce, has witnessed an exponential growth in most of the developed countries where it has been successfully deployed and implemented. Unfortunately, however, as businesses in developed nations are reaping the benefits of these emerging technologies, their counterparts in developing economies, particularly those in sub-Saharan Africa, are bedeviled by a litany of deployment and implementation problems which hinder their ability to exploit the benefits of these technologies. This state of affairs has contributed tremendously to the ever-widening gap which has come to be known as the digital divide. In this paper, an attempt is made to find a viable solution to these deployment and implementation bottlenecks in order to empower the firms in developing nations, especially the small and medium sized enterprises, to maximise their growth potential by reaping the benefits accruing from electronic commerce. The paper also examines the major impediments affecting the adoption and implementation of the B2B technologies in these regions and reports progress in the attempt to develop a suitable model for this purpose.

### **Information Technology in a Developing Country: The Nigerian University Experience**

**Bimbo IDOWU, Rotimi ADAGUNODO, Bayo IDOWU** (Correspondence Author)

Dept. of Computer Sc & Engineering, Obafemi Awolowo University, Ile-Ife, Nigeria

E-Mail: [idowumrs@yahoo.com](mailto:idowumrs@yahoo.com), [eadagun@oauife.edu.ng](mailto:eadagun@oauife.edu.ng), [paidowu@oauife.edu.ng](mailto:paidowu@oauife.edu.ng),

### **ABSTRACT**

Information Technology is spreading to all areas of life but, some of the students entering Information Technology (IT) profession are not IT literate before their admission into university to study computing or IT related courses. This study investigates the reliability of the fact that majority of Information Technology or computing students are not computer literate nor have the opportunity of touching computer keyboard before entering the university. The results of the survey showed that a number of students did not use computer until they came to the university. Those that have used computer before, use it for e-mail and browsing. In Nigeria there is a need to introduce computer literacy to all secondary schools so as to bridge the gap between those that are computer literate and illiterate before admitted to the university.

### **Nigerian University Software Development Training: From Building Walls to Building Bridges.**

**\*Soriyan H.A, Oluwaranti A. I Afolabi A.O. Ikono R.N**

Obafemi Awolowo University, Computer Science and Engineering Department, Ile-Ife, Nigeria.

[hasoriyan@yahoo.com](mailto:hasoriyan@yahoo.com); [aofolabi@oauife.edu.ng](mailto:aofolabi@oauife.edu.ng); [rudo@oauife.edu.ng](mailto:rudo@oauife.edu.ng)

**Mursu A. & Korpela M. J**

University of Kuopio, Computing Centre, PL 1627, FIN-70211 Kuopio Finland

[mikko.korpela@uku.fi](mailto:mikko.korpela@uku.fi); [anjamu@uku.fi](mailto:anjamu@uku.fi)

---

\* Author to whom all correspondence should be made.

## **ABSTRACT**

This paper presents some results from Information System Development for Health in Africa Methods (INDEHELA\_M) project, a just concluded research. that informed the current research sponsored by Academy of Finland through INDEHELA\_Context project. It recognises the rapid diffusion of IT today which, unfortunately, has not been accompanied by substantial benefits in many developing countries. The huge expenditure being incurred in the acquisition and use of Information Technology (IT), and the failure to realize comparable socio-economic returns from such investments has informed the research in software development chain of activities. INDEHELA\_M investigated the existing software system development practice in Nigerian software industry between 1998 and 2001. The research revealed that the software companies are between 130 and 150, and they clustered around Southwest part of Nigeria. The industry line of business is private sector oriented, and the focus is application system development. The study also revealed that the Nigerian software market is dominated by foreign packages, hence the unprotected software industry mostly offer services to maintain these foreign software products. Also the software product implementation in Nigeria hardly re-engineers the user organisations. The research also revealed that university software training programme does not prepare the students for immediate work demand in the industry especially in some specific areas of software development. This is being addressed in the INDEHELA\_C project where a collaborative training programme between software development companies and the university department is being tried out at the computer Science and Engineering Department, Obafemi Awolowo University, Ile-Ife Nigeria.

## **Gandhi's Third Assassination: ICT Education in India**

**Jonathan Ezer**

Department of Information Systems, London School of Economics, Houghton Street  
London WC1A 2AE, United Kingdom, telephone  
Email: [j.f.ezer@lse.ac.uk](mailto:j.f.ezer@lse.ac.uk)

## **ABSTRACT**

The impact that information technology can have on development is the subject of an ongoing debate. Central to this debate is the role of universities. Education shapes people's attitudes towards technology and determines how it will be used. This research shows that in India, students at higher educational institutions are socialised to believe that information technology can have a very positive impact on their country. They do not share the scepticism commonly found in Western literature. This research finds that there is a strong belief that India is on the rise, and ICT is one of the major catalysts. Students believe that it is their destiny to make India a great world power. These attitudes are perpetuated and institutionalised partly through the higher education system, which shapes the way technology is seen. First and foremost, IT is seen as a tool for personal development, where students can leverage their education to become rich and successful, either in India or abroad. Secondly, IT is seen as a tool for Indian ascension, which will lift it to the status of a great global power. Only thirdly, IT is seen as a means to assist in the development of India's poor population.

## **A Research Agenda for Research Projects in the Private Healthcare Sector of South Africa**

**Retha de la Harpe**

Business Informatics, Cape Peninsula University of Technology  
PO Box 652, Cape Town, 8000, South Africa  
Email: [delaharper@cput.ac.za](mailto:delaharper@cput.ac.za)

## **ABSTRACT**

A research agenda is proposed to coordinate research projects within the private healthcare context of South Africa. These projects will specifically deal with data management and utilization of information by small medium size medical practices. This should enable them to benefit from computer-based information systems. Another aim of the research agenda is to address human resource needs to support both the research activities and private healthcare needs resulting from the research projects. Training is an

important part of the delivery of sustainable appropriate information systems and involves the education of IT students to prepare them not only for a career in software development, but also to enable them to become researchers in the information systems field. Healthcare workers also need to be trained, as part of their professional development, to utilize patient data as an important information resource. All the research projects have to deal with many changes that the healthcare and education sectors are subjected to due to government interventions. This is also an attempt to close the gap between the public and private healthcare sectors' research efforts.

### **Standardization of Health Information Systems in South Africa: The Challenge of Local Sustainability**

**Edoardo Jacucci<sup>(a)</sup>, Vincent Shaw<sup>(a+b)</sup>, Jørn Braa<sup>(a)</sup>**

<sup>(a)</sup>Department of Informatics  
University of Oslo, PB 1080, Blindern, N-0316 Oslo, Norway

<sup>(b)</sup>Health Information Systems Programme  
School of Public Health, University of Western Cape, Cape Town, South Africa  
edoardo@ifi.uio.no, vshaw@wol.co.za, jbraa@ifi.uio.no

#### **ABSTRACT**

The paper addresses a particular aspect of the theme suggested by the conference: "What are the major infrastructural problems that institutions face in DCs? How can these be overcome?" The paper illustrates the infrastructural challenge of creating a sustainable nation-wide Health Information System (HIS) from the point of view of a small rural hospital. The overall sustainability of the standard-based HIS is dependent on the quality of data, which is dependent on the skillful use of data at the level of collection. In order for the latter to happen, it is argued, 'local sustainability' of the information system at the level of the facility is required. This is even truer for rural hospitals, which run the risk of being otherwise marginalized. The paper draws upon a case study of a rural hospital in South Africa where we document a successful change process where the organization actively and successfully appropriated the national standard. By analyzing factors contributing to the success, the paper contributes to the ongoing discussion on sustainability of HIS in Developing Countries by developing the concept of 'local sustainability'.

### **IT Perspectives: The Case of Women in Sub-Saharan Africa**

**Victor W. A. Mbarika**

Department of Management, Marketing, and E-Business, Southern University and A&M College  
Baton Rouge, LA 70813, USA  
[victor@mbarika.com](mailto:victor@mbarika.com),

**Fay Cobb Payton**

Department of Business Management, North Carolina State University  
Box 7229, Raleigh, NC 27695  
[fay\\_payton@ncsu.edu](mailto:fay_payton@ncsu.edu),

**Lynette Kvasny**

School of Information Sciences and Technology, Penn State University, University Park, PA 16802  
[lkvasny@ist.psu.edu](mailto:lkvasny@ist.psu.edu),

**Atieno Amadi**

School of Commerce, Jomo Kenyatta University of Arts and Technology, Kenya

#### **ABSTRACT**

While Sub-Saharan Africa women have historically assumed the roles of housewife and subsistence farmer, the reality is that these women have not had the opportunity to become a strong and viable part of modern economies in that region. However, this trend is changing with the exponential growth of information and communications technologies (ICT) globally, giving many historically underserved women access to computers, the Internet and other related technologies. This paper examines the integration of women in

ICT in Sub-Saharan Africa. We do so by exploring major bottlenecks to such integration from historical and contemporary perspectives. In discussing multiple projects, we demonstrate that these bottlenecks are being addressed through ICT initiatives in the region, and how Sub-Saharan Africa women are getting integrated into the information age and becoming contributors to their countries' socio-economic development strategies. We also employed interviews to understand women's reactions to these initiatives. Our findings indicate that women were highly optimistic, embracing ICT as a practical mechanism for achieving entrée into the labor force. However they perceive significant structural barriers, such as gender discrimination in hiring practices, difficulties balancing ICT work with traditional roles in the home, and lack of employment opportunities which would allow them to capitalize on their ICT skills.

### **Extranet Technology and Inter-Organisational Knowledge Sharing: Understanding the Influence of Mexican Cultural Values**

**Juan Pablo DURÁN & Niall HAYES**

Lancaster University Management School, Lancaster, LA1 4YX, United Kingdom,  
[j.duran@lancaster.ac.uk](mailto:j.duran@lancaster.ac.uk); [n.hayes@lancaster.ac.uk](mailto:n.hayes@lancaster.ac.uk)

#### **ABSTRACT**

Over recent years, a number of commentators have claimed that many societies recognise knowledge, rather than traditional resources (such as cheap labour or natural resources), as being their most valuable resource (Drucker 1994; OECD 2001; World Bank 2003). This recognition has resulted in many advanced economies (e.g. Canada), regions (e.g. European Union) and cities (e.g. Barcelona) developing new economic policies which seek to enhance the competitiveness of their traditional industries, while also developing new knowledge based industries. This society, or knowledge society as it is widely recognised, is characterised by the World Bank (2003) as having several distinct features, for example, shorter production cycles, greater levels of innovation, increased importance of small and medium enterprises (specially in the services sector) and a reliance on ICTs, just to name a few. The theme of the knowledge society has attracted the attention of academics and practitioners alike, all of them looking for different ways to describe and explain the effects it has caused in organisations. One of the results of this exploration has been the emergence of a line of research dedicated to understand how organisations share knowledge through the use of technology. Unfortunately, this literature has focussed almost exclusively on intra-organisational knowledge sharing in large organisations and in developed countries (Easterby-Smith & Araujo 1999; Tsoukas 2002), neglecting inter-organisational knowledge sharing (Orlikowski 2002). Further, the majority of these studies have ignored, consciously or unconsciously, developing or 'in-transition' economies, and this omission has been accentuated by the lack of literature that considers small and medium enterprises (Levy, Loebbecke & Powell 2003). Such organisations play a vital role in the economy providing most of the employment and consequently are vital to knowledge generation. It is precisely these omissions in the literature that this research will address. Specifically, this research will critically review how a SME in Mexico uses extranet technology in order to share knowledge with its clients and thus gain competitive advantage.

### **Information Technology In A Developing Country: The Nigerian University Experience**

**Bimbo IDOWU, Rotimi ADAGUNODO & Bayo IDOWU**

Dept. of Computer Science & Engineering, Obafemi Awolowo University, Nigeria.  
Corresponding Author E-Mail: [paidowu@oauife.edu.ng](mailto:paidowu@oauife.edu.ng)

#### **ABSTRACT**

Information Technology is spreading to all areas of life but, some of the students entering Information Technology (IT) profession are not IT literate before their admission into university to study computing or IT related courses. This study investigates the reliability of the fact that majority of Information

Technology or computing students are not computer literate nor have the opportunity of touching computer keyboard before entering the university. The results of the survey showed that a number of students did not use computer until they came to the university. Those that have used computer before, use it for e-mail and browsing. In Nigeria there is a need to introduce computer literacy to all secondary schools so as to bridge the gap between those that are computer literate and illiterate before admitted to the university.

### **Risk Identification and Management in Information Systems Development Projects within the Nigerian University Environments: An Empirical Study**

**Princely Ifinedo**

Department of Computer Science and Information Systems, University of Jyväskylä, Finland

Email: [premifin@cc.jyu.fi](mailto:premifin@cc.jyu.fi)

**Charles Uwadia**

Department of Computer Science, University of Lagos, Nigeria

Email: [couwadia@yahoo.com](mailto:couwadia@yahoo.com); [couwadia@unilag.edu](mailto:couwadia@unilag.edu)

**Goodluck Nwamarah**

Director, Management Information Systems Unit, University of Nigeria, Nsukka

Email: [gm\\_nwamarah@yahoo.co.uk](mailto:gm_nwamarah@yahoo.co.uk)

#### **ABSTRACT**

This paper reports the identification and management of risks associated with developing information systems (IS) within the university environment in Nigeria. The study uses interview and a variation of the Delphi method in eliciting the viewpoints of top IS project managers. The result indicates that socio-economic and organisational related risk items are considered inimical to the success of the IS project. Particularly, top management commitment ranked as the most critical factor needed for a successful IS project within the setup; the absence of which led the study's participants to ascribe the IS project as "partial success". Further, the uncovered risk items, ordered by priority could be used as checklist by other practitioners. Insights of the counter-measures used to ameliorate some of the risk items were also gained. This may be useful for other entities in similar settings. The study presents its implications with regard to the human resource development and IS project management for the country.

### **Training and Capacity Building to Sustain Health Care Information Systems at a Local Level in India**

**Usha Srinath, Jørn Braa**

Department of Informatics, University of Oslo, PB 1080, Blindern, N-0316 Oslo, Norway

[usha@ifi.uio.no](mailto:usha@ifi.uio.no), [jbraa@ifi.uio.no](mailto:jbraa@ifi.uio.no)

#### **ABSTRACT**

This paper reviews the challenges and opportunities observed during an action research project to develop a primary health care information system in rural India and argues for the appropriateness of local level capacity building both for enhancing sustainability of information technology based health care information systems in resource poor environments and for empowerment of the local level health workers in the information age. The paper draws upon a case study at a sub district level in rural South India extending close to a year. Primary health care information systems using information technology are a new area of information systems development in India and the body of knowledge about them is meager. The paper attempts to draw some implications for practice for developing IT based primary health care information systems in India.

## **Importance of Human Resource Capacity in the Context of Low Income Countries**

**Honest C. Kimaro**

University of Oslo, Department of Informatics, Oslo, Norway  
E-Mail: [honestck@ifi.uio.no](mailto:honestck@ifi.uio.no) / [honest\\_c@yahoo.com](mailto:honest_c@yahoo.com)

### **ABSTRACT**

Information and Communication Technologies (ICTs) are typically introduced in organizations with the promise to help to manage resources, increase efficiencies, reduce workload, and increase work productivity. However, in the context of Low Income Countries (LICs), the lure of these promises is magnified given the existing conditions and inefficiencies. International aid agencies play an important role in shaping this promise. However, introduction and use of ICTs in LICs has proven problematic due to failures or unsustainability resulting from many factors. One important factor is the lack of appropriate human resources both with respect to quantity and quality. This paper emphasizes that human resource capacity building in LICs is an urgent issue of concern for the sustainability of ICTs. It draws on concepts of sustainability, ICT literacy and human capacity building to analyze challenges related to human resources in the Health Information System (HIS) and ICTs in the health sector of Tanzania and suggests some strategies to address the problem. Specifically the paper focuses on ICTs initiation in the context of the health sector and argues for human resources with a mix of skills to understand the meaning of data, information and the use of computers. However, the degree of skills and knowledge of human resources is highly dependent on the needs, work processes and attached responsibilities of the specific levels of the health sector.

## **The Potential of District Health Information Software in Tanzania**

**Juma Hemed Lungo**

Department of Computer Science, University of Dar es Salaam  
P. O. Box 35062, Dar es Salaam, Tanzania, Email: [jlungo@udsm.ac.tz](mailto:jlungo@udsm.ac.tz)

### **ABSTRACT**

The paper presents quantitative and qualitative empirical data obtained in a one year research period while piloting the District Health Information Software (DHIS) in Tanzania. The DHIS is in different stages of implementation in several countries including South Africa, India, Malawi, Mozambique and Cuba. However, each country has its own unique needs that do not necessarily match with other countries. It is in this regard, was conducted a thorough evaluation of the DHIS in Tanzanian context in order to determine its potential in terms of user satisfaction toward the reliability and usability of the software. The results indicate that the DHIS software is a reliable and users find it ease to use. However, users need more data in the DHIS software in order to regard it as a health data analysis tool. The study methods contribute to the knowledge body of software end-user satisfaction evaluation research.

## **National Human Resource Development Policy for Software Exports: Case Evidence from Costa Rica**

**Brian Nicholson**

Manchester Business School, Manchester, UK.; [brian.nicholson@mbs.ac.uk](mailto:brian.nicholson@mbs.ac.uk)

**Sundeep Sahay**

University of Oslo, Norway. [sundeeps@ifi.uio.no](mailto:sundeeps@ifi.uio.no)

### **ABSTRACT**

Software industry development is acknowledged as an important engine of economic growth for many less developed countries. The role of national policy has been identified as a catalyst to software industry and software exports development. Software development is a service that is both labour and skill intensive

thus an important aspect of related policy is concerned with provision of appropriately educated and trained human resources in sufficient quantity. This paper provides an analysis of human resources issues facing policymakers in less developed countries engaged in software exports policy formulation. The complexities are highlighted through the case study of Costa Rica where there is an ongoing strategic planning effort to increase software exports.

### **Collaboration: Unearthing Business Opportunities for a Rural Community in South Africa**

**PM Alexander<sup>1</sup>, H Lotriet<sup>1</sup>, J Phahlamohlaka<sup>1</sup>, JJ van Loggerenberg<sup>1</sup>**

<sup>1</sup>Dept of Informatics University of PRETORIA, PRETORIA, South Africa.

Email: [pmalex@postino.up.ac.za](mailto:pmalex@postino.up.ac.za)

#### **ABSTRACT**

This paper reports on the planning phase preceding an unusual occasion in which researchers have been invited to work alongside the Executive Committee of a rural education organisation (SEIDET) with a view to assisting the committee to explore business opportunities. In all probability, such opportunities will have a strong Information Systems content. While the interaction between the researchers and SEIDET is by no means accidental, it is the nature of this occasion that is of particular interest. Since the occasion is yet to come (04 September, 2004), the focus of this paper is on the nuances of the preparatory process, arguing and demonstrating that on its own, the nature of the occasion is academically stimulating and valuable. Collaboration at various levels is central to all the phases of this research. Possibilities of further exploring how these collaborative processes could in future be supported through ICT use cannot be ruled out as it is ultimately the main interest of the researchers. The collaboration is interpreted using Activity Theory, which was also used in the “made-in-Africa” efforts in understanding Information Systems Development (ISD) work practices of the INDEHELA-Methods Finnish-Nigerian project.

### **Expert Assessments of E-Business in Developing Countries: A Theoretical Model of National Infrastructure**

**Chitu Okoli**

John Molson School of Business, Concordia University, Montréal, Canada

[chitu@okoli.org](mailto:chitu@okoli.org), Montréal, Canada,

**Victor W. A. Mbarika**

Department of Information Systems Decision Sciences, Louisiana State University, Baton Rouge, LA  
USA

[victor@mbarika.com](mailto:victor@mbarika.com),

#### **ABSTRACT**

This study investigates experts’ assessments of the pertinent factors affecting e-business in developing countries from a national infrastructure perspective. We design and conduct a survey that empirically solicits information from experts in e-business in Sub-Saharan Africa (SSA) in the first phase (completed and reported here), and in Latin America in the second phase (currently in progress). Our initial results for SSA using PLS analysis show that experts believe that non-specific general information and communication technology (ICT) policies are not very influential, while policies targeted specifically towards e-business are important in affecting e-business capabilities and in obtaining value from e-business, as well as ICT infrastructure. ICT infrastructure only affects e-business capabilities, but not its value. Experts believe that national governance institutions positively affect e-business value, but not capabilities. They do not believe that commercial infrastructure significantly affects e-business outcomes. This study theoretically and empirically distinguishes between two different dimensions of e-business outcomes: specific capabilities and value derived from e-business. It operationalizes the effects of national governance institutions and commercial infrastructure on e-business outcomes and empirically tests for their effects. The study provides empirical support for conceptual arguments for the need of ICT policies specific to the

needs of e-business. It is the first study that conducts a quantitative, broad-based survey on factors that contribute toward e-business in the Sub-Saharan Africa and Latin America regions.

### **Development of a Computer-Based PHC Management System: Towards a Holistic System**

**Soriyan H.A. (Correspondence Author), Afolabi A.O., Fatusi Adesegun, Akinde A.D.**

Computer Science and Engineering Department, Obafemi Awolowo University, Ile-Ife, Nigeria.

Email: [hasoriyan@yahoo.com](mailto:hasoriyan@yahoo.com) ; [aofolabi@oauife.edu.ng](mailto:aofolabi@oauife.edu.ng) ; [adesegunfatusi@yahoo.co.uk](mailto:adesegunfatusi@yahoo.co.uk)

**Korpela M.**

Computing Centre, University of Kuopio, PL 1627, FIN-70211 Kuopio, Finland

Email: [mikko.korpela@uku.fi](mailto:mikko.korpela@uku.fi)

#### **ABSTRACT**

This paper describes the research focus of the Nigerian part of a four-country project on Informatics Development for Health in Africa (INDEHELA), funded by the Academy of Finland. Almost every segment of society is deriving enormous benefit from the use of Computer. Yet the health sector in most developing countries is probably the only sector lagging behind in the use of computers unfortunately there is no human who does not visit a health care professional sometime in his life time. In hospitals where computers are in use, it is for accounts, e-mail or word processing, very few are using computers for the day-to-day working of their medical establishments. This is believed to be as a result of non-availability of system that meets the required specification. Experience has shown that healthcare software developed for industrialized countries do not fit African healthcare facilities' requirements, at least without major re-design. Hence home-grown software packages for Clinical services are becoming popular in Nigeria. This paper presents one of such systems, an outcome of INDEHELA\_Methods research project, the Made In Nigeria Primary and Hospital Information System (MINPHIS). The current project INDEHELA\_Context in Nigeria is focusing on a number of other INDEHELA\_Methods outcomes one of which is the further development of MINPHIS to incorporate Primary Health Care (PHC). The people resources in software development are identified. From experience the tools, techniques etc needed for IS development are often readily available except for the people, especially the software developers. Hence the focus is neither the tools nor techniques but in raising the human resources needed to accomplish the desired task of developing a computer based PHC management Information System (IS). The strategy for acquiring the human resources is discussed.

### **The Evolution of a Framework for Assessing Hospital Information Systems in South Africa**

**Vincent Shaw**

Health Information Systems Programme, School of Public Health, University of Western Cape

Cape Town, South Africa & University of Oslo, PB 1080, Blindern, N-0316 Oslo, Norway

[vshaw@wol.co.za](mailto:vshaw@wol.co.za)

**Edoardo Jacucci, Jørn Braa**

Department of Informatics, University of Oslo, PB 1080, Blindern, N-0316 Oslo, Norway

[edoardo@ifi.uio.no](mailto:edoardo@ifi.uio.no) - [jbraa@ifi.uio.no](mailto:jbraa@ifi.uio.no)

#### **ABSTRACT**

This paper provides an insight into the process of an ex-ante or exploratory assessment of Information Systems (IS) in hospitals in developing countries. Based on a case study of an assessment process conducted in 13 hospitals in the Province of Eastern Cape in South Africa, the paper creates two contributions. Firstly it supports the claim that prior-to-implementation assessment of IS in developing countries are of vital importance in order to reduce the risk of failure. Secondly, elaborating on the findings from the case, it contributes to the ongoing epistemological discussion around positivist vs. interpretivist approaches in IS evaluation. We submit that a balanced approach is necessary, where the balance is determined by contingent factors of the context of work.

## **The Role Of IT In Supporting Women Entrepreneurs In Urban Tanzania**

**Bjørn Erik Munkvold**

Dept. of Information Systems, Agder University College, Norway. E-mail: [Bjorn.E.Munkvold@hia.no](mailto:Bjorn.E.Munkvold@hia.no)

**Hawa Petro Tundui**

Dept. of Business Administration, Mzumbe University, Tanzania. E-mail: [htundui@yahoo.co.uk](mailto:htundui@yahoo.co.uk)

### **Abstract**

The purpose of this study is to analyse the role of IT in supporting women entrepreneurs in urban Tanzania. Based on interviews with women entrepreneurs in the cities of Dar es Salaam and Arusha, we found that women entrepreneurs in urban Tanzania have started using this new technology to improve their businesses. Most of them are using email and Internet services to communicate with their business partners and friends. Internet services are also being used to search for product related information. Several positive effects from using IT were reported, such as increased sales, access to new customers and markets, and improved efficiency of operations. For example, women running garment related businesses used the Internet to search for new designs for women's clothes, thus enabling them to improve their products and enter foreign markets in the neighbouring country of Kenya. Lack of financial resources and lack of computer skills were reported as the major barriers for accessing IT services, while language barriers and lack of time only were mentioned by a few of the women entrepreneurs. However, lack of time was also stated as a barrier to achieving the needed training, thus also having an indirect negative effect on IT adoption and use. These results indicate that providing funding schemes and access to IT training programs are of key importance for stimulating human resource development through further adoption and use of IT services among women entrepreneurs in Tanzania.