

## EDITOR'S COMMENTS

### Information Systems in Developing Countries

It is with great pleasure that I see the efforts of the co-editors of the Special Issue on Developing Countries, Geoff Walsham, Dan Robey, and Sundeep Sahay, coming to fruition. While it was Ron Weber's vision to foster a special issue on this topic, I am happy to support the publication of research on this topic in a section of this issue of *MIS Quarterly*. I encourage IS researchers to build upon the research of the authors in this issue in order to increase our understanding of IT's impacts in developing countries.

Several years ago Vessey, Ramesh, and Glass<sup>1</sup> decried the lack of diversity in Information Systems research. They noted that only 1.6 percent of 488 information systems papers published in five top journals from 1995 through 1999 addressed societal topics. Since the Vessey et al. article was published, there have been a number of journal special issues and conferences on IS in developing countries. Nonetheless, my guess is that there still would be a limited number of research papers on societal issues were their study updated to cover the most recent 5 years. The papers on developing countries in this issue are important for three reasons. First, they signal the importance of societal issues to the Information Systems research community; second, they hopefully will stimulate high-quality research on one critical societal issue, the impact of IS in developing countries; and third, they will serve as exemplars of research in this important but under-researched topic.

There is substantial debate about how Information Systems research can become more relevant. I believe one way would be to address research that has the broadest potential impact. Certainly IS impacts in developing countries would qualify since it encompasses the majority of people on our earth.

#### ***The Dark Side of IS***

The articles in this issue on developing countries are uplifting in the sense that they describe the ability of IS to help large numbers of people—at least they have the potential if implemented correctly. The articles by Puri and Miscione both specifically acknowledge and focus on marginalized groups, and Walsham, Robey, and Sahay acknowledge the need to understand IS in marginalized groups. However, I think that we also need to understand how information and communication technologies (ICT) may create or enlarge marginalized groups. That is, we need to understand the “dark side” of Information Systems and ICT. Let me give you an example.

Consider the heavy use of English on the Internet as a way of expanding the digital divide. Even though there are abundant recognized challenges in measuring the percentage of pages in different languages on the Internet, estimates still place anywhere from 45<sup>2</sup> to 70<sup>3</sup> percent of web content in English. This would clearly seem to privilege English speakers over speakers who can not find web content in their native tongue. Since many people in developing countries do not speak English, they can not

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<sup>1</sup>I. Vessey, V. Ramesh, and R. L. Glass, “Research in Information Systems: An Empirical Study of Diversity in the Discipline and its Journals,” *Journal of Management Information Systems* (19:2), 2002, pp. 129-174.

<sup>2</sup>Daniel Prado, “Political and Legal Context,” in *Measuring Linguistic Diversity on the Internet*, J. Paolillo, D. Pimienta, and D. Prado (eds.), UNESCO Publications for the World Summit on the Information Society, UNESCO Institute for Statistics, Montreal, Canada, 2005, p. 37.

<sup>3</sup>Swissinfo, “Language Gap Threatens Access to Information,” November 26, 2003 (available online through <http://www.swissinfo.org/>).

participate fully in many commercial and educational opportunities afforded by the Internet. For example, consider the Federal Democratic Republic of Ethiopia. Ethiopia was recently labeled by its own infrastructure minister as “one of the ‘least-connected’ countries in the world,” creating a digital divide between Ethiopia and the rest of the connected world that closed “the door to economic opportunity.”<sup>4</sup> Its “official working language,” Amharic, plays a major role in inhibiting wider adoption of Internet and mobile technologies in Ethiopia, and constraining its economic growth. Amharic, one of the world’s oldest languages and the second most-spoken Semitic language in the world after Arabic, makes keyboarding difficult with its 345 letters and letter variations.<sup>5</sup>

For the citizens of Ethiopia and many other countries, the difficulty of using their native language on the Internet has widened the digital divide by separating the information “haves” from the “have nots.” One may counter that the number of web pages in English on the Internet is clearly decreasing as more people publish in their native language. And strides are being made to adopt Unicode to aid Ethiopians and others in translating their native languages to digital form. But beyond the shifts in social, political, and cultural contexts that Walsham et al. and the authors in this issue say are essential, it will also be necessary to overcome the technical challenges that many marginalized groups are facing. These challenges include the following:

- The most widely used encoding of the world’s written language is the American Standard Code for Information Interchange (ASCII). ASCII comprises 128 character assignments and is well suited to North American English. Many subsequent encodings have been based on ASCII. For example, the International Standards Organization’s ISO-8859-1, or Latin-1 encoding, specifies 256 codes with the first 128 being the same as ASCII. In turn, Unicode makes the first 256 characters of the 65,526 characters in the Basic Multilingual Plane (BMP) the same as ISO-8859-1. Unfortunately, Unicode in its most basic form occupies four times as much space as the same ASCII. So the Unicode solution to multilingualism on the Internet comes with a cost: it requires more space, it complicates the lives of software developers; and it increases the transmission, compression, and decompression charges for the larger Unicode documents.<sup>6</sup>
- Language coverage on major desktop platforms is still limited, despite the increase in the number of languages being supported over the last decade. For example, Windows XP (Professional SP2) handles 123 languages, with strong coverage of European languages. However, very few Asian and African languages are covered.<sup>7</sup>
- Search engines are necessary to navigate the eight billion pages written in various languages as of April 2005. “Not to worry,” you say, “just Google it!” But Google is limited to approximately 35 languages. Many Asian and African language pages are not searchable.<sup>8</sup>
- The Internet Corporation for Assigned Names and Numbers (ICANN) has been criticized for moving too slowly in forming domain names in non-Roman languages such as Arabic and Chinese.

When researchers speak of the digital divide, an acknowledged dark side of Information Systems and ICTs, they often talk about the very real and important problems related to people not having access to computers or the Internet, or the problems in adjusting social, cultural, and political systems to obtain the benefits for that access. Expanding on the Ethiopian example above, we recognize that encoding Amharic into a digital form is cumbersome. But encoding the other 83 less-privileged indigenous Ethiopian languages is probably just as problematic, if not more so. Selecting Amharic as the official working language

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<sup>4</sup>A. Heavens, “Progress in an Ancient Tongue,” *Wired News*, November 5, 2004 (available online at <http://wired.com/news/print/0,1294,65596,00.html>).

<sup>5</sup>Ibid.

<sup>6</sup>J. Paolillo, “Language Diversity on the Internet,” in *Measuring Linguistic Diversity on the Internet*, J. Paolillo, D. Pimienta, and D. Prado (eds.), UNESCO Publications for the World Summit on the Information Society, UNESCO Institute for Statistics, Montreal, Canada, 2005, pp. 72-73.

<sup>7</sup>Y. Mikami, A. Z. A. Bakar, V. Sonlertlamvanich, O. Vikas, P. Zavorsky, Pavol, M. Z. A. Rozan, J. Göndri-Nagy, and T. Takahashi, “Language Diversity on the Internet: An Asian View,” in *Measuring Linguistic Diversity on the Internet*, J. Paolillo, D. Pimienta, and D. Prado (eds.), UNESCO Publications for the World Summit on the Information Society, UNESCO Institute for Statistics, Montreal, Canada, 2005, p. 94.

<sup>8</sup>Ibid, p. 96.

nationwide from among the 84 indigenous languages was likely the result of considerable political jockeying. And that political maneuvering doubtless continues as Amharic, which had been the language of primary education, is being replaced by local languages such as Oromifa. Previously, the writing of Oromifa had been banned by the government of Haile Selassie. The current government banned the use of SMS (short message service) prior to elections several years ago in order to discourage the mobilization of opposition. Clearly these political, cultural, and social forces impact the use of Information Systems and ICTs, as well as the marginalization of groups in developing countries.

While the social, cultural, and political forces are certainly important because they can narrow or widen the digital divide for marginalized groups, my comments demonstrate the technical issues. Typically, researchers aren't talking about the technical issues that create subtle barriers for people in developing countries. As IS researchers, we should seek to understand all barriers that form the dark side of IS and ICTs, and actively seek solutions to these barriers. Although they do not appear to have intended it as such, the article by Braa, Hanseth, Heywood, Mohammed, and Shaw in this issue potentially offers insights about how to use flexible standards to devise a solution to the complex, technical problems associated with IS/ICT's dark side. Braa et al. argue that flexible standards can come in the form of "use flexibility" that allows a standard in a number of different environments (e.g., as with different languages) and "change flexibility" that favors small simple standards instead of one complex standard covering everything (such as Unicode).

### ***Is the Glass Half Empty or Half Full?***

When I recently visited a developing country described in this issue, IS researchers there voiced their concerns that many Information Systems journals did not publish research about developing countries. When I pointed out that we would soon be publishing these special issue articles on developing countries, they adopted a "glass half-empty" perspective and pointed out that there were only four articles. I prefer the half-full perspective that focuses on publishing four high-quality articles in a well-regarded journal. It is my hope that these articles will both serve as the exemplars for, and have a strong positive impact on, future research.

### ***A Full Toolbox***

Each of the four special issue articles employs an interpretivist epistemology. While they are serving as exemplars in terms of quality, future research about Information Systems in developing countries can and should adopt alternative research epistemologies (i.e., positivist and critical) as well as a broad range of methodologies. Using the entire toolbox of research epistemologies and methodologies can help triangulate the findings. Each should be respected for its unique contribution.

Universities that are encouraging their doctoral students to conduct research in developing countries should equip them with a variety of methodological tools and perspectives. Teaching only one research perspective not only signals disdainfully that the others are unimportant, but it also results in having the students hammer out research findings when a set of pliers would be more useful. For example, studies of large-scale roll-outs of systems such as e-government or medical systems across an entire country could be effectively conducted using quantitative research from the positivist perspective.

I recognize that I have a positivist bias. I think it is important for us to work for solutions to the problems faced in implementing and using Information Systems in developing countries. Thus, I read with interest when Miscione noted that (p. 422), "Health care would be a practice to be enacted rather than a problem to be solved; thus, the health care system's healing ability would be an emergent property." By taking part in an action-research project to evaluate the telemedicine/health care systems, he had originally intended to contribute ideas of normative relevance. He later abandoned this normative stance because of the complexity of the situation, and adopted a more descriptive one. While description offers an important contribution, a body of research that builds upon one another may be able to inform our understanding of the complexities and provide a meta-view of the phenomenon that could help in shaping solutions.

Doctoral students frequently ask me what areas would be most fruitful for their dissertation and subsequent research. I sincerely believe that research on the impacts of Information Systems in developing countries and other topics with such broad societal coverage offer huge potential for fledgling, as well as more established, careers.

## **Other Articles in This Issue**

A possible danger of a special issue on developing countries is that IS researchers who are doing research in countries that they do not consider to be “developing” may think that this special issue offers little for them. Then they may be very wrong! If one only thinks in terms of the binary categorization of developing and developed, then it may hard to see the applicability of concepts in this issue. However, if one thinks in terms of a continuum, then the articles may be viewed as more relevant since the phenomenon of development spans all countries—all of which are developing to a greater or lesser extent.

Consider the article in this issue by Mary Beth Watson-Manheim and France Bélanger, which compares the use of multiple media within and between two sales divisions in large companies headquartered in a developed country. Watson-Manheim and Bélanger propose the concept of communication media repertoires (or the collection of communication media used by organizational members) as a way of understanding the patterns of media use. Interestingly, Miscione illustrates communication repertoires when describing the challenges of practicing telemedicine in the Amazon. The use of communication media was shaped by the social context: e-mail was seldom used because the senders could not be certain if the e-mail had been received or read. There apparently weren't norms that dictated the receiver's replying upon receipt of the message. Further, the two-way radio was used for explicit purposes including visit logistics, to request medicine to be sent by boat, and to inform the hospital about the status of different cases. Even though the settings for the Watson-Manheim and Bélanger and the Miscione studies differ drastically, the concept of repertoires can be applied to each to understand the use of communication media. Further, the Miscione article offers a test of a concept developed by Watson-Manheim and Bélanger in a radically different setting from that in which their data were gathered.

All but one article in the special section discuss types of knowledge other than technical/scientific rationality. This is also a theme in the article by Chrisanthi Avgerou and Kathy McGrath in this issue. The Avgerou and McGrath article draws from the work of Michel Foucault on power/knowledge and the aesthetics of existence to demonstrate how the rational techniques of IS practice are closely intertwined with the power dynamics of a government organization. It describes a case study of a social security organization in a developed country, Greece, over more than two decades. I included it in this issue because it offers some interesting juxtapositions to the four special issue articles, especially the Silva and Hirschheim article which describes the implementation of strategic information systems in two Guatemalan hospitals using punctuated equilibrium theory. Both the Avgerou and McGrath and the Silva and Hirschheim articles demonstrate the influence of government initiatives and national elections on system implementation failures, although each draws from a different theoretical base. The work of Avgerou and her colleagues both informs and can be informed by several articles in this issue on IS in developing countries.

You should find the remaining two articles in this issue intriguing as well. Rajeev Sharma and Philip Yetton present the results of a meta-analysis designed to explain inconsistencies in previous research findings about the effects of training on IS implementation success. They use technical complexity and task interdependence as moderators in the relationship between training and IS implementation success. Wonseok Oh and Alain Pinsonneault compare two conceptual (i.e., resource-centered and contingency-based) and two analytical (i.e., linear and nonlinear) approaches to assessing the strategic value of information technology. I hope that you find this issue as thought-provoking as I have, and that you will be motivated to submit your high-quality research on developing countries to *MIS Quarterly*.

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