KEY ISSUES IN COMBATING THE DIGITAL DIVIDE

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Summary

Assessing ICT projects aimed at bridging the digital divide is a tricky venture. For one, it is difficult to definitively term projects successes or failures—since such projects fall into the nebulous space between market projects that require financial sustainability and human development projects that require outside support. There also are methodological issues with balancing qualitative and quantitative research techniques in evaluating projects; in finding the right control groups to isolate impacts; and in conducting longitudinal studies. These issues stem from the recent nature of the initiatives. Furthermore, serious impact assessments of human development efforts cannot be made in the short term. Nonetheless, there is enough information to make preliminary suggestions on what key issues or factors organizations must consider so that they can effectively combat the digital divide.

The design of relevant ICT devices and applications, while paramount, is one factor that is not easily achieved. Useful application development often calls for costly ethnographic research and wide-scale adoption as a standard by large institutions. The role of local entrepreneurship, too, is an important factor. Effective local entrepreneurs

provide in-depth market knowledge, connections, and create demand. Strong marketing and outreach strategies are necessary; they inform, encourage participation, and build an overall community presence. The appearance of ubiquity of service impacts user perceptions of access and contributes greatly to the rate of service usage. Other factors, such as those relating to user density, play a large part in how organizations extend their services to a population. Pinpointing where and how clusters of users begin in a community allows organizations to provide better accessibility to a target population. Finally, the issue of technical maintenance must be considered. Obsolescence of technology clearly poses a challenge to any organization attempting to bridge the digital divide.

1. Introduction

Information and communication technologies (ICTs) such as computers, mobile phones, personal digital assistants, and the internet have become a crucial part of economic growth, business and personal communication, and entertainment. Such devices have almost ubiquitously penetrated homes and workplaces in the developed world. While the trend is now repeating itself in select urban hubs of the developing world, many communities, largely those situated in rural areas, still face a substantial lack of access to technology. This disparity or gap in access is known as the Digital Divide. (The state of the art discourse now considers the divide more broadly: north/south, rural/urban, men/women, and many more.)

ICTs have not spread to rural areas of the developing world due to several factors. These factors include a lack of communications and power infrastructure, the high cost of technology, and a deficit of locally relevant information. Several organizations have begun efforts to combat this digital divide. They are promoting access to computing by attempting to build cheaper and more robust devices, tackle infrastructural issues, and develop relevant content. Over the last few years, non-governmental organizations (NGOs), governments, academic institutions, and even businesses have pursued the use of ICT in providing more efficient governance, distance education, and better agro-industrial performance in the developing world.

Hundreds of such organizations are working in Latin America, Africa, Eastern Europe, and South and South East Asia. However, the verdict on the 'success', whether in terms of economic sustainability or human development, of such projects is still an area that has few concrete examples to offer. The notion that technology can solve problems of social inequity is indeed endearing. Not surprisingly then, such projects often flag off with great fanfare, attention that quite often works in their disfavor. It is also typical then, at the end of a few years that such ICT projects run into debilitating problems. Experience shows that technical support, content, and bureaucratic obstacles, are some of the main short-run hurdles for such projects.

This article discusses some critical factors that are seen across ICT projects as necessary in conceptualizing and implementing sustainable efforts to combat the digital divide. (This draws upon the authors' personal experiences working with and studying ICT projects in India and Brazil.) They include:

- Appropriate Applications and Needs Assessment
- Local Entrepreneurship
- Marketing and Outreach
- Ubiquity and Accessibility (Branding)
- User Density
- Technical Challenges: Maintenance, Obsolescence and Infrastructure

2. Appropriate Applications and Needs Assessment

The Simputer, a speech-enabled and Linux-based PDA-type computing device, was in 2001 considered a path-breaking project in personal computing. It was hoped the Simputer would start the reversal of the digital divide by making the complex interfaces of computing much more accessible to the illiterate millions around the world, and by making computers cheaper and more functionally shareable. The project led to the development of an impressive and powerful device, which while capable of a reasonably wide range of functions, was slow in first getting to and then taking off in Indian markets – its primary target. By 2004, the Simputer had reshaped its brand, and changed its original image from a "digital divide device" into a more traditional PDA.

The problem with taking a new product to the masses is a commonly tragic "chicken and egg" problem for projects attempting to utilize ICTs in underserved regions. What is the hardsell? Is it the application, or the device? If it is both, which comes first?

The issue of relevant applications becomes especially vital in a nascent market. Convincing people of the 'need' for personal computers, as general-purpose devices, is not a major issue in most cities in the developing world. In these places, there is not only a reasonable familiarity with the concept of computing and its functions, but also a range of immediately relevant applications – both of standalone and networked devices. In cities, posing the question "Why Computers?" is virtually akin to asking "Why School?".

But as one moves away from the cities into areas limited in educational and economic attainment and opportunity, the case is much different. It is not patently clear first, whether computers are an appropriate computing device (and if not, what is?), and second, they are an appropriate device for what?

The Simputer was created to deal with the first question, i.e. to create a 'more appropriate' computer for a specific population – a large body of Indians with limited literacy skills, limited buying power, and no prior experience with computers. The device was designed to be mobile with smart-card inputs for sharing across users, to have a simple visual interface, and to support speech synthesis – all with the goal of 'appropriate design for reaching out to a larger number of Indian users. Yet, the Simputer faced challenges with the second question above – 'appropriate for what?' In other words, assuming one had a Simputer, what could the device be used to do? And in addition, are there any benefits arising from the technical competency of knowing how to use a Simputer? With the skills gained from learning to use a computer, there is much potential with what one can do. However, a device tailored for use by a specific population is only as good as its practical applications.

Finding and then designing such applications is a daunting task, since the design process is essentially reversed. Instead of having an existing service that requires an appropriate delivery mechanism or device, the designer's task is to think of a specific population and then create a device that allows such a population to use a variety of existing applications that other populations, who use standard computing devices, are able to use. In short, the Simputer is a go-between device for illiterate and poor users, who presumably do not use computing services due to cost and complex interface. The initial design of the Simputer was indeed that of an inexpensive all-purpose computer for poorer, semi-literate people

This design process thus involves going beyond what the device can do into what existing functions and daily life activities can be positively impacted by introducing the new technology. For its usefulness to be immediately evident, a device like the Simputer would essentially have to perform an array of useful functions for a rural user in India. These functions might evolve around, for instance, a user's current banking, education, communications, or healthcare information needs. This in turn requires that existing credit, communications, or healthcare institutions change their current practices, possibly incurring significant costs. Such institutions would then be required to be convinced of the benefit, in the long run, at least, if not in the short run, of there being profitability in business with these user groups. Alternately, where the projects are intended as public utilities, the government or any organization needs suggested evidence, likewise, that there will be a large enough user base for these services.

Thus, when the Simputer first made its debut it was a visionary device, in many ways — one that technically could be used by several rural residents using smart cards. However, there were few companies building back-end applications that could be run using a Simputer interface, or even simpler browser-based interfaces for existing web applications optimized for Simputer use. There was consequently little anyone could think of doing with a Simputer other than keeping a daily calendar, writing notes, or listening to some recorded stories made available for the device. With the knowledge of being able to operate a Simputer unable to stand alone as a marketable skill, the device had little chance of taking off in rural areas where even basic literacy can be a valuable skill.

So what should have the Simputer team done? Human Computer Interaction researchers and social scientists working on development issues would agree that ethnographic research and some amount of interface design research would have been very useful. While the Simputer project did do an assessment, it fell largely in the post-production phase rather than in an earlier stage of design. More importantly, the question raised here is whether the assessments should be made at the user end or at the service provider end. Should banking institutions be the indicator of demand for new applications and devices, or should the people who use them? The answer may lie in iterative design involving both ends.

The Simputer case highlights a regular issue faced by both project managers and designers alike, working in the social use of ICTs. The design of the Simputer has its roots in a common UI/Systems argument among computer scientists that personal computers, with their complex usage models and sharp learning curve, offer an

inappropriate interface for developing regions, especially those where literacy in one's own language may be limited to speaking alone. Assuming that computing devices and applications in the developing world tend to be passed down from the West, this means that both the device design process and the subsequent application design are likely to be fairly top-down processes. The knowledge of operating a computing device is in itself a skill. In the Simputer case, however, there is an interesting contrast; the device itself is not enough of a widely accepted industry standard that being a skilled user has industry value. In this case, the device is only as important as the social and economic services it facilitates (such as using it as a GIS mapping device). In such a situation, the design of the device involves input from the service provider, such as a bank for the design of an ATM machine, or a courier service for the design of an inventory tracking PDA. Here, a non-IT related service is extending itself to the user and the device is only used as a mediator. On the other hand, if the application design is conceptualized by the manufacturer of IT devices, there is a risk of highly speculative applications based on the designer's own selective understanding of social or economic utility.

Finding the right applications is a non-trivial task. If we go beyond application design for devices like the Simputer and move into the space of kiosks, we see similar problems. A common kiosk approach has been to design applications based on the economic structure of an area. Thus, several rural kiosk projects around the world have experimented with agriculture or fishing portals with an underlying assumption that technology inserted into the livelihood of the most prominent industry of a community has a greater chance of succeeding. However, this can be a much more challenging task, since such applications require lifestyle changes in relation to critical livelihood functions. The limited usage of agricultural content by rural users in many parts of India is a possible indicator of this.

So what counts as another step above the 'speculative' application design? Researchers have pointed towards in-depth ethnographic studies and have also called for more participation from the client audience during the design process. However, within the industry, such exhaustive background work placed into product design usually requires the economic justification of large-scale product ideas. This is ominous for those working on digital divide issues, since the client population has little, if any spending power, and yet needs the most attention in terms of product design research. Such application design research requires a balance to be struck between the calculated benefit of acquiring new users and the cost of conducting the design research—research requiring significant resources in terms of time and trained manpower. Considering that at the heart of the application design is the principle that no single product fits all, the benefit case may well be small. Furthermore, differences across and even within communities may dictate an ultimate or final design with few common denominators. Such a case would make the process of solid needs assessment somewhat less effective. Thus, in the absence of common languages, intuitive interfaces and application support for what are "markets", it may well be that the technology will do no more than incremental work to adapt itself, while the underserved and fragmented populations will themselves be required to make certain cultural adaptations (in many cases, a switch to the use of a dominant language), in order to be full partners in the technology revolutions.

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Biographical Sketches

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