

## Chapter 14

# Leapfrogging the Digital Divide: Myth or Reality for Emerging Regions?

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### ABSTRACT

*The leapfrogging theory claims that instead of following the conventional digital trajectory set by the west, emerging regions can straightaway use cutting-edge technology to “leapfrog” the digital-divide. To explore the possibility of digital leapfrogging by an emerging region, this study looks at the three domains of hardware, software and connectivity. In each domain the default technology and its potential is evaluated as a digital inclusion tool while being juxtaposed with the latest “cutting-edge” alternative that could be used instead for “leapfrogging”. Three specific scenarios are developed in telephony, banking and the World Wide Web, which illustrate how a combination of these different technologies help emerging regions ‘leapfrog the digital divide.’ Finally, the paper suggests certain leapfrogging trajectories that ICT4D projects should explore.*

### INTRODUCTION

The past decade has seen a radical change in information and communication technology (ICT) and its effects on our daily lives. Yet, significant parts of the world are yet to benefit from these technologies, hence, the so-called “digital divide” between the developed world and emerging regions. By the late 90’s ICT was seen as the potential tool to help the developing world scramble out of its current state of impoverishment as was chiefly

featured in the UN’s Millennium Development Goals. Terms like “bridging the digital divide” and ICT4D (information and communication technologies for development) became popular topics of discourse, leading to a whole gamut of initiatives both by governments in developing nations, world-wide organizations like the World Bank, the UN and other non-government enterprises. However, successful ICT4D projects that have made significant differences to the under-privileged in a sustainable and scalable way are

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few and far between, with the limited success of many projects being attributed to either unsustainable business models or a lack of understanding of local needs or unsuitable technology to begin with (Kenniston, 2001).

In this paper, we explore the possibility of “leapfrogging” the digital divide. In other words, instead of using traditional digital technology which may be unsuitable to bridge the divide, is it possible for emerging regions to by-pass this technology and use the very latest information and communication technologies to “leapfrog” the divide? The term “leapfrogging” has been used in varied contexts like technology usage in the industrial settings, minimizing our environmental impact by using modern technology and more recently in the context of digital inclusion (Steinmueller, 2001; Davison, 2000; Singh, 1999).

The leapfrogging theory goes thus -- the developing world can be perceived to be at a relative advantage since it does not need to adopt the digital trajectory followed by the West. Instead, it can reap the benefits of years of research and development invested into by the West to straight-away adopt the very cutting-edge technological offerings, thereby bypassing intermediary ICTs that are used widely in the West.

Consider a typical digital-enabled home or office scenario - a desktop (probably running a proprietary operating system) with a wired broadband Internet connection and loaded with common proprietary office applications. To achieve digital inclusion, does this scene need to be re-created in say a rural village in India? We argue that most of these components in this familiar scenario are unsuitable for bridging the digital divide - the desktop, the wired connection, the proprietary operating system and the quintessential applications. Instead we analyze the latest technologies that might be better suited to bridge the divide, hence enabling emerging regions to “leapfrog” across the more traditional digital setup.

This paper looks at the three major spokes that make the digital wheel spin - the hardware, software, and connectivity. In each spoke we evaluate the default technology and its potential as a digital inclusion tool while juxtaposing it with the latest “cutting-edge” alternative that could be used instead for “leapfrogging.” We closely study numerous recent ICT projects and technology to identify trends that promise a “leapfrogging” potential. We finally describe three comprehensive scenarios where a combination of these technologies can be effectively used to leapfrog the digital divide, in three different contexts.

## **HARDWARE: THE FIRST SPOKE**

Traditional hardware used for computing has been the ubiquitous desktop. Many ‘ICT4D’ projects revolve around creating a “tele-center” which typically houses one or more desktops connected to the Internet. An entire village or multiple villages might share one such center. The government of India has embarked on a mammoth digital-inclusion project where more than 100,000 Common Services Centers (CSCs) (a typical tele-center,) are being established across the country, especially targeting rural areas (<http://www.csc-india.org>).

However the telecenter model of shared PCs has met with limited success. The National CSC scheme for example, which is modeled as a public-private partnership, after an initial euphoric phase had many of its public players backing out. Out of the total rollout of 85,000 plus CSCs, around 4,600 are currently non-operational (<http://www.csc-india.org>). In the Akshaya telecenter project in Kerala, India (Gurumurthy, 2005) nearly half of the 634 tele-centers created in the pilot phase in 2004 had shut-down after just three years of operation. Why has the “tele-center” model of shared desktops met with limited success, even as it continues to be the default choice for many ICT4D projects the world over?

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