Chapter 1
Introduction to Social and Economic Effects of Community Wireless Networks

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ABSTRACT

This chapter provides an overview of the topic of community wireless networks and infrastructures. In particular, it compares community wireless networks to municipal and commercial wireless networks. It also provides a brief account of the social and economic benefits of CWNs.

By itself Internet cannot feed the poor, defend the oppressed, or protect those subject to natural disasters, but by keeping us informed, it can allow those of us who have the opportunity to give whatever help we can.

The Dalai Lama

INTRODUCTION

Pervasive computing and ubiquitous communications are increasingly becoming essential to conduct our daily life affairs. The Internet, in particular, has grown to be a superhighway for accessing tremendous social economic, social, entertaining,

and personal services and opportunities. However, 85 percent of the world populations do not have access to affordable and reliable Internet services. According to the Internet World Stats (2009), the percentage of people who do not have affordable high speed Internet is 84 in Africa; 78 in Asia, 37 in Europe; and 22 in North America. These people are lagging behind, in the digital sense, because they are not part of the information society. Such communities usually lack viable commercial incentives to attract telecommunication companies. This could be due to their remote location, harsh terrain, high costs of deploying and maintaining infrastructures, low income and willingness to pay, harsh geographical terrain, and insufficient population density and/or limited capacity (Middleton, Longford, Clement, & Potter, 2006; Abdelaal & Ali, 2007; Siochrú & Girard, 2005; Kawasumi, 2004). As a result, the market mechanisms have failed to achieve digital inclusion of the society at large. Such social settings, we believe, require innovative and customized solutions for the digital inequality problem.

Wireless technologies can provide the much needed high-speed Internet access to any community in any location either through terrestrial telecommunication infrastructures or satellite backbones. They are particularly beneficial to a wide range of populations (Cisco, 2007). For example, those who by their nature are quasi nomadic (e.g. healthcare practitioners, real estate brokers, municipal employees, students, the mobile business persons, etc.) would find these emerging infrastructures to be of great benefit. Another group that would benefit from these emerging technologies is those who live in old neighborhoods, rural, rocky and mountainous, and remote areas.

Wireless standards (e.g. Wi-Fi and WiMax) have gained the capabilities to provide a wide range of customized connectivity solutions that suit different social settings. They enable individuals to use laptops, Wi-Fi phones, Personal Digital Assistants (PDAs) security cameras and other portable communications devices. There are many initiatives to make wireless devices more affordable all over the world. The One Laptop Per Child (OLPC) program is a great initiative lead by the MIT Media Lab for the purpose of providing low-cost and low-power laptop to children of developing countries. There are 30 projects all over world working on this program. This laptop consumes very low power ($<=7W$). Therefore, it could be charged by hand or powered by car or truck battery. It also uses wireless mesh technology, has a camera and audio facilities. In addition, it uses Open Source Software (OSS) such as Mozilla Web browser and Linux.

In addition to providing mobile and flexible real-time communications, these emerging communication technologies achieve significant time, money, and effort savings to their users. Most importantly, wireless technologies enable individuals to share their Internet connections and computer resources with others. As a result, wireless communications have the potential to provide ubiquitous and affordable Internet access and assist all communities to become and remain full participants in the emerging Internet-based "Information Age."

COMMUNITY WIRELESS NETWORKS AND INFRASTRUCTURES

The digital revolution has reached a tipping point after the deregulation of the 2.4 GHz spectrum in many countries. Opening this spectrum for the public provides individuals, private companies, non-profit organizations, and public entities the opportunity to build their own wireless networks using Wi-Fi standards. The following section discusses the main types of wireless networks that have evolved depending on the 2.4 GHz spectrum.

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