Chapter XXIX
The Wireless City

Sukumar Ganapati
Florida International University, USA

Christian F. Schoepp
Florida International University, USA

ABSTRACT

In this chapter, we explore the evolution of wireless broadband networks in cities. We examine the technological alternatives for city-wide implementation, and the governance arrangements for such implementation. Several wireless infrastructure technologies, such as Wi-Fi, WiMax, and Mesh networks have quickly evolved during this century. In terms of governance, we identify different models of ownership and deployment of wireless networks. Although the municipal provision of wireless broadband is controversial, we argue that the municipalities have a crucial role to provide such network infrastructure.

INTRODUCTION

Wireless is the future of broadband. It offers several advantages over the wired connections for Internet access. It allows for greater mobility and flexibility, so that wireless devices can be used in the field for various purposes. However, wireless accessibility in the field requires extensive wireless networks. Although wireless hotspots are available in several locations, such as coffee shops, fast food places, airports, and hotel lobbies, such wireless coverage may not be available beyond these sites. In this chapter, we focus on the technological and governance alternatives for providing citywide broadband wireless coverage. Consideration of these alternatives is an important issue for local governments.

Technologically, several types wireless network alternatives have emerged in the recent years, including the Wi-Fi, Mesh Networks, and WiMax. These networks hold both prospects and problems for citywide implementation in terms of costs, management, and technical characteristics. These wireless technologies do not necessarily replace wired networks; rather, they complement and supplement the wired networks for last mile solutions.

With respect to governance, considerable debate has emerged about whether or not local governments should provide the wireless infrastructure. Proponents argue that the municipal wireless networks are required for bridging the digital divide ("digital inclusion"), enhancing economic development, public safety, and municipal field operations. Critics maintain that the private sector can better provide the network services. However, few private sector telecommunication agencies have stepped in to provide city wide coverage. Also, municipal wireless networks have started to hit snags recently in the United States, as a few major cities dropped their plans for implementing such networks. We identify the different models of governance, and argue that municipalities have an important role to play in implementing wireless broadband networks despite the criticisms. Our focus is mainly on the American cities, although several cities internationally have undertaken wireless initiatives (e.g. Taipei, London).

The rest of the chapter is organized as follows. First, we provide a background on the evolution of broadband wireless. Second, we dwell on the technological alternatives of wireless broadband networks. Third, we explore the governance alternatives, and give particular attention to municipal wireless broadband. Lastly, we conclude with the significance of local governments in the provision of wireless broadband.

EVOLUTION OF WIRELESS BROADBAND NETWORKS

Infrastructure, in general, is a public good, where governments have a stake in developing it. There is an extensive coverage of basic infrastructure such as the telephone and power lines (overhead or underground) across the country, having evolved over more than a century. Telephone lines (e.g. copper wires) represent the basic component of telecommunications infrastructure. With the exponential growth of Internet based services that require high bandwidth (i.e. broadband), the traditional communications infrastructure has proven to be insufficient. Traditional dial-up modems used with telephone lines, for example, can hardly handle the emerging data, audio, voice, and video demands. Coffman and Odlyzko (2002) observe that Moore's law[1] is applicable for the internet growth, wherein the data traffic almost doubles annually. According to Pew Internet Research, the percentage of American adults online crossed the 50 percent mark by April 2000, and reached 71 percent by March 2007 (Horrigan, 2007). The Internet has become a crucial component for communications.

Broadband is particularly significant for the future growth of the Internet (Gillett, Lehr and Osorio, 2004). Broadband refers to the high speed Internet communications, which are typically faster than the 56.6 kilobytes per second (kbps) speed offered by dial-up modems. The Federal Communications Commission (FCC) defines the first generation broadband as speeds that exceed 200 kbps (kilobytes per second) in at least one direction. The broadband infrastructure includes both wired and wireless technologies. Wired infrastructure is based on a cable connection; wireless infrastructure is based on transmission and reception of radio wave signals, and does not require a physical cable connection. Examples of wired broadband include the Digital Subscriber Line (DSL) (which use telephone lines), Cable (which use cable television's co-axial lines), Fiber to the Home (FTTH) (which use fiber lines), and Broadband over Powerline (BPL) (which use power lines). Wireless infrastructure includes wireless antenna and/or towers for internet connectivity.

The broadband infrastructure has grown overall in the United States. Table 1 shows the growth of broadband infrastructure in the United States between 1999 and 2006. As the table shows, high-speed lines grew phenomenally from 2.48 million to 82.5 million between 1999 and 2006.