

## Chapter 20

# The Future of WiMAX

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### ABSTRACT

*WiMAX is being promoted as a potential solution to a number of problems that have plagued the wired and wireless broadband industry since it originated. Can WiMAX fulfill this promise in a crowded and competitive market? If so, what factors are critical to its success? Who will use WiMAX and for what purposes? This chapter identifies both the critical success factors that will give WiMAX an edge over other existing wireless technologies and the key applications that will contribute to its success. The top three critical success factors for WiMAX are availability of handset devices and consumer premise equipment, bandwidth speed, and interoperability and standardization. A panel of WiMAX experts concludes that broadband on demand, wireless services provider access, and Voice over IP are the top three killer applications for WiMAX.*

### INTRODUCTION

WiMAX (Worldwide Interoperability for Microwave Access) is an emerging wireless technology that promises to change the way people access the Internet by providing them additional freedom to stay connected seamlessly. WiMAX is engineered to deliver ubiquitous fixed and mobile services such as VoIP, on-demand video, online music, Internet access, multimedia messaging, and online

shopping to end users at data rates as high as 72 Mbps and covering a large geographical area, up to about 50 kilometers or 31 miles.

Throughout the world, but especially in the executive offices of mobile network operators (MNO) and equipment manufacturers, the questions being asked are: Is this potential real? What the critical success factors that will determine the future of WiMAX? What are potential killer applications for WiMAX?

This chapter explores the future prospects for WiMAX in a world of diverse and rapidly

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expanding telecommunications options. The first objective is to identify the technical and business issues – critical success factors – that will determine the future of WiMAX. The principal research question is “What are the critical success factors that will give WiMAX an advantage over other existing wireless technologies?” The second objective is to assess the potential market for WiMAX. Specifically, this research addresses the research question: “What are the killer applications that will determine the future of WiMAX?” In fulfilling these objectives, this chapter offers an in-depth examination of WiMAX, its potential, and its future.

## **BACKGROUND**

This section begins by offering a brief explanation of WiMAX. More detailed material on WiMAX is available from a variety of sources including Pareek (2006), Senza Fili Consulting (2005), Thelander (2005), and the WiMAX Forum ([www.wimaxforum.org](http://www.wimaxforum.org)). Then WiMAX capabilities are explored in more depth by identifying 12 factors that distinguish WiMAX from other wireless technologies. Indeed, this subsection offers the most comprehensive comparison of competing telecommunication technologies currently available in the literature. Finally, opportunities for deployment of WiMAX are explored by identifying six potential applications or application areas.

### **Overview of WiMAX**

WiMAX is sometimes called a wireless metropolitan area network or WMAN because its intended range of 50 kilometers (31.1 miles) is approximately the size of a metropolitan area. As such, WiMAX sits between wireless local area network (WLAN) technologies such as Wi-Fi and the cellular networks used on mobile telephones (wireless wide area networks or WWAN). Unlike Wi-Fi, WiMAX is available at anytime and

anywhere in the coverage area; so a “meeting warrior” could move from location to location without having to make new connections to a new local area network each time. WiMAX’s advantage over cellular networks is speed – at 72 Mbps (peak rate), WiMAX is faster than any 3G cellular network and comparable to data rate speeds expected for Long Term Evolution (LTE) or 4G. What gives WiMAX its high data rate is orthogonal frequency division multiplexing (OFDM), which allows multiple carrier signals to be sent at different frequencies, some of the bits on each channel.

WiMAX is based on the broadband wireless access standard IEEE 802.16. There are two forms of WiMAX – fixed version (IEEE 802.16-2004) and the mobile version (IEEE 802.16-2005). This study focuses on the mobile version of WiMAX, and all references to WiMAX in this chapter refer to mobile WiMAX unless explicitly stated otherwise.

WiMAX is no longer just an imaginary tale. After ratification of the Mobile IEEE 802.16 standard in 2006, several WiMAX networks have been tried and deployed in South Korea (Wu, 2006), the United States (“Sprint Nextel Announces”, 2006), and New Zealand (“Hamilton Poised to Become”, 2006).

### **Success Factors for WiMAX**

This section identifies 12 factors that may influence the future of WiMAX, based on a review of the business-oriented WiMAX literature. These factors, listed in alphabetical order, are the basis for answering the question “What are the critical success factors that will give WiMAX an advantage over other existing wireless technologies?” Accordingly, many of the factors discuss WiMAX in comparison to other technologies (e.g., Wi-Fi, 3G) that are commonly known or described elsewhere in the literature. Later in this chapter, the results of a Delphi survey of WiMAX and telecommunication experts will be reported to

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