

Chapter XXVIII

Adoption of Wi-Fi Technologies and Creation of Virtual Workplaces

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ABSTRACT

This chapter introduces adoption theory and applies it to examine the use of wireless fidelity (Wi-Fi), which has the potential to expand virtual workplaces significantly. Research shows that the use of Wi-Fi to access the Internet is surprisingly low. As understanding users and their needs is a prerequisite for the success of any new information technology, this chapter identifies factors accounting for the low usage of Wi-Fi in organizations and seeks to build a model to increase Wi-Fi usage. Empirical research reported in this chapter shows that motivations of Wi-Fi use, mass media use, and technology cluster have impacted on the awareness of, interest in, and likelihood to use Wi-Fi. More important, a chain-effect process in the adoption of Wi-Fi was presented: the awareness of Wi-Fi, which was influenced mostly by reading newspapers, had a direct effect on interest in Wi-Fi, which directly affected the likelihood to use Wi-Fi. Thus, to increase Wi-Fi usage, the awareness of and interest in this newer Internet technology must be in place. The chapter also discusses future trends in Wi-Fi technology and how increased adoption of Wi-Fi enhances the virtual workplace.

INTRODUCTION

Wireless fidelity (Wi-Fi) and WiMax represent newer Internet technologies that provide wireless access to the Internet. Wi-Fi uses the 2.4 GHz 802.11 wireless Ethernet standard and with a range up to 350 feet. It is also known as IEEE 802.11b and 802.11g with a data transfer speed up to 11 Mb/s. WiMAX is similar to Wi-Fi, but with a range of 25 to 30 miles (Meadows & Grant, 2006). Both technologies are becoming core architectures of

wireless computer networks. A wireless network is an extension of the wired network as it provides broadband access to the Internet via “hot spots” (also called a wireless cloud) built to the edge of the wired network. With this new way of accessing the Internet, users can check e-mail (the most popular online activity), search for information, download files, and access databases on the go. Wi-Fi and WiMax provide a new type of network on which a virtual workplace wirelessly accessible can be built and maintained.

It is noteworthy that wireless Internet networks known as wireless local area network (WLAN) have grown rapidly with the advent of Wi-Fi and WiMAX. Using radio waves, a WLAN allows Internet users to connect to a local area network (LAN) at broadband speed anytime and anywhere within the reach of hot spots. WLANs were deployed at universities, corporate offices, retail outlets, hotels, airports, and downtown areas. In corporate offices, WLANs are installed to serve common office environments offering hot spots. For instance, at its headquarters in Seattle, Microsoft installed 4,000 hot spots. There were 84,000 hot spots in the world in 2005; industry estimates put the total over 100,000 in 2006 (Best, 2005). In addition, municipal Wi-Fi projects for public wireless access are mushrooming in the United States. Young (2006) estimated that 300 cities (including Philadelphia and San Francisco) plan to implement municipal wireless networks for places like parks, libraries, and other public places.

With Wi-Fi, the Internet becomes portable and easily accessible at a low cost. With a wireless card (known as WNIC—wireless network interface card) on laptops, PDAs, cell phones, or game consoles like Wii, users within the range of Wi-Fi or WiMax can go online wirelessly anywhere, anytime. Wireless Internet and mobile computing expand Internet applications (e.g., wireless broadband access on laptops) and services (e.g., live city traffic information). More important, widespread access lets Internet users maintain mobile communication (such as e-mailing) to virtual communities to which they belong. Given these advantages, there is little doubt that Wi-Fi facilitates the expansion of virtual workplaces as a backbone of network infrastructure. With Wi-Fi, employees are able to work in multiple locations, including outdoor areas.

Wi-Fi networks are particularly appealing to organizations that intend to build, maintain, and expand virtual workplaces for employees because of low cost (the cost of Wi-Fi systems has decreased by 70% in the recent years), a seamless

connection between Wi-Fi and wired networks, the freedom from wires, and the capacity to offer emerging new applications such as video conferencing and voice over WLAN systems. Deploying Wi-Fi would boost productivity. For instance, Microsoft provided WLAN to its 35,000 employees in the 1990s. Convenience and flexibility drove employees to use e-mail at least 30 minutes per week, which meant a return on \$6 million per year on the \$9 million invested in Wi-Fi (Microsoft, 2005).

However, existing research shows that use of Wi-Fi in general is low. Only 6% of Internet users surveyed by Jupiter Research in 2002 indicated they ever used it in public places (Villano, 2003). The number of people who accessed the Internet wirelessly increased to only 27% in 2005 (Golvin, 2005). It appears a gap between building a new wireless network and actual use exists in the diffusion of Wi-Fi. Fichman (1995) called it an assimilation gap. That is, a system of new information technology may be built by organizations, but it is only sparsely used within adopting organizations. As understanding users and their needs is a prerequisite for the success of any new information technology, this chapter has three objectives: (1) to explore how user needs account for the low usage of Wi-Fi in organizations where Wi-Fi has become an integral part of the information infrastructure, (2) to build a model that will help organizations increase Wi-Fi usage among employees, and (3) to discuss future trends in Wi-Fi technology and the importance of increased Wi-Fi use in enhancing virtual workplaces.

BACKGROUND: CONCEPTS, HYPOTHESES, AND DATA

An innovation refers to a new idea, practice, or product. With a hardware component (e.g., WLAN) and a software component (e.g., applications), Wi-Fi exemplifies what Rogers (1995) called a technological innovation. Past research

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