Chapter 12
What Happened to Preferences for Next Generation Internet? A Survey of College Students in Taiwan

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ABSTRACT

The growing popularity of the Internet has resulted in attracting many enterprises to do business transactions over the Internet. The current Internet protocol version 4 (IPv4) has been used for over 20 years. Even though IPv4 applications have been quite successful, it faces a problem of shortage in IP addresses, ineffective security mechanisms, and a lack of service quality management, etc. Scientists and engineers have devoted considerable effort to the development of next generation Internet protocol version 6 (IPv6), which is the core component of Next Generation Internet (NGI) to meet the future requirements of the Internet. Even though NGI is technically superior to the traditional Internet and is being established worldwide, few people have transmitted data through it. According to the Innovation Development Process in the Diffusion of Innovation theory, IPv6 is currently in a stage of technological diffusion. The research studies whether educating potential customers with more IPv6 knowledge created in the innovation process can increase their preference for the technology. With surveys collected from 596 undergraduate students, the results show that knowledge of the commercial applications of IPv6 in mobile communications and information appliances significantly contributes to a preference for the IPv6 technology.

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INTRODUCTION

The Internet has come into our lives and affects our ways of thinking, learning, working, communicating, entertaining, socializing, shopping, etc. Even though the Internet is viewed as a modern technology that has had an important impact on our daily life, the core component of current network is Internet protocol version 4 (IPv4), which has been used for over 20 years. IPv4 has gradually shown its age and is unable to cope with the demand of application trends. For example, IPv4 does not have enough IP addresses if all home appliances are to be connected, the security mechanisms that are needed for business transactions are not included in IPv4, and IPv4 cannot support service quality differentiation. These shortcomings greatly hinder the progress of application development for the Internet. Scientists and engineers of the Internet Engineering Task Force (IETF) therefore have devoted considerable effort to the development of the Next Generation Protocol (IPv6) in 1995. IPv6 can solve the above problems and provide a healthy internet platform for the development of new next generation applications (Bicknell, 2007; Everett, 2008; McLoughlin, 1999; Michael Mackay, 2003; Monteiro, 1998; Shiau, Chao, & Hsu, 2005; Shiau, Li, Chao, & Hsu, 2006; Weiser, 2001; Wright, 2007). However, with all its merits, Next Generation Internet (NGI) based on IPv6 has not been widely adopted (Hovav, Patnayakuni, & Schuff, 2004), which impedes the development of new applications. The lack of new applications in turn reduces the momentum of IPv6 adoption. The research studies whether educating potential customers with more IPv6 knowledge created during the Innovation Development Process can help with NGI diffusion. The research hypothesis is that potential customers with more IPv6 knowledge during the Innovation Development Process will have a better understanding of the knowledge in the latter stages and whether potential customers with NGI knowledge are more likely to prefer the technology. With survey results collected from 596 undergraduate students, we found that the knowledge of foreseeing the applications of IPv6 in mobile communication and information appliances has a direct and significant influence on the preference for NGI. The rest of the paper is organized as follows. Section 2 shows the research framework and hypotheses, which were derived from the Innovation Theory. Section 3 explains the data collection process. Section 4 shows the analysis results of reliability, correlation and analytic strategy for assessing the model. Section 5 shows the verified model and suggests ways to attract users’ interest in NGI. Section 6 summarizes the findings of the research and any limitations it may have.

CONCEPTUAL FRAMEWORK AND RESEARCH HYPOTHESES

An innovation is an idea, practice, or object that is perceived of as new by an individual or other unit of adoption (Roger, 1983). Today we can see innovation taking place extensively in every field and industry, e.g. (Atuahene-Gima, 1996; Cabral, 1998; Hjalager, 1997; Johne, 1999; Keegan & Turner, 2002; Manu & Sriram, 1996; Silveira, 2001; Uzun, 2001) (Aa & Elfring, 2002; Atuahene-Gima, 1996; Evangelista, Perani, Rapiti, & Archibugi, 1997; Garcia & Calantone, 2002; Getz, Siegfried, & Anderson, 1997; Kano, 2000; Kuckartz, 2001; LaRose & Hoag, 1996; Mohamed, 1995; Sisaye., 1999; Vonortas & Xue, 1997). The innovation-development processes consists of recognizing a problem or need, research, development, commercialization, diffusion, adoption and consequence (Roger, 1983). In the paper, a path analytical model is built to examine whether potential customers with knowledge created in former stages can have a better understanding of the knowledge in the latter stages and whether potential customers with NGI knowledge are more likely to prefer the technology. With survey results collected from 596 undergraduate students, we found that the knowledge of foreseeing the applications of IPv6 in mobile communication and information appliances has a direct and significant influence on the preference for NGI. The rest of the paper is organized as follows. Section 2 shows the research framework and hypotheses, which were derived from the Innovation Theory. Section 3 explains the data collection process. Section 4 shows the analysis results of reliability, correlation and analytic strategy for assessing the model. Section 5 shows the verified model and suggests ways to attract users’ interest in NGI. Section 6 summarizes the findings of the research and any limitations it may have.