EXPLORING USER ACCEPTANCE OF FREE WIRELESS FIDELITY PUBLIC HOT SPOTS: AN EMPIRICAL STUDY

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Abstract: *Research regarding commercial and free wireless fidelity (Wi-Fi) public hot spots acceptance and adoption is sketchy. Therefore, it has become imperative to understand the critical factors that affect their acceptance. The focus of this study is free Wi-Fi public hot spot users, with the objective to better understand their user acceptance. In doing so, this study integrated two well-established initial acceptance models, specifically, the technology acceptance model and the diffusion of innovation theory. This study was conducted using an on-line survey that collected data from 129 users. It uses the Partial Least Square (PLS) technique to examine the relationship between variables. The results indicate that each critical factor has direct or indirect positive effects on current use and/or future use intention, which confirmed the majority of the proposed hypotheses. Relative advantage emerged as the only construct with a direct positive effect on both current use and future use intentions.*

Keywords: *technology acceptance model, diffusion of innovation, free Wi-Fi, public hot spots, partial least square, wireless fidelity.*

INTRODUCTION

Researchers suggest that advanced information technology and telecommunications infrastructures are requirements for active participation in today's global information economy (Cairncross, 2001; Kelly, 1998). One of the most important components in accelerating such active participation is high-speed broadband technology. The U. S. Technology Administration & Office of Technology Policy (2002) noted that most experts predict broadband access will enable the creation of new applications and services that will transform economies and significantly impact the competitiveness of the businesses of the future.

More importantly, wireless Internet access has entered the mainstream of the United States and other industrialized countries. As a result, broadband access to the Internet has increased and become more available to the general population. A wireless network uses radio waves as its carrier to establish broadband network connections to the Internet for users within a coverage area.

Wireless communication allows consumers and businesses to transcend time and place, thus increasing accessibility and expanding both social and business networks (Palen, 2002). Wireless communication also promises to provide convenience, localization, and personalization of services (Clarke, 2001). One of the driving forces behind wireless technology growth was the creation of the working group of Institute of Electrical and Electronics Engineers (IEEE) 802.11 standard of 1997, called wireless fidelity and popularly known as Wi-Fi (Bianchi, 2000).

Devices such as laptop computers and personal digital assistants (PDAs) enabled with Wi-Fi can send information to and receive it from the Internet anywhere within the range of an access point. Omni directional Wi-Fi access points are currently capable of transmitting signals up to 300 feet at up to 54 megabits per second.

Because a broadband Internet connection is seen as a facilitator for electronic commerce, eGovernment, eLearning, telemedicine, telecommuting, and overall economic prosperity, organizations and governments have supported its deployment and development by promoting the establishment of free public "hot spots" for citizen use, while businesses have created commercial public hot spots for subscription fees. For example, the early free Wi-Fi public hot spots were championed by technology enthusiasts, such as, among others, Anthony Townsend—professor of geographic information systems at New York University and co-founder and advisory board member of NYCwireless, a non-profit organization that promotes community broadband initiatives using an unlicensed wireless spectrum—who pioneered the early deployment of free Wi-Fi public hot spots in Bryant Park, Manhattan in 2002. In May 2003, the Alliance for Downtown New York City launched the Lower Manhattan Wireless Network, a collection of free wireless public hotspots in seven large and widely used locations throughout Lower Manhattan. In recent years, other players have joined in the deployment of free Wi-Fi public hot spots, hoping to reduce the digital divide and spur economic activities.

Research regarding both commercial and free Wi-Fi Internet access acceptance is sketchy; therefore, it has become imperative to understand the critical factors that affect the user acceptance of Wi-Fi public hot spots. The focus of this study is on free Wi-Fi public hot spot users, with the objective to better understand factors influencing their current use and future use intentions. In doing so, this study draws upon several well-established acceptance models, specifically the technology acceptance model (TAM; Davis, 1989), rooted in the theory of reasoned action (TRA; Ajzen & Fishbein, 1980), and the diffusion of innovation theory (DIT; Rogers, 1983, 1995, 2003).

The results of this study will extend the current knowledge of technology acceptance, and Wi-Fi in particular. The research outcome is useful to (a) academics, in extending, integrating, and refining the TAM and DIT; and (b) government and non-profit organizations, for better assessing the benefits of free Wi-Fi public hot spot investment.

For clear communication of the research findings, this paper will first present a review of the current technology acceptance literature, followed by a discussion of the theoretical framework for the study. The paper then describes the methodology and data analysis results. It concludes with a discussion of the findings, conclusions, contributions to theory and practice, limitations, and future research.

LITERATURE REVIEW

Adoption research typically attempts to describe and explain the adoption decision of individual end-users by integrating various individual and social theories of decision making. Innovation research postulates that many different outcomes are of interest in technology acceptance, including the initial decision to use the system and the continued or sustained use of the innovation (Rogers, 1995). Furthermore, as individuals gather and synthesize information, the information processing results in the formation of perceptions about the target innovation (Agarwal & Prasad, 1997). Based on these perceptions, a decision is made to adopt or reject the innovation; if this decision favors adoption; overt behavior change is manifested in the use of the innovation (Wee, 2003). The initial use of an innovation, however, may not always be sufficient to fully derive the benefits desired from the system. Users sometimes need to institutionalize the innovation as part of regular use, a usage referred to as confirmation or continued use (Rogers, 2003). Thus, this study will not only examine the factors influencing the initial use, but also will further understanding of the determinants of future use intentions.

The two theoretical models providing the underlying framework for this research—the TAM, based on the TRA, and the DIT—are explored in greater detail in the next two subsections. I will look at the TAM and DIT separately, and then how they relate to each other in regard to this study.

Technology Acceptance Model (TAM)

The most widely accepted model used to understand end-user adoption and acceptance of information technology is the TAM (Davis 1989; Davis, Bagozzi, & Warshaw, 1989) and its extension, referred to as TAM2 (Venkatesh & Davis, 2000). Many studies have successfully applied TAM, its extension, and other theories to explain end-user acceptance of various information and communications technology systems and applications (Ajzen, 1991; Moore & Benbasat, 1991; Mathieson, 1991; Taylor & Todd, 1995b).

Based on the TRA notion that a person's behavioral intention depends on the person's attitude towards the behavior and subjective norms, TAM theorizes that an individual's behavioral intention to use a system is determined by two factors: perceived usefulness and perceived ease of use. Both perceived usefulness and perceived ease of use directly affect a person's attitude towards the target system and indirectly affect actual system use (Davis, 1993). While TRA was designed to explain virtually any human behavior, the goal of TAM was to specifically provide an explanation for information systems acceptance. TAM also provides an explanation of the determinants of computer acceptance that is general and capable of explaining user behavior across a broad range of end-user computing technologies and user populations, while simultaneously being theoretically justified (Davis et al., 1989).

The Szajna (1994) study found that the perceived usefulness (PU) and ease of use (EU) instruments demonstrate reasonably good predictive validity. Legris, Ingham, and Collerette (2003) concluded that TAM has proven to be a useful theoretical model for understanding and explaining user behavior. TAM has also been tested frequently in empirical research and the tools used with the model have proven to be of quality and to yield statistically reliable results (Legris et al., 2003).

A number of studies have successfully utilized TAM to study the acceptance of Internet-related technologies. Such technologies include e-mail (Gefen & Straub, 1997), the World Wide Web (Agarwal & Prasad, 1997; Fenech, 1998; Moon & Kim, 2001), microcomputers (Igbaria,Guimaraes, & Davis, 1995), the computer resource center (Taylor & Todd, 1995a), voice mail (Straub, Limayem, & Karahanna, 1995), telemedicine (Chau & Hu, 2001; Hu, Chau, Sheng, & Tam, 1999), a digital library (Hong, Thong, Wong, & Tam, 2002), and on-line shopping (Gefen, Karahanna, & Straub, 2003).

The Diffusion of Innovations (DIT)

This theory has been used to understand adoption behavior related to innovation (Rogers, 2003). DIT provides a theoretical framework for analyzing the characteristics of adopters and understanding their behavior over time in relation to innovations (Rogers, 1995). Diffusion has been defined as the process by which (a) an innovation (b) is communicated through certain channels (c) over time (d) among the members of a social system (Rogers, 1983, 1995, 2003). Innovations that are perceived by individuals as having greater relative advantage, compatibility, trialability, observability, and less complexity will be adopted more rapidly than other innovations (Rogers, 2003). This model has been used frequently in research to predict information technology innovation and systems acceptance.

TAM and DIT Studies

Moore and Benbasat (1991) adapted the characteristics of innovations presented in Rogers (1983) and refined a set of constructs that could be used to study individual technology acceptance and adoption. In developing the instrument to measure an individual's perceptions concerning the attributes of an innovation, they pointed out the many parallels between the TAM and the DIT. As such, Moore and Benbasat asserted that the TAM's constructs, PU and EU, are essentially the same as the constructs of relative advantage and less complexity in DIT, reflecting the dominant measurement paradigm in ICT research, and hence the integration of both in this study.

Numerous studies had incorporated the TAM and DIT. Apart from Moore and Benbasat (1991), for example, Agarwal and Prasad (1997) examined the relationship between the innovation characteristics of the World Wide Web via perceived Web voluntariness and acceptance behavior. They tested individual perceptions about the characteristics of the target technology as explanatory and predictive variables for acceptance behavior. The two outcomes examined were initial use of an innovation and intention to continue such use in the future. The research model's variables accounted for 48% of the variance in current usage.

Lu, Yu, Liu, and Yao (2003a) developed a technology acceptance model for wireless Internet mobile devices (WIMD), a conceptual framework to explain the factors influencing user acceptance of WIMD. TAM for wireless Internet proposes that the key constructs affecting the medium are individual differences, technology complexity, facilitating conditions, social influences, and the wireless trust environment (Lu et al., 2003a).

Rogers (1995) used innovativeness, operationalized as time of adoption, to derive adopter categories. However, Agarwal and Prasad (1998), in reviewing prior work that has examined Rogers' notion of innovativeness, presented evidence suggesting that Rogers'

definition of a theoretical construct in operational terms suffers from methodological limitations. The shortcomings include its measurement as an ex post descriptor of behavior, thereby precluding its use as a predictor, and a lack of metrics to assess the reliability and validity of the construct. They developed and validated a construct labeled personal innovativeness in the domain of IT (PIIT), which was conceptually defined as the willingness of an individual to try out any new information technology. Their research suggested that the PIIT moderates the relationship between individuals' perceptions about technologies and their intention to use them (Agarwal & Prasad, 1998).

Chen, Gillenson, and Sherrell (2002) applied TAM and DIT to achieve an extended perspective of consumer behavior within the virtual store context, and found that these two classical theories remain valid in explaining and predicting user behavior in the business-to-consumer eCommerce context. Chen et al.'s (2002) study suggests that TAM and DIT reconfirm each other's findings, which raises the validity and reliability of these theories.

Critiques of TAM and DIT have suggested that both models do have strong limitations. Following an analysis of 22 published papers from 1980 to 2001, Legris et al. (2003) concluded that TAM was a useful model; however, they suggested integrating it into broader model. Also, critiques found DIT not predictive enough, and an overly simplified representation of a complex reality (Rogers, 2003).

Despite the criticisms, Venkatesh, Morris, Davis, and Davis (2003) integrated the elements of TAM, DIT, and six other prominent acceptance models to formulate the unified theory of acceptance and use of technology (UTAUT). The UTAUT model sets out to integrate the fragmented theory and research on individual acceptance of information technology into a unified theoretical model found to outperform each of the individual models (Venkatesh et al., 2003).

RESEARCH MODEL

The primary goal of this study is to better understand users' acceptance of free Wi-Fi public hot spots. Acceptance in this case includes the initial use and future use intentions. It is evident from the literature that a number of factors influence the acceptance of this innovation. According to the integration of TAM and DIT, the factors include, but are not limited to, the following: relative advantage (RA), ease of use (EU), facilitating conditions (FC), wireless trust (WT), and personal innovativeness in the domain of information technology (PI). These factors most likely will influence free Wi-Fi acceptance, that is, current use (CU) and future use intention (FU). Finally, this literature review has progressed to establish relevant theoretical foundation and conceptual framework necessary for hypothesis development and to operationalize the proposed study.

Hypotheses Development

The hypotheses, developed from theory-based constructs, explored the critical factors that affect acceptance of Wi-Fi in free public hotspots. In all cases, the theoretical framework of this research is based on the TAM and the DIT, as previously discussed. The five critical factors from TAM and DIT that affect the acceptance of free Wi-Fi public hot spots are shown in Figure 1.
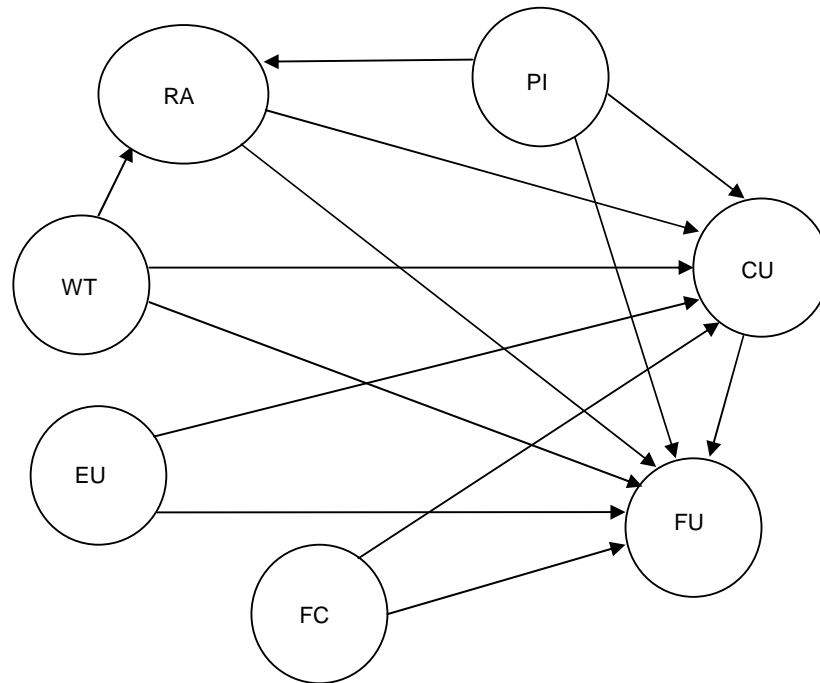
Figure 1. Research Model and Hypotheses: Relationship of Critical Factors and Wi-Fi Acceptance (current use/future use intention). Note: RA = Relative Advantage; PI = Personal Innovation in the Domain of Information Technology; CU = Current Usage; FU = Future Use Intent; FC = Facilitating Conditions; EU = Ease of Use; and WT = Wireless Trust.

Relative Advantage (RA)

RA describes the degree to which an innovation is perceived as better than that which it supersedes (Rogers, 1983; 1995). Moore and Benbasat (1991) adapted RA from the DIT (Rogers, 1983) to study individual technology adoption. They reiterated that the relative advantage construct is similar to the notion of PU in TAM (see also Davis, 1989; Plouffe, Hulland, & Vandenbosch, 2001; Venkatesh et al., 2003). Venkatesh and Davis (2000) defined PU as the degree to which an individual believes that using a particular system would enhance his or her job performance. Davis (1993) argues that PU is the most influential determinant of system usage.

Moreover, empirical studies support the importance of RA in predicting adoption behavior (Adams, Nelson, Todd, 1992; Agarwal & Prasad, 1997; Davis, 1993; Moore & Benbasat, 1991; Tornatzky & Klein, 1982). Therefore, the first two hypotheses postulate that users will name RA as direct and immediate positive effects as a determinant in their acceptance (in CU and FU) of Wi-Fi service in free public hot spots.

H1: RA of free Wi-Fi has a direct and positive effect on the CU of free Wi-Fi public hot spots.

H2: RA of free Wi-Fi has a direct and positive effect on the FU of free Wi-Fi public hot spots.

Ease of Use (EU)

Venkatesh et al. (2003) defined perceived EU as the degree to which an individual believes that the use of a particular system would be free of physical and mental effort. Systems that are perceived to be easier to use and less complex have a high likelihood of being accepted and used by potential users (Agarwal & Prasad, 1997). EU is opposite in definition to Rogers' (1983) notion of complexity, which is the degree to which an innovation is difficult to understand and use. Moore and Benbasat (1991) adapted EU and defined it as the degree to which a potential adopter views usage of the target system to be relatively free of effort. Venkatesh et al. (2003) found similarity in Davis' (1989) perceived EU and Moore and Benbasat's (1991) EU definition.

In any emerging information technology, perceived EU is an important determinant of users' intention of acceptance and usage behavior (Venkatesh & Davis, 2000). Therefore, EU will be examined as a determinant of free Wi-Fi acceptance in CU and FU situations.

H3: EU has a direct and positive effect on the CU of free Wi-Fi public hot spots.

H4: EU has a direct and positive effect on the FU of free Wi-Fi public hot spots.

Facilitating Conditions (FC)

FC are defined as the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system (Venkatesh et al., 2003). Moreover, FC encompass environmental factors that make it easy or remove barriers to perform a desired behavior (Thompson, Higgins, & Howell, 1991). Thus, FC were described as factors in the environment that encourage or discourage a behavior (Triandis, 1979). According to Lu et al., (2003a), in the context of workplace technology use, FC are believed to include the availability of training and the provision of support.

FC are confirmed as an important factor affecting Internet and WWW usage (Cheung, Chang, & Lai, 2000). Other empirical results indicate that FC do have a direct influence on usage beyond that explained by behavior intention alone (see, e.g., Cheung et al., 2000; Taylor & Todd, 1995b; Thompson et al., 1991; Venkatesh et al., 2003). Therefore, FC will be examined as a determinant of free Wi-Fi acceptance (CU and FU).

H5: FC have a direct and positive effect on the CU of free Wi-Fi public hot spots.

H6: FC have a direct and positive effect on the FU of free Wi-Fi public hot spots.

Wireless Trust (WT)

WT can be defined as the extent of a user's belief that privacy protection, security assurance, and system reliability are achieved within a wireless technology (Lu, Yu, Liu & Yao, 2004). Lu et al., (2003a) argued that trust is a complex social phenomenon that reflects technological, behavioral, social, and psychological, as well as organizational aspects, of interactions among various human and non-human agents. Trust is someone's assurance that he or she may predict the actions of the third party, may rely upon those actions, and that those actions will follow a predictable pattern in the future, especially under risky circumstances and when no explicit guaranty is provided (Jones, 2002). Consumer trust was found to be important in on-line commerce, and a widely accepted antecedent (Gefen et al., 2003). McKnight, Cummings, and Chervany (1998) defined institutional-

based trust as an individual's perceptions of safety and security within the institutional environment, in this case wireless technology, and the structural characteristics of the Internet.

According to a survey conducted by the Boston Consulting Group (Goldman, 2001), nearly 75% of U.S. consumers are concerned about security and privacy in the wireless environment. For example, computer hackers with appropriate software can steal the personal information of users (Brewin, 2002). Compared to wired Internet, wireless access to the Internet is exposed to a greater danger of security breaches (Lu et al., 2003a). The open nature of the Internet as a communication and transaction infrastructure and its global reach has made trust a crucial element of transactions, such as eCommerce (Hoffman, Novak, & Peralta, 1999).

Lu, Yu, Liu, & Yao (2003b) proposed WT as one of the determinants affecting acceptance of wireless Internet for mobile devices. WT has three key elements: security, privacy, and system reliability (Lu et al., 2004). Reports of privacy and security concerns in using the wireless Internet have been on the rise (Desai, Richards, & Desai, 2003; Phillips, 2002). Privacy concerns often arise with new information technologies, such as the wireless technology that supports enhanced capabilities for collection, storage, use, and communication of personal information (Culnan, 1993; Milberg, Burke, Smith, & Kallman, 1995; Webster, 1998). In addition to security and privacy, overall system reliability also contributes to user perceived trustworthiness. In fact, system reliability serves as the basis for system trust (Lu et al., 2004).

Because trust is a complex psychological construct, it is not easy to define its antecedents. The use of the TAM infused with the trust element is perceived to be adequate and efficient to assess users' trust levels and acceptance in virtual on-line shopping and wireless environment (Gefen et al., 2003; Lu et al., 2003a; 2003b; 2004; Mcknight, Choudhury, & Kacmar, 2002; McKnight et al., 1998). Dahlberg, Mallat, and Öörni (2003) proposed the applications of the trust-enhanced TAM to investigate user acceptance of mobile payment solutions.

It is impossible to implement business applications in a public wireless environment without first setting up a trustworthy on-line environment (Lu et al., 2003a). Therefore, all communications and transactions require an element of trust; especially those conducted in the uncertain environment of wireless technology (Lee, 1998), Therefore, WT closely relates to the RA and the CU and FU acceptance of free Wi-Fi, as I propose:

H7: WT has a direct and positive effect on the RA of free Wi-Fi public hot spots.

H8: WT has a direct and positive effect on the CU of free Wi-Fi public hot spots.

H9: WT has a direct and positive effect on the FU of free Wi-Fi public hot spots.

Personal Innovativeness in the Domain of Information Technology (PI)

PI epitomizes the risk-taking propensity that is higher in certain individuals than in others (Lu et al, 2003a). In DIT research, highly innovative individuals have been recognized as active information seekers of new ideas who are able to cope with high level of uncertainty and, at the same time, develop more positive intentions towards acceptance (Rogers, 1983, 1995, 2003).

Agarwal and Prasad (1998) defined PI as an individual trait that reflects the willingness of a person to try any new information technology. It is assumed that individuals with higher-level innovativeness are more likely to adopt an innovation. The PI construct, developed and validated, is conceptually defined as the willingness of an individual to try out any new information technology (Agarwal & Prasad, 1998).

Prior research demonstrates that individual characteristics play an important role in people's decisions to adopt or reject innovation (Lu et al., 2003b; Rogers, 1983, 1995, 2003; Tornatzky, Fleischer, & Chakrabarti, 1990). For example, Hung, Ku, and Chung (2003) confirmed that PI directly affects an individual's attitude towards the use of wireless application protocol services. Karahanna, Ahuja, Srite, and Galvin (2002) concluded that PI is one of the factors that influence a person's perceived RA of using group support systems. Lee, Kim, and Chung (2002) hypothesized and empirically supported that PI has a positive direct impact on the degree of PU of mobile Internet services.

Wi-Fi is an important information technology innovation. Potential adopters and users have the opportunity to use it of their own volition, and among them are innovators and early adopters. Therefore, it is appropriate to include PI as one individual variable in the current study to test its impact under new circumstances. Thus, PI closely relates to the RA and the acceptance of Wi-Fi, as I propose:

H10: PI has a direct and positive effect on the RA of free Wi-Fi public hot spots.

H11: PI has a direct and positive effect on the CU of free Wi-Fi public hot spots.

H12: PI has a direct and positive effect on the FU of free Wi-Fi public hot spots.

Current Usage (CU)

Innovation research postulates that many different outcomes are of interest in technology adoption, including the initial decision to use the system and the continued or sustained use of the innovation (Rogers, 1995). Initial use does not necessarily indicate that user will continue to use the target system. Furthermore, as individuals gather and synthesize information, the information processing results in the formation of perceptions about the target innovation (Agarwal & Prasad, 1997). Based on these perceptions, a decision is made to adopt or reject the innovation. If this decision favors adoption, overt behavioral change, as manifested in the use of the innovation, results (Wee, 2003). Therefore, current use for this study is defined as the successful use of free Wi-Fi public hot spot at least once.

The initial use of innovation is the CU, although it may not always be sufficient to fully derive the benefits desired from the system or lead to continued use. Past research acknowledged the necessity to control the potential influence of inertia resulting from existing use on FU (Agarwal & Prasad, 1997). Consequently, this model suggests that CU may influence the FU; hence, I propose:

H13: CU has a direct and positive effect on the FU of free Wi-Fi public hot spots.

Future Use Intention (FU)

CU and FU are the key dependent variables in information technology research and many studies have examined empirically their determinants (Agarwal & Prasad, 1997; Davis, 1989, 1993; Mathieson, 1991; Moore & Benbasat, 1991). The assumption was that widespread use of Wi-Fi had not occurred. Therefore, this study examined the decision to engage in the outcomes: Current system usage, a measure of a successful Wi-Fi use, and FU, which reflects the likelihood that the Wi-Fi usage would be institutionalized in the future (Agarwal & Prasad, 1997). This study would explore further whether the same perceptions relevant for CU also affect FU.

METHODS AND RESULTS

The research employed cross-sectional quantitative survey research as the methodological and measurement path to this study. New York City, with Wi-Fi public hotspots available throughout Manhattan, and the John F. Kennedy (JFK) and LaGuardia airports, presented the opportunity to find Wi-Fi users in the numbers needed to make the research meaningful.

A purposive sampling method was employed to identity users of Wi-Fi hot spots and to distinguish between commercial and free users. Sampling occurred in high traffic public Wi-Fi hot spot locations in Manhattan, and JFK and LaGuardia airports areas. Leaflets announcing the study were conspicuously displayed at public hotspots throughout New York City. Respondents either picked up the leaflet or were approached in person. They were asked to visit a Web site to complete a short on-line questionnaire. No discriminatory criteria (age, sex, device used) affected the decision to approach potential respondents.

A 26-item instrument was developed for the survey. The combined 8-item measures of RA (5) and EU (3) were based on the work of Agarwal and Prasad (1997), which is an adaptation of instruments previously created by Moore and Benbasat (1991) to measure the perceptions of adopting an information technology innovation. RA scored a Cronbach's alpha scale for reliability of 0.90 in studies by Agarwal and Prasad (1997), and Moore and Benbasat (1991), while EU was 0.80 and 0.84 respectively (Agarwal & Prasad, 1997). The 4-item scale of FC was based on the UTAUT model by Venkatesh et al. (2003). The questions were slightly modified to fit the context of Wi-Fi hotspots. The internal consistency reliability of Venkatesh's et al.'s (2003) original questionnaire was 0.87. The instrument to measure the level of WT (5) of users of Wi-Fi was adapted from the conceptual and definition of WT by Lu et al. (2004). The questions were revised to reflect the nature of Wi-Fi. The Cronbach's alpha internal consistency reliability for Wi-Fi was 0.84 (Lu et al., 2004). The questions measuring the degree of PI (4) were taken from the research of Agarwal and Prasad (1998), with a composite reliability for PI of 0.91 (Larsen & Sorebo, 2005).

The 5-item measures of CU (3) and FU (2) were also based on Agarwal and Prasad (1997), as adapted from Davis (1993). Self-reported measures are reasonable indicators of relative system use, and since this study is not longitudinal, a FU scale will assess the likelihood of continued usage (Agarwal & Prasad, 1997; Davis, 1993). CU and FU resulted in a Cronbach's alpha scale reliability of 0.92 and 0.81, respectively (Agarwal & Prasad, 1997).

The instrument employed a 5-point Likert scale to elicit respondents' responses to statements regarding "Wireless Fidelity Public Hotspots Service" (Elmore & Beggs, 1975). The respondents scored the statements from 1 (*strongly disagree*) to 5 (*strongly agree*). Data were collected during a period from December 2005 through September 2006. In total, 181 responses were collected. Of the 181, 52 responses were removed because the respondents did not complete the entire survey and/or they failed to indicate the particular Wi-Fi hot spot they used most often, thus making it impossible to classify them as free Wi-Fi public hot spots users. Consequently, the usable sample was reduced to 129 responses.

Descriptive Data Analysis

Of the respondents, 60% were males, 40% females. The overwhelming majority (69%) of respondents were under the age of 39 years. Only 1% were over 65 years of age. Fifty-three

percent identified themselves as professionals, while 16% were self-employed and 30% were students. Forty percent of the respondents had obtained a graduate degree (master's or higher) while 27% completed undergraduate degree. Only 4% did not attend college. Even though the study did not determine the nationalities or residence location of the respondents, the education level of Wi-Fi users surveyed is much higher than that would be found in the general U.S. population. According to 2006 U.S. census data, 25% of Manhattan residents, aged 25 and older, hold graduate degree; nationwide the number is 9.4 percent (Census Bureau, 2006).

Thirty-six percent of respondents had an annual income of above $60,000, while 33% had incomes between $30,000 and $59,999. The mean annual income of the New York metropolitan statistical area averaged $47,200 in 2005, as reported in the Metropolitan Area Occupational Employment and Wage Estimates (Bureau of Labor Statistics, 2005).

Regarding respondents' technology skill level, 48% classified themselves as experts, while 38% were high intermediate. Sixty percent have used Wi-Fi on or before 2003, and the same percentage use Wi-Fi from 1 to 5 hours a week. Laptops were by far the most frequently used device for accessing Wi-Fi (80%), and 59% used Wi-Fi in hotels, library, park, and/or schools. Given the current status of Wi-Fi use in the US (see McIntyre, 2007), the reported demographics of the respondents indicate a representative sample of Wi-Fi public hot spots users.

Partial Least Square

The data analysis of this study included the use of the Sequential Equation Modeling (SEM), specifically Partial Least Square (PLS) and SPSS analysis packages (Chin 1998b). Due to the exploratory nature of this study and its sample size, the partial Least Square (PLS) versions—Visual PLS – LVPLS version 1.04, and Chin's PLS-GRAPH 3.0 Build-1126 software—were used to estimate the model (Chin, 2003; Fu, 2006a). The minimum sample size requirement for PLS is determined by finding the larger of two possibilities: (a) a construct with the largest number of indicators, or (b) a dependent construct with the highest number of independent construct impacting it (Chin, 1998b; Gefen, Straub, & Boudreau, 2000). The minimum sample size should be at least 10 times the larger number of these possibilities (Chin 1998b). The RA and WT constructs had the largest number of indicators (five); the 129 survey respondents exceed the minimum of 50 respondents required to establish statistical validity and reliability. Analysis with PLS comprised two actions: the assessment of the measurement model, and the assessment of the structural models (Bagozzi, 1982; Fornell, 1982; Fornell & Bookstein, 1982).

The Measurement Model

The measurement model defines how each set of indicators (items) relates to its respective construct. The model comprised six latent independent variables and three latent dependent variables with 26 indicators (items). All of the items were related to constructs in reflective mode because they were viewed as effects (not causes) of the latent variables (Bollen & Lennox, 1991).

PLS is a predictive technique that handles many independent variables, even when the variables display multicollinearity (Chin, 1998b, Gefen et al., 2000). To assure that the manifest variables (items) measure the unobservable latent variables (construct), the measurement model was evaluated by examining the individual item reliabilities, reviewing

the internal consistency or convergent validity of the measures, and assessing discriminant validity (Barclay, Higgins, & Thompson, 1995).

Individual Item Reliability

In assessing the individual item reliability, the loading of each indicator on its respective construct was examined (see Chin, 1998b). Hair, Anderson, and Tatham (1987) recommend retaining indicators with a factor loading of at least 0.50 and consider them significant. In the initial run, three indicators—FC3, FC4, and WT5—loaded lower, and were subsequently dropped (see Hulland, 1999). Another run displayed acceptable factor loadings.

Internal Consistency

Internal consistency, also referred to as composite reliability or convergent validity, indicates the reliability of each block of items used to measure a specific construct. Composite reliability is considered a closer measure of internal consistency of reliability than Cronbach's alpha (Fornell & Larker, 1981). Nunnally's (1978) guideline of 0.70 for assessing reliability coefficients was used for evaluating the composite reliability of each measure block of manifest variables. A composite reliability score of 0.70 or higher is considered to be acceptable (Barclay et al., 1995). The data indicate the composite reliability and Cronbach's alpha in the free Wi-Fi model were found to be higher than the acceptable level.

Discriminant Validity

As previously stated, discriminant validity reflects the degree to which each construct is unique. To establish discriminant validity, the average variance extracted (AVE) was assessed for each construct. AVE is a measure of the average variance shared between a construct and its manifest variables (Fornell & Larker, 1981). The AVE should be greater than or equal to 0.50 for satisfactory convergent validity for a construct (Chin, 1998a; Fornell & Larker, 1981). Secondly, the AVE for a construct should be greater than the squared correlations of the construct and other constructs in the models (Chin & Newsted, 1999). These data indicate that the AVEs in the model were found to be higher than the acceptable levels.

Another measure of discriminant validity is that the square root of the AVE for a given construct should be greater than the variance between that construct and other constructs (Chin, 1998b). The final requirement of discriminant validity is that no indicator should load more highly on another construct than the construct it intends to measure (Barclay et al., 1995). An examination of the square root of the AVEs and cross-loading matrix data show that constructs and items exceeded the acceptable level.

Based on the measurement model, several observations were made. Each item loaded more highly on its own construct than on any other. Constructs' reliabilities exceeded the thresholds of > 0.70, ranging from 0.84 to 0.95. The AVEs exceeded the threshold of 0.50, ranging from 0.57 to 0.90. The scores of the constructs compared well with those measured in previous studies. Therefore, the constructs provide ample evidence of sufficient internal consistency and convergent validity of the reflective construct scales, and their items, as shown in Tables 1 and 2.

Table 1. Reliability Analysis and Average Variance Extracted.

Constructs	Composite Reliability	Cronbach Alpha	AVE
RA	0.92	0.89	0.70
EU	0.87	0.77	0.68
FC	0.91	0.82	0.84
WT	0.92	0.89	0.74
PI	0.84	0.73	0.57
CU	0.86	0.75	0.67
FU	0.95	0.90	0.90

Note: RA = Relative Advantage; EU = Ease of Use; FC = Facilitating Conditions; WT = Wireless Trust; PI = Personal Innovation in the Domain of Information Technology; CU = Current Usage; FU = Future Use Intent.

Table 2. Correlations of Latent Variables (Free Wi-Fi).

	RA	EU	FC	WT	PI	CU	FU
RA	0.840*						
EU	0.546	0.828*					
FC	0.249	0.456	0.917*				
WT	0.234	0.253	-0.222	0.863*			
PI	0.389	0.352	0.398	0.129	0.854*		
CU	0.390	0.445	0.442	0.104	0.328	0.867*	
FU	0.595	0.402	0.190	0.281	0.460	0.558	0.951*

*Square Root of AVE

Note: RA = Relative Advantage; EU = Ease of Use; FC = Facilitating Conditions; WT = Wireless Trust;
PI = Personal Innovation in the Domain of Information Technology; CU = Current Usage; FU = Future Use Intent.

The Structural Model

The structural model estimates the relationship among the latent constructs. The assessment of the structural model is basically examining the path coefficients and R^2. PLS path coefficients are similar to standardized beta coefficients in ordinary regression. Larger values of R^2 indicate a higher percentage of variance of dependent variable that is explained by respective independent variables (Barclay et al., 1995). In essence, the path coefficient (standard coefficient, known as beta) indicates the relative strength of statistical relationships, while the R^2 is the relevant statistic that explains the predictive capability of the model (Fornell & Larker, 1981).

The PLS makes no distributional assumptions, therefore, a nonparametric test must be used to determine the significance of the model parameters. Moreover, the traditional overall goodness-of-fit measures used by SEM (e.g., LISREL) would be neither appropriate nor meaningful in this model (see Chin, 1998b; Hulland, 1999).

To examine the stability of the estimates, or the significance (*t* statistics) of the path coefficients, a nonparametric resampling method, such as bootstrapping or jackknifing techniques (Chin, 2003), were used to further confirm the predictive ability of the hypothesized paths (Chin 1998b; Gefen et al., 2000). In this study, the hypotheses were tested by running a bootstrapping procedure with the resampling set at 200, as recommended by Chin (1998b), to determine path coefficients and to assess their significance with *t* values.

The PLS Graph and VPLS software calculated the R^2 score for each endogenous variable (CU, FU, & RA), and the path coefficient score for each structural path between constructs. The models demonstrated high predictive power with R^2 for FU at 0.544, which indicates the explanation of 54% of the variance of future use intention. The models also demonstrated predictive power of R^2 for CU at 0.311, which indicates the explanation of 31% of the variance of the CU. Furthermore, the R^2 for RA is 0.186, as shown in Figure 2 and Table 3.
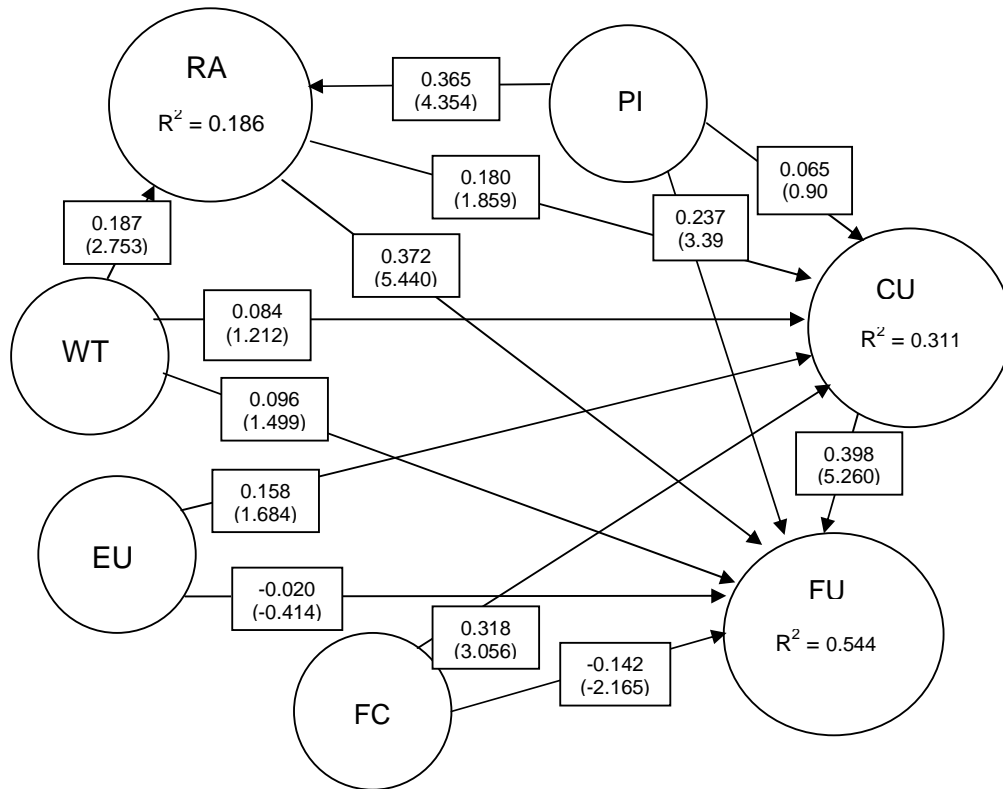

Figure 2. Free Wi-Fi public hotspots acceptance model with beta, t-statistics, and R^2
Note: RA = Relative Advantage; PI = Personal Innovation in the Domain of Information Technology;
CU = Current Usage; FU = Future Use Intent; FC = Facilitating Conditions; EU = Ease of Use; and
WT = Wireless Trust.

Table 3. Variance Explained/R-squared.

	Free Wi-Fi Acceptance Model
Future Use Intention (FU)	0.544
Current Use (CU)	0.311
Relative Advantage (RA)	0.186

The Effect Sizes

To further confirm the results, recall that the R^2 provides the same information about variance explained as in ordinary regression. The larger values of R^2 indicate a higher percentage of variance explained by the contributing latent variables. According to Chin (1998a), the predictive power of each latent variable can be assessed by estimating the effect size. Effect size of an independent latent variable on dependent variable is calculated to determine the magnitude of effect.

To calculate effect size in this study, each path from the exogenous (independent) construct contributing to the endogenous (dependent) construct was in turn eliminated individually, and the resulting R^2 was used to calculate the effect size (see Chin, 1998a). As recommended by Cohen (1988), the effect size value of 0.02, 0.15, and 0.35 are viewed as small, medium or large effect on the structural level. The results indicate at least a small effect exist for all validated hypotheses. Table 4 presents summary results of the interrelationships of the variables.

Table 4. Free Wi-Fi Acceptance Model Hypotheses Summary of Results.

Hypotheses	Path	Beta	t-stat	Validation
H1	RA>CU	0 .180	1.86*	Supported
H2	RA>FU	0.372	5.76***	Supported
H3	EU>CU	0.158	1.68*	Supported
H4	EU>FU	-0.020	-0.41	Not supported
H5	FC>CU	0 .316	3.05**	Supported
H6	FC>FU	-0.142	-2.16	Not supported
H7	WT>RA	0.187	2.75**	Supported
H8	WT>CU	0.084	1.21	Not supported
H9	WT>FU	0 .096	1.50	Not supported
H10	PI>RA	0.365	4.35***	Supported
H11	PI>CU	0.065	0.91	Not supported
H12	PI>FU	0.237	3.40**	Supported
H13	CU>FU	0.398	5.26***	Supported

Note: * $p =.05$, **$p = 01$, *** $p = .001$
Note: RA = Relative Advantage; EU = Ease of Use; FC = Facilitating Conditions;
WT = Wireless Trust; PI = Personal Innovation in the Domain of Information Technology;
CU = Current Usage; FU = Future Use Intent.

DISCUSSION OF THE FINDINGS

The purpose of this study was to understand the critical factors affecting user acceptance of free Wi-Fi public hot spots. Eight of the 13 hypotheses proposed by the model were supported.

The RA construct was represented by five questions that reflected different dimensions of the benefits of Wi-Fi. The data support RA positive effect on CU and FU, which validates H1 and H2, statistically significant at <.05 and .001, respectively. This implies that users of free Wi-Fi public hot spots consider the benefits in their decision-making process. The validation supports much of prior research on the role of RA on CU and FU (see Agarwal & Prasad, 1997). Perhaps the actualization of the benefits that initially led users to try Wi-Fi and the derived benefits and satisfaction propelled the continued use, which is acceptance.

According to the research study data, EU has a significant influence on CU, which validates H3, statistically significant at 0.05 levels. This implies that users considered the difficulty or simplicity of the use of Wi-Fi during their decision-making process. Moreover, EU has been observed to be a significant predictor of user acceptance in a wider variety of prior research studies (see, e.g., Davis 1989; Mathieson, 1991). However, contrary to prior expectation, the results indicate that EU has no statistically significant influence on FU; thus, H4 is not supported.

There is a plausible explanation for the appearance of EU as a significant factor on CU but nonsignificant influence on FU. As stated previously, the majority of free Wi-Fi users in this study are self-proclaimed experts or high intermediates in technology skills. This suggests that users are experienced in technology use. They may consider EU as a given in new products and, as such, may not necessarily consider it in their decision to continue use of Wi-Fi beyond the initial use. Moreover, most manufacturers now include Wi-Fi chip in new laptops at no extra cost, making connection in the hotspots effortless.

In regard to FC, the research results indicate a direct and positive effect on CU, which validates H5, statistically significant at <0.001. The FC construct is represented by two questions (FC1, FC2) that reflect factors in the environment that encourage behavior, including the availability of technological resources for and knowledge about Wi-Fi usage. The results indicate that users of Wi-Fi found the technological resources, technical infrastructure, and knowledge are available and favorable to the CU of Wi-Fi. However, the results indicate that the FC construct did not demonstrate significant direct effects on FU. Thus, H6 is not supported. FC proved to have a negative and slightly significant impact on FU. The nonsupport for H6 is one of the particularly unexpected findings of this study. The direction of the hypothesized relationship was reversed, meaning that with increased availability of technological resources and knowledge ofWi-Fi, there was a decrease in FU. One possible explanation is that the majority of free Wi-Fi users in this study are relatively young (under 39), highly educated, and possessing high income and vast technology use experience. It is reasonable to infer that FC may not be as important for these users as compared to others with less experience and resources.

Regarding the WT relationship to RA, the study data show a very significant direct and positive effect, which validates hypothesis H7, statistically significant at 0.0001 levels. However, contrary to expectation, the results do not support the WT effect on CU and FU; thus, H8 and H9 were not supported. The WT construct was tested by four questions that reflect transmission security and privacy protection. In the Lu et al. (2004) study, WT had an

indirect positive but moderate effect on intention to accept through RA. Since the free Wi-Fi users in this study were of vast technology use experience, highly educated with a high income it is possible that they are well aware of the nonsecured environment of free Wi-Fi. As a result, they probably narrowed their online activities to transactions of limited risks, which might have suppressed their concerns for transmission security and privacy protection. Thus, while the free Wi-Fi users in this study were concerned about transmission security and privacy protection, such concerns seem to be factored in through RA, which highlights the benefits of the use free Wi-Fi public hot spots.

According to the results, the PI construct demonstrated significant direct and positive effects on RA, which validates hypothesis H10, significant at 0.001 levels. These findings suggest that highly innovative and more technologically experienced free Wi-Fi users perceive the benefits of the technology more than the less innovative users. However, contrary to expectation, the results found that PI has no significant influence on CU; H11 was not supported. The lack of support suggests that free Wi-Fi users do not directly accept a technology solely on its individual innovativeness. However, there are plausible explanations. While there are only a few studies (see, e.g., Lee, Kim & Chung, 2002) that found PI as a direct and positive effect on CU, the majority of prior studies found PI exerts an indirect influence on CU through other constructs, such as usefulness, RA, and EU (Agarwal and Prasad, 1998).

Furthermore, in regard to the relationship of the PI construct on FU, the results also show very significant direct and positive effects, which validate hypothesis H12, statistically significant at 0.0001 levels. The findings suggest that the highly educated and innovative free Wi-Fi users do frequently explore the new technology by experimenting with it as they become proficient and master the various uses. The experience in technology increases mastery of use, which subsequently leads to a positive influence on continued use of Wi-Fi. According to Rogers (2003), it has been recognized that highly innovative individuals are active information seekers of new ideas who are able to cope with high level of uncertainty and, at the same time, develop more positive intentions towards acceptance (Rogers, 1983, 1995, 2003).

Lastly, the results demonstrated very significant positive relationship between CU and FU, which validates H13, statistically significant at 0.001. According to Agarwal and Prasad (1997), the initial use of innovation may not always be sufficient to fully derive the benefits desired from the system. Users sometimes need to institutionalize the innovation as part of regular use; this type of usage is referred to as *confirmation*. Initial use, which is a form of participation in the implementation process, can also potentially serve as a means of developing favorable perceptions for continued use (Barki & Hartwick, 1989). The actual use, in most cases, is a prerequisite for FU. These findings are not unexpected because intentions are often formed on the basis of past behavior (Triandis, 1979).

CONCLUSIONS

This study was developed to better understand the critical factors that affect the acceptance of free Wi-Fi public hot spots. Like many other technologies, the practical implementation of Wi-Fi preceded its theoretical research.

The results indicate that each critical factor, except WT, has direct and positive effects on CU and/or FU, which confirmed majority of the proposed hypotheses. Although not all the

hypotheses were confirmed, the results showed strong support for the inclusion of these variables in the model. Thus, this research study partially fills a void in free Wi-Fi hot spots acceptance and, based on the results, a number of theoretical and practical implications are suggested that may be of interest to persons involved in the development, deployment, and study of free Wi-Fi public hot spots.

This research specifically examines the integration of TAM and DIT, known to be among the most influential theories in predicting technology acceptance and innovation diffusion. The research findings add to the cumulative knowledge on technology acceptance prediction because it clarifies the critical factors influencing Wi-Fi acceptance at free public hot spots.

Specifically, the theoretical contribution of this study is the demonstration of the importance of each of the critical factors (constructs) on the acceptance of free Wi-Fi public hot spots. The results demonstrated that the acceptance of free Wi-Fi in the public hot spots is subject to the direct or indirect influences of RA, EU, FC, WT, and PI, and the affect of CU on FU. Each construct taken alone can provide insight into user perception that contributes to Wi-Fi acceptance.

Furthermore, free Wi-Fi acceptance is being influenced by RA, EU, and FC with direct and positive influence on CU, while RA, PI, and CU have positive influence on FU. Interestingly, RA is the only construct found to have direct and positive influence on both CU and FU. WT and PI demonstrated direct and positive effect on RA, and thus indirect positive effect on CU. Overall, the research model demonstrates high explanatory power in the CU and FU of free Wi-Fi in the current research setting.

In addition to the theoretical contributions, the study has important practical considerations to contribute. RA reflected different dimensions of Wi-Fi benefits. Consequently, the evaluation of these benefits is particularly influential in the initial use and ultimate acceptance of Wi-Fi. Moreover the significance of the RA in this study also has managerial implications on how organizations and governments can expand the usage of Wi-Fi public hotspots. Operators will need to highlight the tangible benefits of Wi-Fi to potential users to convince them to try it. When users try Wi-Fi and the promised benefit matches the actual experience, there will be a tendency for continued use. In addition, operators will need to demonstrate the EU of Wi-Fi to attract new users. These demonstrations must incorporate a clear demonstration of the tangible benefits of using the Wi-Fi.

The findings suggest that the momentum generated by current Wi-Fi use in free public hotspots can be relied upon to prompt continued FU. Consequently, the favorable experience of current users of Wi-Fi is instrumental in predicting FU. Therefore, operators of public Wi-Fi hotspots must ensure a pleasant experience by meeting the benefit expectation of the initial users, with hope of retaining them as permanent users.

This study was implemented in a wide variety of locations within New York City. While it is believed to comprise a solid cross section of potential use locations, there is no evidence that the New York City user or any specific location is (or is not) representative of the rest of the United States, or any other country. Thus, these findings may not apply to the full spectrum of Wi-Fi public hot spots users at all times and in all locations. This is an exploratory study of a relatively new technology. The constructs, items, and on-line survey techniques were used uniquely for this study. Furthermore, this study suffers from certain limitations that must be taken into consideration while interpreting the results. Due to self-selection of respondents, it is impossible to conclude that a random sample was obtained. The

sample size, though valid for the techniques and methods used in the analysis, could be improved further. The sample size prevented the performance of confirmatory factor analysis on items included in the perceptual scales.

The characteristics of respondents were very different than is found in the general U.S. population. For example, the overwhelming majority of this study's users held college degrees and indicated a much higher annual income as compared to the general population. Also, they reported years of experience using technology. Such differences therefore limit the applicability of the research findings to ongoing efforts to reverse what is often called "the digital divide" (where Wi-Fi is sometimes positioned as a means of equipping people who cannot afford a monthly contract fee with an Internet service provider). Despite the above limitations, it is believed that this study does provide valuable and relevant information that may be of interest to both researchers and practitioners.

Several avenues for future research are available. In this research study, the focus was on a specific new technology, wireless fidelity in the context of examining the critical factors that influence its acceptance in the free Wi-Fi public hot spots. Future research could build upon this study through a replication across different samples, different locations, and a range of new technologies.

In addition, this is a cross-sectional research study design, which provided insight into the predictors of Wi-Fi acceptance in free public hotspots on the assumption that Wi-Fi is still in infancy and has not been widely accepted and used. Additionally, a longitudinal research design could be used with multiple samples over an extended period to provide more information to correlate or extend the findings of this study. Moreover, as we begin to understand the acceptance of Wi-Fi in the free settings with quantitative research, a qualitative research study could be very useful in providing an in-depth investigation and understanding of other issues surrounding Wi-Fi acceptance.

In summary, the overall objective of this research study was to better understand the acceptance of free Wi-Fi public hot spots users. This objective was achieved by adapting a theoretical framework of several well-established initial acceptance models that helped identify and define a set of critical factors deemed to positively influence acceptance of Wi-Fi. Moreover, the analysis employed the partial least square approach to test the constructs' relationship. Overall, the results support some of the widely held beliefs about technology acceptance while lending no support for others.

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APPENDIX

RESEARCH INSTRUMEMNT

Relative Advantage (RA)

RA1:   Using the "Wireless Fidelity Public Hotspots" makes it easier to do my work.

RA2:   Using the "Wireless Fidelity Public Hotspots" helps me to accomplish my tasks more quickly.

RA3:   Using the "Wireless Fidelity Public Hotspots" improves the quality of the work I do.

RA4:   Using the "Wireless Fidelity Public Hotspots" gives me greater control over my work.

RA5:   Using the "Wireless Fidelity Public Hotspots" enhances my work effectiveness.

Ease of Use (EU)

EU1:   Learning to use the "Wireless Fidelity Public Hotspots" is easy for me.

EU2:   I find it easy to get the "Wireless Fidelity Public Hotspots" to do what I want it to do.

EU3:   My interaction with the "Wireless Fidelity Public Hotspots" is clear and understandable.

Facilitating Conditions (FC)

FC1:   I have the technological resources necessary to use the "Wireless Fidelity Public Hotspots."

FC2:   I have the knowledge necessary to use the "Wireless Fidelity Public Hotspots."

FC3*:   The "Wireless Fidelity Public Hotspots" are often not compatible with other wireless equipment I use.

FC4*:   I would know whom to contact if I had problem with the "Wireless Fidelity Public Hotspots."

Wireless Trust (WT)

WT1:   When using "Wireless Fidelity Public Hotspots," I am sure that I will be notified if personal information is collected for commercial use.

WT2:   When using "Wireless Fidelity Public Hotspots," I am sure I will be allowed to access the data collected from me.

WT3:   When using "Wireless Fidelity Public Hotspots," I am sure that I have a choice to op-in and/or opt-out on the sharing of my personal information with third parties.

WT4:   When using "Wireless Fidelity Public Hotspots," I am sure that adequate procedures exist to protect my personal information.

WT5*:   "Wireless Fidelity Public Hotspots" are reliable all the time.

Personal Innovativeness in the Domain of IT (PI)

PI1: I like to work with new information/communication technologies.

PI2: If I heard about new information/communication technology, such as Wi-Fi, I would look for ways to experiment with it.

PI3: In general, I am hesitant to try out new information technologies. (Reversed)

PI4: Among my peers, I am usually the first to try out new information/ communication technologies.

Current Usage (CU)

CU1: I use the "Wireless Fidelity Public Hotspots" at least once per week.

CU2: I use the "Wireless Fidelity Public Hotspots" whenever I am in a location where it is available.

CU3: I use the "Wireless Fidelity Public Hotspots at least three times per week.

Future Use Intention (FU)

FU1: I intend to increase my use of the "Wireless Fidelity Public Hotspots" in the future for personal and entertainment purposes.

FU2: I intend to increase my use of the "Wireless Fidelity Public Hotspots" in the future for my work purposes.

*dropped for low loading during the analysis