Impact factors model of internet adoption and use: taking the college students as an example

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Abstract

The goal of this study was to explore the impacts of factors model of internet adoption, along with discussing the impact of the variables on internet adoption time, internet use time and internet use related to study and work. This study comes up with the hypothesis based on the theoretical frameworks of diffusion of innovation, uses and gratifications, technology acceptance model. Through taking XX university?s students as sample (N = 302), the article reveal that socio-economic status significantly influences the time of internet adoption and use. The adoption time of the internet significantly influences the time of internet use. However, the adoption and time usage of the internet do not significantly influence the internet use related to study and work, as it is significantly affected by the college students? perception about the usability and ease of use of the internet.

Index terms— the adoption of the Internet?Internet use; innovation diffusion; uses and gratification; technology acceptance model.

1 INTRODUCTION

Author : School of Journalism and Communication , Jinan University, GuangZhou , 510632, China. E-mail : zengfanbin@vip.sina.com urbanization level and information technologies application on levels; these studies offer a widespread development of theoretic and empirical evidence of this particular topic.

As Internet grows stronger, researchers change their angle from original study to the time, mode and purpose of Internet use. For instance, some researchers analyzed the age difference between different users; the conclusion was that the younger population is likely to use Internet as the tool of communication and interaction as compared with the older generation. Whereas some researchers argued that people in a higher socioeconomic status use Internet more frequently as a recreational tool as well as in advanced vehicles to access information as compared with those of lower socioeconomic status. These studies reflect that different people have different ways of usages of the Internet even if they have the same Internet adoption.

However, the comprehensive understanding about the impact of Internet on different people has not been obtained through the studies of the adoption and use of the Internet respectively. People would use Internet only after they have adopted it, while the same level of Internet adoption does not mean the same level of Internet use. Therefore, a study the adoption of Internet combined with the use of it should be undertaken.

Researchers from other countries have conducted similar researches. For example, Kyung (2004) found that factor such as socioeconomic status, attitude towards Internet and social support (especially family support) have a significant impact on the Internet access of population through the data from South Korea. Such research also noted the way of Internet use in South Korean, such as using search engines, playing online games, communicating with others, shopping online, as well as social networking. However, results from other countries' research should not be applied or assumed to the ways people use Internet in China. In order to comprehend the impact of Internet on Chinese, a study of the influencing factors of Internet adaption and their relationship should be undertaken. However, the empirical research on the adoption and the use of Internet in China was relatively vague, particularly

on the model's establishment of the influencing factors of adoption and use of Internet. This particular report illustrates the research that has been undertaken to Reports also depict that young, high educated and high-income population will gradually obtain higher income and better employment opportunities through the use of Internet. On the other hand, the aged and the lower income segment will face a more difficult life without the use of Internet. The relevant research displays the impact factors of Internet's adoption between countries, including the economic development, knowledge, and opening up and communication technology import level. While the A internal impact factors include the economic growth, selecting the college students as example. The reason of using college students as the sample population is that relevant research shows that the rate for college students' users was 97.5% in 2007; seven times of the rate (12.3%) of its overall internet users which shows that the college students are the main adopters and users of the Internet. More importantly, as most college students will be working in the future, the use and impact of Internet on them will directly affect the social development in the long term. Hence they will be selected as the object in this particular study.

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From the above analysis, there are two aspects of meaning to this study: (a) Theoretically, organize theoretical models to describe the relationship between adoption and use of the Internet (including the time and the purpose); (b) Practically, the major influencing factors between Internet adoption and use found by the empirical data which can be used to improve the adoption and use of Internet, especially for college students as it is important and practically helpful to facilitate the appropriate use of Internet.

3   II.

4   THEORETICAL MODEL AND HYPOTHESIS

Most noticeably diffusion of innovation (Rogers, 1995) or uses and gratifications (Rubin, 1994), While Dutton, Rogers, & Jun (1987) explicitly underscores the causal links among diffusion, use, and social impact of home computing and thus integrates these processes into a unified framework. Figure 1 (see Appendix A) below summarizes the exogenous, intervening, and dependent variables proposed by Dutton, Rogers, and Jun (1987).

Home computing involves a three-stage process: individual socioeconomic and demographic characteristics, perceptions and attitudes towards Internet, socio-cultural setting, and hardware and software features serve. These independent variables have a direct impact on: (a) the adoption of home computers, which in turn determines; (b) the use of home computing, which in turn affects; (c) a wide range of perceptions and behavior including learning and education, family functioning, leisure activities, work from home, household routines, privacy, civil liberties, and property rights. The 11 survey-based investigations reviewed by Dutton, Rogers, and Jun (1987) have provided supporting evidence, in varying degrees, for some portions of the model. They have depicted that social economic status as well as formal education create a remarkable influence on home computers, and that capabilities growth is higher than its entertainments features' growth.

This chain process model is substantial for the model on the predictors of the adoption and use of the internet as both Internet and home computers are related as an "instrumental tool" (e.g., for work, word processing, education, home budgeting, etc.) However, this model is incomplete and inadequate, as the relations between adoptions with use of home computing and the impact of this model lacks in detailed statistical data, Moreover, though home computers have predictors on the Internet adoption and use, it cannot be used directly. Therefore, the model of the adoption and use of the Internet should be created.

With regards to the Internet adoption and use, researchers employ innovation diffusion theory and uses and gratifications as main frameworks. A study conducted by Rogers (1995), demonstrates that the diffusion theory addresses the characteristics of innovations and their adopters (Rogers, 1995) According to **??**ogers (1995, p. 11), "an innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption." He also defines "innovativeness" as "the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than the other members of a system" (p. 22). This diffusion theory suggests that adoption of technological innovations is a function of one's innovativeness, or willingness to try new products (Atkin, et al., 1998;Neuendorf, et al., 1998;Rogers, 1995) Roger's (1995) research has focused on the socioeconomic characteristics of an individual, the perceived attributes of innovations, technology cluster, situational factors, as well as the characteristics of the innovations which influenced adoption which has allowed him to comprehend the potential predictors of adopters in innovation. Zhu (2004) has further emphasized this particular study by developing a new construct of needs for new media technology, called "Weighted and Calculated Needs for New Media (WCN)". This allowed the research to fill a gap in the literature on diffusion and uses and gratifications. WCN not only integrates two mentioned theory but also elaborate mechanisms underlying the adoption and use of new media: contrasting between the conventional and the new media, and the weighting among different needs. As such, WCN predicts that individuals continuously adopt and use a different medium when the conventional media cannot satisfy their specific needs. For instance, social network websites are used in order to satisfy the needs of communication. Take the Internet for example, only when people feel the conventional media can't satisfy certain need (e.g. express personal advice of meet some friends) and Internet is able to satisfy this need, they will use the Internet. Based on this, this study uses WCN to balance people's use need of Internet.

Technology Acceptance Model (TAM) has been used to further explore impact factors as some researchers believed the innovation diffusion theory and November uses and gratifications contains lack of supporting the relations of Internet adoption and use, The Technology Acceptance Model (TAM) was developed to address this key problem surrounding the field of information technology. The primary objective was to assess why performance gains were often inhibited or obstructed by a user's unwillingness to accept new technology. It has stated that "Because of the persistence and importance of this problem explaining user acceptance has been a long-standing issue in MIS research" **??**Davis, 1989, p.319). The Technology Acceptance Model (TAM) was an adaptation to the Theory of Reasoned Action (TRA) developed in 1980 by Fishbein & Ajzen. TRA was an original theory in the sense that the researchers hypothesized that a person's intention to perform a behavior (BI) was influenced by a person's attitude (A) and subjective norm (SN). BI = A + SN.

The Technology Acceptance Model (TAM) is the information systems theory that illustrates how users accept and adapt a technology (See figure 2 in Appendix A). The model suggests that a number of factors influence their decision about how and when they will use it when presented with a new technology, notably including the following:

Perceived usefulness (PU) -This was defined by Fred Davis as "the degree to which a person believes that using a particular system would enhance his or her job performance".

Perceived ease-of-use (PEOU) -Davis defined this as "the degree to which a person believes that using a particular system would be free from effort" (Davis 1989).

TAM postulates that compute usage is determined by BI, and BI is determined by the person's attitude toward using the system, and PV, and the attitude is determined by PV and PEOU.

According to the theory above, this study attempt to test figure 3 (see Appendix A) after adjusted the variable of figure 1: Research depicts that Internet usage by college students are essentially for education and work. However, it does not illustrate other activities of students' Internet usage. According to figure 3, this study tries to answer the following questions and testing the following hypothesis: Inevitably, the key demographic variables of this convenience sample is valid (All the data in this study can be obtained from researchers after authorization) Meanwhile, the data shows that the minimum of the average online time is one hour, while the minimum Internet age of is one year. Combined with the popularity of the University Internet, it can be drawn from the sample of these students who has no difference between Internet access, which leads to be unnecessary to analyze whether they adopted Internet or not. b) Dependent variable 1. Years of Internet adoption: Measurement question is that "How long are you online until now?" Years of Internet use is a continuous variable.

2. Internet use time: Measurement question is that "How much average time do you spend online per day?" Internet use time is a continuous variable.

3. Internet use about learning and working: According to the research needs, the conduct of Internet use was focused to obtain knowledge about learning or working. Therefore, this article uses the following questions measure: As following actions, the frequency is (1 = never use, 2 = rarely used, 3 = sometimes used, 4 = more frequently used, 5 = often used). A, use e-mail to learn and study work-related information; B, participate in online, discussion and learning things about life; C, through a search engine on the Internet for research purposes in learn living-related information; D, visit relevant website, BBS that published professional knowledge and related to learning and living; E, to use blog for posting articles about study and life. For this purpose, Internet access will directly change into online behavior and learning, life, the extent of knowledge related to measurement. All items will add up to a subsidiary of another branch dependent variable, workrelated Internet use index which also belongs to a continuous variable. population's Internet skills, categories have been created: any college and above the standard level of education as standard, father or mother received any college education and higher level = 1; not received any college education= 0. (2) Living expenses per months. Living expenses per months represent the ability of consumption per months, and on behalf of the income of their household. It is a continuous variable and recorded according the actual figure **??** (3) Birthplace. As the Internet usage between city and non-urban becomes different, we set urban = 1, suburban and rural = 0 for the assignment. (4) Educational level. We set undergraduate=0, graduate students and beyond=1.

2. Weighted and Calculated Needs. According to the measurement by Zhu (2004), this study measures the variables of college students needs: need for news, need for personal information, need for work/study information, need for entertainment, need for expression, and need for relationship. In view of these needs, Measurement questions are: (a) how much the conventional media have satisfied these needs, (b) how much the Internet may satisfy these needs, and (c) how important each of the needs is. The respondents answered the first two questions on a 5-point scale and the last question by ranking the importance of the six needs. (6 is the most important). A composite score for each dimension was then calculated by multiplying the difference between Questions 1 and 2 by Question 3. For example, if a person considers his or her need for news, ranked as the most important (6), is totally unsatisfied by the old media (1) but could be fully met by the Internet (5),then the person will have a score of 24 = ([5 -1] × 6) on need for news from the Internet.

3. Perceived usefulness (PU) and Perceived ease-of-use (PEOU). (**??**)The concept of Perceived usefulness is regarded as the perception of the object which is helpful to the living. This study adopts six items to measure the degree of advantageous of Internet which is helpful to the living. The respondent is required to state clearly their attitude towards the six statements in the Likert Scales, which 1 means "totally disagree",5 means" totally agree". The six statements is as following: A, using Internet can assist in the completion rate of a task; B, using the

Internet can improve work (learning) performance; C, using Internet can strengthen my work (learning) ability; D, using Internet can improve my work (learning) efficiency, E, Internet allows things to be achieved easier, F, Internet is useful in my daily life. The measurement of Perceived usefulness is summed up by the figure of six statements. (2) The concept of Perceived ease-of-use is the attitude toward the particular system is easy to learn and use by users. This study adopts six 6 items to measure Internet which is helpful to the living and request the respondent to state clearly that the attitude toward six 6 statements in 5-Likert Scales, which 1 means "totally disagree",5 means" totally agree". The six statements is as following: A, learning how to use the Internet is an easy thing for me, B, Doing the things what I want through the Internet to is much easier, C, I understand how to use Internet, D, In my opinion, the use of network system process is very flexible, E, Grasping the skill of using the Internet is not a difficult task to me F, I think Internet is easy to use. The measurement of Perceived ease-of-use is summed up by the figure of 6 statements.

4, Personal attributes. (**??**) Gender. M = 1, female = 0. (**??**) Age (continuous variable)

IV.

5   RESULTS

In this study, as the three dependent variables are all continuous variables, independent variable is category variables (dummy variables) or continuous variables, multiple linear regression analysis of the three dependent variables has been used respectively, Years of Internet use is Independent variable when dependent variables are Internet use times and Internet use about learning and working in the model, and years of Internet use is also independent variable when dependent variable is Internet use about learning and working in the model. This can be seen in table 2 (see Appendix B).

a) Firstly?the answer of RQ1 Model 1 shows that the age variable, the living expenses per months, the Place of birth variable, Perceived ease-of-use are significant predictors to the years of Internet use, while the Betas of all independent variable are positive(B?0). It shows that the college students with older, more living expenses per months, bore in urban areas are using more years of Internet use than those contrast. Among these factors, age is easy to understand for older students are more advantageous than younger students, while the conclusion which living expenses per months and place of birth are positive predictors to the years of Internet use is the same as previous study. The variables of gender, father education, mother education, educational level have no influence on the variable of the years of Internet use. The educational level has no influence as the social status of college students does not correlate with the education level nowadays.

Model 2 shows that the living expenses per months, the Place of birth, the educational level are significant predictors to Internet use time per day, while the Betas of living expenses per months, the Place of birth are positive(B?0).It shows that college students with more living expenses per month, bore in urban areas are using more Internet use time per day than those contrast. The Beta of education level is negative(B<0), shows that the undergraduate college students are using more Internet use time per day than graduate students.

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Model 3 shows that gender, place of birth, education level, Internet's perception of the usefulness and usability are significant predictors to Internet use about learning and working. The Beta of gender is negative(B<0), suggests that the number of male students who use internet for learning and working are higher than female students., The Beta of Internet's perception of the usefulness and usability is positive(B?0), suggests that college students with more perception of the usefulness and usability are more using internet for learning and working more than However, the Internet use about learning and working does not correlate with Years of Internet use and Internet use time per day as it correlates with the variable of Internet's perception of the usefulness and usability, which suggests that if there is an increase in Internet use about learning and working, the cognition of internet among college and minus the difficulty of internet using by college students should also be increased.

V.

7   CONCLUSION AND DISCUSSION

This study proposes a variable of Weighted and Calculated Needs from Figure 3 model, however, it does not significant influence on the three dependent variables, which are not consistent with previous researches (Zhu, 2004, Zhou, 2008) In order to discuss this problem, the comprehensive value of Weighted and Calculated Needs are divided with the following results in Table 3 (see Appendix B):

According to the analysis of table 3, the average of six demand values is concluded as positive which depicts that the attitude of Internet use by college students is positive. Among these values, the opinion expression demand value is highest, the following is: the interpersonal relationship needs, recreational needs, personal information needs, working information and news information needs. This indicates among the university student group, the most important is opinion expression but not for working and learning information. Therefore, when the dependent variable is based on Internet use for learning and working, the variable of Weighted and Calculated Needs will have no influence.

From the above findings and discussions, it has been concluded that the following kinds of countermeasures to improve the Internet adoption and use of students include:

(1) To reduce the cost of using the Internet. According to the above research, socioeconomic status has a positive impact on the time of Internet adoption and use. The reason is probably that the high expense of using Internet, embarrass the students in lower socioeconomic status to better use of the Internet. To provide free or low-price computer products, it's conducive for students to overcome the economic costs while enhancing the efficiency of Internet.

(2) To provide the education of using Internet effectively, it involves two aspects: firstly, educate students' knowledge of the Internet use, such as searching for study materials, identifying misconduct uses of Internet and harmful information. In addition, necessary hardware and software knowledge should also be taught to students to enhance the facility of Internet; secondly, increase in students' confidence and positive attitudes on using the Internet. As there have been reports on students' inappropriate use of Internet from the media, it has been difficult to cultivate students' confidence and positive attitudes towards the aspects of Internet. Therefore, the university should provide relevant courses and seminars to overcome this difficulty while enhancing the facility of Internet for the students. According to the front study conclusion, enhancing Internet facility for the students will promote the use of Internet for study or work purposes. On the other hand, educating students will allow them to slowly adapt the appropriate use of Internet.

(3) Internet has become an essential tool for students in order to obtain relevant information for work and study as well as an efficient communication for social interactions. Therefore, it will provide effective resources for both teachers and students while achieving a solid basis in building socialist in the current society as the aspects of Internet grows stronger.

Inevitably, this research contains some limitation, including the sample not being selected Impact factors model of internet adoption and use: taking the college students as an example randomly enough. Therefore, the sample was able to test the hypothesis but could not deduct to the whole. In order to overcome this limitation, future research should adopt an enhanced random sample while acquiring a relatively larger sample to increase reliability and validity of the research results.

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9 APPENDIX A

Figure 1:

Figure 2:

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[Note: Enrollment in mainland China (199, 65.9%), Hong Kong's enrollment (66, 21.9%), Macao's enrollment (26, 8.7%), Taiwan's enrollment (5, 1.7%), other regional enrollment (6, 1.99%)]

Figure 3: Table 1 :

3

Figure 4: Table 3 :

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		Years of Internet use(model 1)		Internet use time per day (model 2)		Internet use about learning and working (model 3)	
		B	SE	B	SE	B	SE
constant		-4.249	2.072	0.510	2.500	12.326***	2.799
Personal attribute	Gender	-0.432	0.282	-0.089	0.339	-1.223**	0.380
	Age	0.31**	0.087	0.082	0.107	-0.048	0.120
Social status	Father education	0.263	0.354	-0.075	0.425	-0.676	0.476
	Mother education	0.142	0.398	-0.094	0.477	0.914	0.534
	living expenses per months	0.001***	0.000	0.001***	0.000	0.000	0.000
	Place of birth	1.306***	0.326	1.186***	0.401	-0.682	0.456
	Educational level	0.481	0.374	-1.257**	0.449	0.986	0.509
Weighted and Calculated Needs	The index of Weighted and Calculated Needs	-0.003	0.008	0.006	0.010	0.011	0.011
PU and PEOU	Perceived usefulness	-0.019	0.034	0.002	0.041	0.180***	0.046
	Perceived ease-of-use	0.124**	0.037	0.035	0.045	0.176**	0.050
Years of Internet use				0.142*	0.070	0.039	0.079
Internet use time per day						0.036	0.066
R Square		0.269		0.278		0.256	
Adjusted R Square		0.244		0.251		0.225	
N		302		302		302	

* p < .05; ** p < .01; *** p < .001.

	the news	information about personal living	information about working	entertainment	express personal opinion	perso... relat...
Mean	0.75	1.57	1.50	1.95	3.34	2.39
Standard deviation	3.26	3.64	3.01	4.66	6.56	4.83
Maximum value	-18	-12	-8	-15	-24	-15
Minimum value	24	18	16	24	24	24

Figure 5: Table 2 :

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