# Perceived Usefulness of Internet for Adopters and Non-adopters: An Empirical Analysis of Retired Senior Citizens in Hong Kong

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Abstract — Intense competition in Hong Kong Internet service market has resulted in increasingly sophisticated marketing practices by service providers, such as market segmentation and targeting. Senior citizens have now become a focus of attention of Internet business companies. However, perceived usefulness of Internet on part of retired senior citizens has not been studied adequately. The present study is intended to fill this important gap. Survey questionnaire was employed as the means of data collection. The main results revealed that adopters perceive Internet services significantly more useful than non-adopters. However, there is no significant difference between perceptions of male and female adopters.

*Keywords* — Internet business companies; demographic profiles; perceived usefulness; retired senior citizens; adopters and non-adopters

## I. INTRODUCTION

According to the results of the Household Survey conducted by the Hong Kong Census and Statistics Department, personal computers (PCs) and Internet connections are very common in households. About 76.4% of all domestic households in Hong Kong had their PCs connected to the Internet in 2010 [1]. Although the marketplace of Internet usage has been largely young-driven, it is becoming increasingly focused on older customers [2].

As shown in Table 1, there is a trend of continuous aging in the population of Hong Kong. The median age of the population will rise from 41.7 in 2011 to 43.4 in 2016 and 46.3 in 2026. The proportion of older persons aged 65 and over in the population is expected to increase from 13% in 2011 to 16% in 2016 and is projected to further increase to 23% in 2026 [1]. Therefore, the sheer number of seniors requires Internet service providers' attention.

Table 1: Characteristics of the Population in Hong Kong

	Mid-2011	Mid-2016	Mid-2026			
Population (Thousands)	7 071.6	7 370.5	7 937.1			
Median age	41.7	43.4	46.3			
Percentage of aged 65 and over	13%	16%	23%			

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With the recent rapid increase in number of retired senior citizens in Hong Kong and the growing demand for various Internet services by this segment of users, Internet business companies have started targeting this group of citizens so as to "catch them early" in the belief that their switching behavior is limited and that they remain loyal and use additional services as they progress through the life cycle [3]. With so many Internet business companies targeting this potential segment it is essential that market offerings meet the needs and demands of this distinct market segment. In order to formulate the strategy properly, a thorough study concerning the Internet behavior of this could-be lucrative segment is deemed to be necessary. However, there seems to be a lack of up-to-date research to indicate what the precise needs of this segment are with respect to Internet services.

## II. OBJECTIVES

In spite of the rapid adoption of Internet in Hong Kong [1], little academic investigation about the Internet behavior of retired senior citizens has been conducted in Hong Kong. In particular, many questions about the demographic profiles and perceived usefulness of retired senior citizens remain unanswered and unexplored. Assumptions made are often contradictory, as are the findings of surveys carried out to date. There is, therefore, a clear need to examine this group of people more closely, in order to build on old knowledge and develop new insights that can prove valuable in developing marketing strategies targeted at them. This study intends to fill the above stated gap in the literature. Specifically, the main objectives of this study are to:

- (1) examine if there are significant demographic differences between adopters and non-adopters of Internet service;
- (2) examine if there are significant differences regarding perceived usefulness of Internet services between adopters and non-adopters;
- (3) examine if there are significant differences regarding perceived usefulness of using Internet services between male and female adopters.

## III. LITERATURE REVIEW

The literature review focuses on reviewing the main reasons why retired senior citizens use Internet along with the issues that can impact their use of the Internet. After extensive literature review, five main reasons were identified, namely, communication, entertainment, assessing information, shopping and financing.

## A. Communication

It is clear that retired senior citizens use computers mainly for Internet access. Through the Internet, retired senior citizens have access to global information and instant communication. Today, email is a primary mode of communication [4]. Also, social networking websites encourage members to share their interests, ideas, stores, photos, music and videos with other registered users. Popular social networking websites include Facebook and MySpace. Past research has found that the reasons why senior citizens use Internet as a communication media include reconnection with others as well as increasing their mental stimulation [5], personal correspondence [6]and psychological boost from being connected [7].

### B. Entertainment

An entertainment website offers an interactive and engaging environment. Popular entertainment websites offer music, videos, sports, games, chats and more. Nowadays the most popular entertainment websites include online television, radio and games. Past research also suggested that seniors also want to visit fun websites [8].

## C. Assessing Information

The Internet is a global resource of information. Many Hong Kong government departments have informational websites providing useful information to citizens. Other organizations provide information such as public transportation schedules and products and services information online. A search engine is particularly helpful in locating web pages about certain topics or in locating specific web pages, images, videos, news and other information for which senior citizens do not know the exact web address. Thousands of search engines are available. Some are general and perform searches on any topic; others are restricted to certain subjects. Past research has found that one primary use of the Internet for senior citizens is to search specific information, including health topics [9, 10, 11, 12], medical information [10, 13], social services [14], news and current events, vacation and travel information and checking weather information [15].

## D. Shopping

A business website contains content that promotes or sells products or services. Most large businesses have a business website in Hong Kong. Many of these companies also allow users to purchase their products or services online. Past research has found that senior citizens are more likely to buy on-line than to surf the net. The most popular purchase categories are travel and financial services, books, computers and healthcare products [16].

### E. Financing

Compared to conventional business, the fact that the Internet facilitates an easy-to-use, inexpensive, speedy and round-the-clock global access to an almost unlimited amount of information, holds great potential to business as well as great convenience to consumers [3]. Many people use Internet to manage their finances. Some use Internet banking to check account balance, pay bills, manage investment and evaluate financial plans. Past research has found that the Internet can be useful to access financial information for senior citizens [10].

### IV. METHODOLOGY

### A. Design of the Research

The design of methodology of an empirical research has considerable influence upon the nature and quality of research output since it influences both validity of the results and the extent to which the results can be generalized to other settings. The principal decisions involved in the design of this research were whether to adopt exploratory approach or confirmatory approach.

- i. Exploratory research is conducted in the case of research problems or issues when there are very few or no earlier studies to which a researcher can refer for information [17].
- ii. Confirmatory research is to find out if the theory is supported by the facts. The starting point for confirmatory research is a theory that the researcher narrows the focus to increasingly specific hypotheses and observations. Hypotheses are then tested with specific empirical data in order to confirm or reject the original theory [17].

This research has adopted an exploratory approach as the aim of this study is to look for patterns and ideas of Internet behavior of retired senior citizens, rather than testing or confirming a hypothesis.

## B. Population and Sample Size

The target population includes all Hong Kong senior citizens who were aged 55 or above at the time of the survey. According to the Hong Kong Census and Statistics Department, there are 1,857,700 (27.4% of total population) persons aged 55 or above in Hong Kong, as per the Hong Kong Census and Statistics Department, 2012 [1].

In common with many studies, the sample size was determined by considerations pertaining to resources available, requirements of data analysis and the quality of the research access. Narins (1994) presented an equation which can be used to determine the suitable sample size, as shown in Equation 1 below. Although the equation is ideally used for dichotomous variables, it is also suitable for Likert scales if Py and Pn are both set at 0.5 [18].

Equation 1:

$$N = \frac{(Py)(Pn) + Std.Error^{2}}{\frac{(Py)(Pn)}{N_{1}} + Std.Error^{2}}$$

Where:

Ν the sample size required  $N_{I}$ the size of the true population the percent of response to a dichotomous variable Py and Pn (usually set at (0.5)(0.5) for the most conservative estimate) Std Error<sup>2</sup> the standard error

Since all the eleven research variables of perceived usefulness in this research are measured by Likert scales, Equation 1 was adopted to estimate the suitable sample size for this study. As recommended by Narins (1994), the standard error should be set at (0.05/1.96)2 or 0.0006507 for 95% confidence level and Py and Pn should be set at 0.5 for Likert scales. Using Equation 1, the estimated sample size of this study should be at least 386.

## C. Questionnaire Design

To facilitate adequate response, a highly structured questionnaire in Chinese was used. The final version of the questionnaire was pilot tested among 30 retired seniors one month before formal data collection in order to avoid any major problems of design and thereby help avoid difficulties of question wording, format and structure. The final survey questionnaire consisted of two sections and contained 15 questions. The first section contains 11 questions regarding perceived usefulness of using Internet. According to pilot testing, these 11 questions can be categorized into five areas communication, shopping, entertainment, financing and accessing information (see Table 2). All questions were measured using a seven-point Likert-type scale with anchors "1=strongly disagree" and "7=strongly agree". The second section contains four questions relating to respondents' demographic characteristics - gender, age, education and Internet skills.

	Table 2:	Categories	of Internet	Services
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Perceived Usefulness
Communication
Communicating via email
Communicating via chat rooms
Shopping
Shopping and/or gathering product information
Entertainment
Playing online games
Listening radio and/or music
Reading news and/or events
Watching videos
Financing
Monitoring bank accounts
Conducting investment transactions
Accessing Information
Accessing health and/or medical information
Accessing information other than health and medicine
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## D. Data Collection

Face-to-face interviews were employed as the means of data collection. Participation was voluntary. Interviews were conducted over two weeks from 1 October to 14 October 2012. In order to avoid any demographic variations the survey was conducted in different districts in Hong Kong, such as Times Square (a major shopping mall in Hong Kong Island), Langham Place (a major shopping mall in Kowloon Peninsula) and New Town Plaza (a major shopping mall in New Territories). University students majoring in marketing studies were employed and trained as helpers to conduct interviews with the target respondents. Training provided to helpers included the ability to fully understand the questionnaire context, to own communication competence, to manage interview skills and to deliver efficiency. Three groups of helpers (each group had three helpers) were assigned the task. They stood aside at the entrances of Times Square, Langham Place and New Town Plaza. When retired senior citizens left the malls the helpers politely asked them whether they would accept a questionnaire survey for 5-7 minutes for academic research purpose. A screening question was then asked, such as "Are you aged 55 or above and retired?" and "Are you currently living in Hong Kong?" These questions were designed to ensure that the select senior citizens were appropriate respondents for the survey.

## V. RESULTS

## A. Response Rate and Non-response Bias

After two weeks of data collection, 750 responses were received. The number of responses was considered sufficient for data analysis. A common problem in all field surveys is non-response bias. In order to assess whether non-response bias was present, interviews were undertaken with an additional 50 retired senior citizens people randomly selected at Hung Hom Railway Station on 16 October 2012. The brief survey collected basic demographic details together with information relating to all eleven research variables. Chi-square goodness-of-fit test and independent-sample T-test were used to test demographic and perceptual differences between the 750 respondents from three shopping malls and the 50 respondents from Hung Hom Railway Station. The overall results indicated that demographic and research variables were not significantly different in three shopping malls and Hung Hom Railway Station (p<0.01). The overall findings imply that non-response bias is not have a significant issue in the main research findings.

## B. Demographic Profile of Adopters and Non-adopters

As shown in Table 3, 51.9% (n=389) of respondents claimed they were adopters, while 48.1% said they were non-adopters (n=361). Demographic profiles in terms of gender, age, education and Internet skills were investigated with a Chi-square test in order to find out if there were significant differences between adopters and non-adopters. The results show that education and Internet skills were perceived to be significantly different between adopter and non-adopters (p<0.01). The results clearly show that adopters are more educated and have more Internet skills than non-adopters. There are no significant differences between adopters' and non-adopters' gender and age. Adopters were equally distributed in different genders and age groups and so were non-adopters.

Table 3: Demographic Profiles of Adopters and Non-adopters

	Adopters	No-adopters	Chi-	df	P-
	%	%	Square		value
	(N=389)	(N=361)			
Gender			0.865	1	0.352
Male	50.3	49.7			
Female	53.7	46.3			
Age			9.797	5	0.081
Less than 55	57.5	42.5			
56-60-	46.7	53.3			
61-65	47.5	52.5			
66-70	60.2	39.8			
71-75	47.8	52.2			
More than 75	60.9	39.9			
Education			79.293	4	0.000
Primary school	28.8	71.2			
Form 5 or below	38.9	61.1			
Form 7	51.4	48.6			
Diploma or equivalent	60.5	39.5			
Undergraduate degree	74.4	25.6			
Internet Skills			61.613	4	0.000
Cannot use	33.6	66.4			
Adequate skills	41.2	58.8			
Satisfactory skills	48.9	51.1			
Good skills	58.3	41.7			
Excellent skills	73.9	26.1			

## C. Perceived Usefulness between Adopters and Non-adopters

In order to test if there are significant differences regarding the eleven items of perceived usefulness between adopters and non-adopters, independent-samples t-tests were conducted. Independent-samples t-tests are used to determine the likelihood that two samples (adopters and non-adopters) came from populations that have the same mean. Since the two samples were drawn from the same population, the difference between these samples was expected to be equal to 0 [19]. Table 4 indicates that only one item, shopping and/or gathering product information, was not perceived to be significantly different between adopters and non-adopters (p>0.05). Overall, the findings clearly indicate that perceptions of usefulness of using Internet was significantly different between adopters and non-adopters.

## D. Perceived Usefulness between Male and Female Adopters

Mean scores and ranks of retired senior citizens who adopted Internet on all the eleven items of perceived usefulness are shown in Table 5 As most perceived usefulness scores were larger than the central point of 4 in a seven-point Likert-type scale, it is obvious that respondents generally perceived Internet usage as quite useful and this applies to both male and female groups.

For all respondents, the three most useful applications of Internet were watching videos, reading news and/or events and listening to radio and/or music. On the other hand, the three least popular usage of the Internet were playing online games, monitoring bank accounts and conducting investment transactions.

In order to further test the perceptual differences in the eleven items between male and female adopters, an independent-samples t-tests was conducted. Table 4 indicates that usefulness of all the eleven items was perceived to be similar by male and female adopters (p<0.01).

Table 6 outlines the three most and least perceived usefulness between male and female adopters. If we analyze the findings in terms of gender, only one perceived usefulness, watching videos, was among the top three usages for both sexes, while the least perceived usefulness areas were identical for the whole sample.

Table 4: Independent-samples t-tests between Adopters and Non-adopters

Items	Adopters	Mean	T-test for Equality of Means			
				(Equal var	riances assumed)	
			t-value	df	<i>p</i> -value	Mean
					(2-tailed)	Difference
Communicating via email	Adopters	4.36	3.289	748	0.001	0.368
	Non-adopters	3.99				
Communicating via chat rooms	Adopters	4.39	2.779	748	0.006	0.305
	Non-adopters	4.09				
Accessing information other than health and medicine	Adopters	4.32	2.802	748	0.005	0.296
	Non-adopters	4.03				
Conducting investment transactions	Adopters	3.96	4.748	748	0.000	0.513
	Non-adopters	3.44				
Monitoring bank accounts	Adopters	4.01	5.085	748	0.000	0.542
	Non-adopters	3.47				
Playing online games	Adopters	4.05	5.522	748	0.000	0.583
	Non-adopters	3.47				
Watching videos	Adopters	4.52	2.880	748	0.004	0.312
	Non-adopters	4.21				
Reading news and/or events	Adopters	4.47	3.128	748	0.002	0.329
	Non-adopters	4.14				
Listening radio and/or music	Adopters	4.42	3.729	748	0.000	0.430
	Non-adopters	3.99				
Accessing health and/or medical information	Adopters	4.30	2.157	748	0.031	0.248
-	Non-adopters	4.05				
Shopping and/or gathering product information	Adopters	4.25	1.785	748	0.075	0.208
	Non-adopters	4.04				

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## Table 5: Ranking of Perceived Usefulness between Male and Female Adopters

	All		Ma	le	Femal	e	T-test for Equality of		
							Means		
	(n = 3	389)	(n = 198)		(n = 19	(n = 191)		(Equal variances assumed)	
	Mean	Rank	Mean	Rank	Mean	Rank	t-test	Sig. (2-tailed)	
Watching videos	4.52	1	4.38	4	4.66	1	-2.030	0.043	
Reading news and/or events	4.47	2	4.40	3	4.54	2	-0.973	0.331	
Listening radio and/or music	4.42	3	4.31	6	4.53	3	-1.394	0.164	
Communicating via chat rooms	4.39	4	4.51	1	4.27	8	1.602	0.110	
Communicating via email	4.36	5	4.42	2	4.29	6	0.843	0.400	
Accessing information other than health and medicine	4.32	6	4.37	5	4.28	7	0.639	0.523	
Accessing health and/or medical information	4.30	7	4.27	7	4.34	4	-0.431	0.667	
Shopping and/or gathering product information	4.25	8	4.18	8	4.32	5	-0.913	0.362	
Playing online games	4.05	9	4.06	9	4.04	10	0.133	0.894	
Monitoring bank accounts	4.01	10	3.96	10	4.07	9	-0.789	0.431	
Conducting investment transactions	3.96	11	3.93	11	3.98	11	-0.305	0.761	

## Table 6: The Three Most and Least Perceived Usefulness between Male and Female Adopters

All Sample	Male	Female
The three most beneficial factors	The three most beneficial factors	The three most beneficial factors
Watching videos	Communicating via chat rooms	Watching videos
Reading news and/or events	Communicating via email	Reading news and/or events
Listening radio and/or music	Reading news and/or events	Listening radio and/or music
The three least beneficial factors	The three least beneficial factors	The three least beneficial factors
Playing online games	Playing online games	Playing online games
Monitoring bank accounts	Monitoring bank accounts	Monitoring bank accounts
Conducting investment transactions	Conducting investment transactions	Conducting investment transactions

## VI. CONCLUSIONS

### A. Implications

This research has identified certain significant implications for researchers and the Internet business industry. With recent technological developments, computers have become more affordable and access to the Internet is more readily available. As a result, the use of Internet has grown dramatically in the world. This change has given customers more power to choose and switch to alternative Internet business companies [3]. Therefore, surveying retired senior citizens' perceptions relating to their perceived usefulness of Internet services will provide both researchers and banks with information valuable in retaining customers.

The important implications of this study can be viewed from two dimensions: theoretical contributions and practical implications. Theoretically, this study fills an important gap in the literature, which is, exploring demographic profiles and perceived usefulness between adopters and non-adopters and between male and female adopters in the lucrative retired seniors' market in Hong Kong. Therefore, the findings of this study can add to the existing mass of literature and can serve as a starting point on which future studies can be built. On the practical side, this study can help Internet business decision makers to identify the major factors that may affect perceptions of usefulness among retired senior citizens. Such information should help managements of Internet business companies devise appropriate marketing strategies for reaching and attracting retired seniors.

## B. Discussions of Findings

The main findings of this study are threefold. First, the results show that in terms of education and Internet skills there are significant differences between adopters and non-adopters (see Table 3). Obviously, it is quite impossible to improve the education level of retired seniors. However, government and Internet business companies can constantly launch some courses free or at very low fees in order to let retired seniors have opportunities to realize the usefulness of different Internet services.

Second, perceptions of usefulness of adopters and non-adopters are different in the case of ten out of eleven perceived usages. These differences might be due to the fact that the non-adopters did not realize the usefulness of Internet services. Again, promotional campaigns from government and Internet business companies are necessary to improve the perception of usefulness of Internet among non-adopters. During the pilot testing, a number of respondents expressed that they are very enthusiastic members of online communities but they need help from family and classes. In addition, because they have a large amount of leisure time, and a need to communicate with others, especially their grandchildren, they are willing to learn and embrace the Internet and all it has to offer with excitement.

Third, several studies in extant research on various factors that influence Internet usage tend to treat users as homogeneous entities, ignoring gender [20].Therefore, whether there are significant differences regarding the perceived usefulness for both genders was also examined. The results revealed that although it can be said that the ranking of perceived usefulness are different between male and female segments (see Table 5), independent-samples t-tests revealed that there are no significant differences in terms of mean values of perceived usefulness between male and female segments. The findings indicate that the perceived usefulness of using Internet services is similar for both genders

### C. Limitations and Future Research

This study represents one of the very few empirical inquiries into a phenomenon of great managerial and academic interest. However, a number of limitations do qualify the findings of this study. First, it would be interesting to examine the applicability of the findings by replicating similar studies in other countries with similar levels of information technology infrastructure such as Singapore and Japan in order to strengthen the generalizability of the findings. Second, there is need to analyze factors affecting the perceived usefulness of Internet in different segments of retired seniors. Possible factors include Internet training, availability of Internet access and security concerns. Finally, this study examined one type of Internet users, that is, the senior citizens. Although this segment of the market is important to study, other segments such as retired disabled senior citizens, who may have different perceptions of usefulness, should not be ignored.

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