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INFORMATION TECHNOLOGY USAGE AND QUALITY OF LIFE AMONG OLDER PERSONS: A QUALITATIVE STUDY IN HONG KONG

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MPHIL

LINGNAN UNIVERSITY

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INFORMATION TECHNOLOGY USAGE AND QUALITY OF LIFE AMONG OLDER PERSONS: A QUALITATIVE STUDY IN HONG KONG

by
CHAN Wing Fung, Chad

A thesis
submitted in partial fulfillment
of the requirements for the Degree of
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ABSTRACT

INFORMATION TECHNOLOGY USAGE AND QUALITY OF LIFE
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Master of Philosophy

INTRODUCTION: In this high technology era, rapid developments in information technology (IT) have the potential to transform the lives of older persons. Ageing tends to be associated with reductions in health status and resources, which can be potentially affect the adoption of new technology. However, the role of IT is becoming ever more influential in our daily living though the digital services such as email, e-banking and e-shopping. Therefore, older persons inevitably come across various IT-related products, especially computers and the Internet, in their everyday lives. Moreover, the quality of life of older persons is important and has been identified as an important aspect of successful ageing. This study will explore the relationships between IT usage and the quality of life amongst older persons in order to determine the main reasons why they do or do not use IT and how they learned about IT. The research findings will contribute to the improvement of understanding of older persons' well being and attainment of successful ageing, especially in a rapidly ageing society such as Hong Kong.

METHODS: The study employed a combination of research methods. A sample of twelve older persons was invited to participate in two focus group discussions (FGD). Nine in-depth interviews with key informants were then conducted with respondents from both professional and older persons' groups. A face-to face survey was conducted amongst 96 respondents who were recruited from nine neighbourhood elderly centres (NECs) in four districts of Hong Kong. A questionnaire was designed to investigate IT usage behaviour and quality of life among older persons. The questionnaire had four main parts: 1) IT usage and behaviour, 2) Intentions of using IT, 3) IT and quality of life, and 4) Personal profiles of respondents.

RESULTS AND DISCUSSION: The results showed that major reasons for IT usage among older persons were perceived usefulness, social trends, maintenance of family connections, self-enhancement and leisure activities. Both professionals and older persons held positive attitudes towards IT usage among older persons, as they mentioned that IT usage is likely to be positively related to older persons' quality of

life. The survey results supported the suggestion that IT usage is indeed related positively significantly to quality of life. The results also suggest that public policies and practices related to IT learning and support and free wireless services should be enhanced to enhance the social connectedness and quality of life amongst older persons.

DECLARATION

I declare that this is an original work based primarily on my own research, and I warrant that all citations of previous research, published or unpublished, have been duly acknowledged.

_____

(CHAN Wing Fung, Chad)

September 2008

CERTIFICATION OF APPROVAL OF THESIS

INFORMATION TECHNOLOGY USAGE AND QUALITY OF LIFE AMONG OLDER PERSONS: A QUALITATIVE STUDY IN HONG KONG

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List of Abbreviations

FGDs	Focus Group Discussions
HKSAR	Hong Kong Special Administrative Region
IDT	Innovation Diffusion Theory
IT	Information Technology
KIs	Key Informants
OP	Older Persons
TAM	Technology Acceptance Model
TPB	Theory of Planned Behavior
TRA	Theory of Reasoned Action
WHOQOL	World Health Organization Quality of Life

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Chapter 1: Introduction

In this high-technology era, rapid developments in information technology (IT) may have transformed the lives of older persons. Although some people feel that ageing tends to be associated with the deterioration of health, a reduction in resources, and omissions, especially in areas such as the adoption of new technology, the influence of IT on older persons should not be neglected. As the role of IT is becoming increasingly influential in our daily lives through digital services such as email, e-banking and e-shopping, older persons will inevitably come into contact with various IT-related products, especially computers and the Internet, almost daily.

IT usage may be beneficial to older persons in many ways. It could help them to remain active and live independently, which could enhance their quality of life. Indeed, older persons' quality of life is a vital aspect of successful ageing. This study will explore the relationships between IT usage and quality of life amongst older persons. It will also identify any barriers and potential barriers to IT usage amongst older persons. IT's impact upon older persons' perspectives will also be investigated. The research findings have the potential ultimately to contribute to the improvement of older persons' well-being through increasing IT adoption amongst older persons.

1.1 Rationale for the study

This research focuses upon two notable social trends in Hong Kong: population ageing and the penetration of IT in our society. Hong Kong is a good case study for investigating the impact of IT on older persons' daily lives because the government of the Hong Kong Special Administrative Region (HKSAR) launched an IT Awareness Programme for the Elderly in 2000. Indeed, Hong Kong is also one of the most rapidly ageing parts of the Asia-Pacific region (Phillips, 2000; Kinsella and Phillips, 2005; ESCAP, 2007). Ageing in Hong Kong and public policy towards older persons provide a favourable environment for the investigation of the impact of IT on older persons' daily lives.

1.1.1 Why older persons?

In Hong Kong, like many other developed countries such as Japan, the United States and United Kingdom, the increasing proportion of older persons has been duly noted (Phillips, 2000; Kinsella and Phillips, 2005; ESCAP, 2007). The proportion of the older population has continued to grow as a result of fertility declines and an increase in longevity (life expectancy). According to the Hong Kong Census and Statistics Department (2007a, 2008), the median age of Hong Kong's population rose from 23 in 1961 to 39.9 in 2007; during the same period, the percentage of the persons aged 65 and over increased sharply from 2.8% to 12.6%.

In the future, the proportion of the population aged 65 and over is projected to rise markedly from 12% in 2006 to 26% in 2036 (Hong Kong Planning Department, 2007). This means that, in less than 30 years, almost one out of every four people will be aged 65 and over. The issue of ageing has captured public attention, and requires reorientation of resources on the part of government and our society, particularly in health care and welfare services. For example, the HKSAR government has launched a programme of health care reform in the 2000s to sustain quality health care services. It would also like to increase the working age population (aged between 15 and 64) in relation to the elderly population (aged 65 or above) and increase public health expenditure over the next 20 years (Hong Kong Food and Health Bureau, 2008).

As population ageing is apparently inevitable, it is crucial for social gerontologists and those interested in social policy generally to investigate how to help older persons to live independently and healthily. It is therefore necessary to study the needs of older persons and seek a positive solution to the issue of ageing in our society, to appreciate older persons' contributions to our society, and to help them achieve successful ageing. IT usage amongst older persons may be one solution that helps older persons to adapt to a modern information society.

1.1.2 Why research older persons and IT?

Rapid developments in technology have transformed the lives of older persons in contemporary society. Nevertheless, the use of IT amongst older persons is much less common than amongst younger people. According to the Hong Kong Census and Statistics Department (2007b), persons aged 10–14 had the highest rate of Personal Computer (PC) use in the preceding 12 months (99.6%), whilst persons aged 15–24 and 25–34 had a rate of 98.9% and 92.6%, respectively. The lowest rates were recorded for older persons; 6.7% of those aged 65 and over had used a PC in the preceding 12 months.

However, across the globe, more and more older persons are interacting with IT in their daily lives. In the USA, for example, it is common for older persons to use IT. In 2002, 40% and 35% of people over the age of 65 used computers and accessed the Internet, respectively (US Department of Commerce, 2002). In addition, SeniorWatch (2002) reported significant growth in the use of IT by older persons (aged 50+) in several nations; for example, older Internet users accounted for 32.1% of the UK's online population. A high percentage of older Internet users was also found in Sweden and Denmark, with 47.1% and 46.4%, respectively (SeniorWatch, 2002).

In Hong Kong, more and more older persons have begun to use IT in their daily lives. According to the Census and Statistics Department (2002, 2007b), the percentage of persons aged 65 and over who had used a PC in the 12 months preceding the survey rapidly increased from 0.6% in 2000 to 6.7% in 2007. In particular, there was a rapid increase from 0.2% in 2000 to 5.8% in 2007 of those aged 65 and over who had used the Internet in the preceding 12 months (Census and Statistics Department, 2002, 2007b). This demonstrates that more and more older persons are using IT in their daily lives, it is interesting to investigate IT's impact on older persons. (The relationships between IT usage and older persons' well-being, specifically their quality of life, will be discussed in detail in Chapter 2.)

1.1.3 Why research IT and quality of life amongst older persons?

Quality of life is important for older persons' daily living (see Chapter 2). IT has become important in the everyday life of older persons, especially in Hong Kong, where there is a high rate of IT penetration into daily living. The high rate of IT penetration not only influences the young, but also older persons, through the use of email communication, e-banking, e-shopping, online library search systems, and online passport renewal. It is now difficult for older persons to avoid encounters with IT, so it is essential to explore the influence of IT on older persons' quality of life.

For example, can IT potentially improve older persons' quality of life by increasing their communication with their families and other parties? Or, can IT also potentially decrease older persons' quality of life by increasing their stress in trying to use and learn IT?

1.1.4 Why Hong Kong as a case study?

In Hong Kong there is a mix of Eastern and Western cultures; there is both a high IT penetration rate and an ageing population. The HKSAR government aims to promote IT usage amongst older persons in order to equip them with IT knowledge in modern society. The IT Awareness Programme for the Elderly was jointly organised by the government's IT Services Department and Social Welfare Department in 2000. Now, several years on, more and more older persons interact with IT in their daily lives. Therefore, it is worthwhile investigating the relationships between IT usage and quality of life amongst older persons in Hong Kong, in order to help older persons to adapt to a modern information society. However, this research does not evaluate the government's projects as there are too many influences upon the development of IT for older persons in Hong Kong. However, the combination of the above factors makes Hong Kong in many ways an ideal case study for this research topic.

1.2 Objectives and research questions

This research has three main objectives:

- To determine the major reasons why older persons use or do not use IT.
- To understand how older persons learn about and use IT.
- To explore the relationships between IT usage and quality of life amongst older persons.

Before investigating IT usage amongst older persons, it is important to understand the meaning of IT from an older person's perspective. Therefore, the first research question is as follows:

1) What is the meaning of IT amongst older persons?

This research aims to determine the major reasons for IT usage amongst older persons and to understand how older persons learn about and use IT. The second research question is as follows:

2) For what reasons do older persons accept or not accept the use of IT, and what barriers do they meet if they attempt to use IT?

Finally, this research aims to explore the relationships between IT usage and the quality of life of older persons:

3) To what extent does IT usage influence quality of life?

1.3 Significance of the study

There has been relatively little research to date on the impact of IT usage on older persons' quality of life in Hong Kong, as outlined in Chapter 2 (literature review). Although some studies were found that investigate IT acceptance amongst older persons (e.g. Chan et al., 2003; Lam and Lee, 2005) and their quality of life (e.g. Leung et al., 1997; Chan et al., 2004; Cheng et al.; Lee, 2005) separately, no research was found that focused on the relationship between IT usage amongst older persons and their quality of life in Hong Kong. Thus, this study will help to fill this gap in the research and develop a new perspective in both social gerontology and gerotechnology research. In social gerontology, this research is innovative in that it studies specific social change that impacts upon older persons' daily lives. To date, gerontological research in Hong Kong has focused more on health care and life-long learning. Research in social gerotechnology has so far developed mainly in Western countries and remains less developed in Asian countries, except perhaps Japan and Singapore.

Secondly, this research can help to identify and understand the major reasons why older persons learn and use IT. This could help to outline potential ways to encourage

older persons to use IT in order to enhance their quality of life.

Lastly, this research will try to identify barriers, both perceived and real, to the use of IT, and the perceived benefits of using IT. This information could be useful in developing guidelines and recommendations for the HKSAR government at social and public policy levels.

Chapter 2: Literature Review

The development of IT has created a new information age. This is not only important to teenagers and working adults, but also older persons. Even though older persons may sometimes seem to adopt to change slowly, many are also interested in advanced technology and modern developments. Therefore, many governments are investing in the promotion of IT usage amongst their citizens, especially young and older persons, in order to create a society without barriers. However, there is little research on the impact of IT on older persons. The following five sections outline previous research on this topic: the crucial concepts; global ageing and IT usage trends; ageing and IT situations in Hong Kong; a review of studies on IT and ageing; and IT acceptance theories and models.

2.1 Conceptualisation

There are three main concepts in this research: information technology (IT), quality of life, and older persons.

2.1.1 Information technology (IT)

The wide definition of technology is a tool, technique or cultural force to help solve problems and fulfil needs (Marshall, 1998). This definition was adopted in this

research, referring to the use of IT as a tool to solve problems.

IT increasingly impacts upon older persons' daily lives, so a new scientific discipline called gerontechnology has been developed in order to better understand the broad issues related to technology and ageing (Charness et al., 2001). Bouma et al. (2004, p. 1581) defined gerontechnology as "the study of technology and ageing for ensuring an optimal technical environment for older adults".

Technology has the potential to improve older persons' lives in many ways: to assist with health care (health care technology); to enable older persons to remain functionally independent (assistive technology); and to acquire information and communicate with family and friends (information technology). This research focuses upon information technology (IT), because the rapid development of IT has increased older persons' daily interaction with IT in this information age.

The concepts, methods and applications of IT are affected by social change, therefore it is difficult to achieve a universally accepted definition of IT although an official local definition is as follows:

> "Information technology (IT) encompasses automated means of originating, processing, storing and communicating information, and

> covers recording devices, communications networks, computer systems (including hardware and software components and data) and other electronic devices." (Hong Kong Monetary Authority, 2003, p. 2)

In most developed regions, the majority of individuals and households use computers, the Internet and mobile phones in their daily lives. In the USA, these applications are referred to as IT, whilst in Europe the phrase information and communication technologies (ICT) is more commonly used (Brynin and Kraut, 2006), with the C in ICT specifically referring to the communication of information by electronic means. The Hong Kong Special Administrative Region (HKSAR) government has endeavoured to promote older persons' use of IT through the IT Awareness Programme for the Elderly since 2000. Thus, older persons in Hong Kong are more familiar with the term IT than ICT, so the term IT was adopted in this research.

The wide definition of IT led to potential difficulty in older persons understanding this research, as they have less experience with IT than younger people. It was therefore worthwhile to reconstruct the meaning of IT from an older person's perspective in order to understand their needs more deeply.

2.1.2 Quality of life

Quality of life is not a tangible concept and different research communities have their

own definitions and conceptualisations. Most definitions of quality of life are broad. For example, Lawton (1991, p. 6) described quality of life as a "multidimensional evaluation, by both intra-personal and socio-economic criteria, of the personal-environment system of the individual". Gilhooly et al. (2005, p. 26) described quality of life as a "multi-dimensional collection of objective and subjective areas of life, the parts of which can affect each other, as well as the sum". Lee (2005, p. 340) adopted the definition of quality of life from George and Bearon in 1980 that quality of life is composed of four central dimensions: subjective evaluations (life satisfaction and self-esteem) and objective conditions (general health and socio-economic status).

Some academics have aimed to narrow the concept of quality of life in some specific respects. For example, health-related quality of life focuses upon health care interventions (Brown et al., 2008), and disease-specific quality of life focuses upon specific illnesses (Philip et al., 2005) such as dementia (Brod et al., 2000).

In the West, researchers have been systematically investigating older persons' quality of life for a long period (George and Bearon, 1980; Farquhar, 1995; Hwang et al., 2003; Gott and Hinchliff, 2003). However, researchers in Hong Kong have only relatively recently stated to carry out rigorous studies on this topic (Leung et al.,

1997; Chan et al., 2004; Cheng et al.; Lee, 2005).

In addition, researchers are interesting in developing not only the concept of quality of life, but also the measurements of quality of life. Several measurements were developed to measure quality of life in different situations and assumptions. Table 2.1 shows the common measurements of quality of life from different studies, such as WHOQoL-100.

Table 2.1: Common measurements of quality of life

Measurements	**Domains and Facets**
WHOQoL-100 (WHOQoL Group, 1995, 1998)	100 items, 24 facets (4 items per facet + 4 general items), 6 broad domains (physical health, psychological, level of independence, social relations, environment, spirituality) and 4 domains (physical, psychological, social relationship and environment)
WHOQoL-BREF (WHOQoL Group, 1998, 2004)	26 items, 24 facets (1 item per facet + 2 general items), 4 domains (physical, psychological, social relationship and environment)
LEIPAD (De Leo et al., 1998a, 1998b)	49 items, 31 form 7 core subscales (physical function, self-care, depression and anxiety, cognitive functioning, social functioning, sexual functioning, and life satisfaction) and 18 items form moderators
CASP-19 (Higgs et al., 2003)	19 items, 4 domains (control, autonomy, self-realisation, and pleasure)
HKQoLOCP (Chan et al., 2004)	21 items, 6 domains (subjective well-being, health, interpersonal relationship, achievement-recognition, finance, and living conditions)

Having reviewed different types of quality of life and its measurement, it became clear that there have been no recent studies of IT-related quality of life. Therefore, a broad and well-established concept of quality of life was adopted in order to provide a more comprehensive perspective on older persons' daily lives.

According to the World Health Organization Quality of Life (WHOQoL) Group (1997), quality of life (QoL) takes into account individual perception and relationship to the environment. This was useful in this research since it does not focus solely upon health. Moreover, WHOQoL is a systematic and reliable measurement of QoL, as it has been translated into 20 different languages and has been widely adopted in different related research on older persons (Hwang et al., 2003; Gott and Hinchliff, 2003). The subjective concept of quality of life is useful in assessing older person's quality of life, and this has been the dominant approach in studying quality of life from older persons' perceptions (Farquhar, 1995). Therefore, the WHOQoL (1997, p. 1) definition was adopted in this research: "Quality of life is defined as an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to goals, expectations, standards and concerns."

The WHOQoL provides a wide range of measurement in different languages and with different concerns, such as WHOQoL-HIV and WHOQoL-SRPB (SRPB stands for spirituality, religiousness and personal beliefs) (World Health Organization, 2008). The WHOQoL-100 consists of 24 facets grouped into six domains (physical, psychological, independence, social, environmental, religious/spiritual), whilst the WHOQoL-BREF includes 24 facets grouped into four domains (physical,

psychological, social relationship and environment).

Some domains of the WHOQoL may not be directly relevant to the relationships between IT and older persons' quality of life because of the specific nature of IT. It is therefore necessary to explore the concept of IT-related quality of life from an older person's perspective.

2.1.3 Older persons

According to the Hong Kong Social Welfare Department (2008), "older persons" refers to people aged 60 or above. This is because most elderly services are targeted towards people of this age. Although there are other definitions of older persons – for example, Hong Kong residents aged 65 or over are eligible for the Senior Citizen Card and Social Security Allowance (SSA) scheme – this research focuses upon older persons aged 60 or above who are members of an elderly centre and who participated in computer courses.

2.2 Global ageing and IT trends

The ageing of the population and a high IT penetration rate are notable global trends. These trends for selected regions of Asia, Europe and North America are shown in Tables 2.2 and 2.3, compiled using information from the CIA (the independent US

government agency responsible for providing national security information to policymakers), Internet World Stats (an international website providing up-to-date world Internet usage, population statistics and market research data), and the US Census Bureau (an official statistics department providing quality data about the US).

From Tables 2.2 and 2.3 it is clear that the challenge of ageing is faced in many regions of the world. In almost all regions included, at least one in every four people will be aged 65 and over in less than 30 years. Population ageing is pervasive and enduring (United Nations Population Division, 2002), with unprecedented impacts. Trends of IT penetration were also found in the selected regions, demonstrating potential opportunities for older persons to use IT in their daily lives. IT usage may be one way to empower older persons to continue to contribute to the new information society.

Table 2.2: Ageing and IT trends in selected regions of Asia

	China	Hong Kong	Japan	Korea, South	Singapore	Taiwan
Population in 2007 (millions)	1330.04	7.02	127.29	48.46	4.61	22.92
Median age in 2007	33.6	41.7	43.8	36.1	38.4	36
% of total population aged 65 and older in 2007	8	13	21.6	9.9	8.7	10.5
Estimated % of total population aged 65 and older in 2035	19.9	33.0	31.7	27.7	29.3	26.2
Penetration of Internet use in 2007 (% of total population)	15.9	69.9	68.7	71.2	53.5	67.4
Internet users in 2007 (millions)	210.00	4.88	87.54	34.91	2.42	15.40

Sources: Central Intelligence Agency, 2008; Internet World Stats, 2008; US Census Bureau, 2008

Table 2.3: Ageing and IT trends in selected regions of Europe and North America

	Canada	France	Germany	Italy	United Kingdom	United States
Population in 2007 (millions)	33.21	64.06	82.37	58.16	60.94	303.82
Median age in 2007	40.1	39.2	43.4	42.9	39.9	36.7
% of total population aged 65 and older in 2007	14.9	16.3	20	20	16	12.7
Estimated % of total population aged 65 and older in 2035	25.8	24.1	29.9	30.0	24.3	20.3
Penetration of Internet use in 2007 (% of total population)	65.9	54.7	64.6	57.0	66.4	71.4
Internet users in 2007 (millions)	22.00	34.85	53.24	33.14	40.36	215.09

Sources: Central Intelligence Agency, 2008; Internet World Stats, 2008; US Census Bureau, 2008

2.3 The ageing and IT situation in Hong Kong

Having reviewed the global ageing and IT trends, these trends are now examined for Hong Kong. Ageing cohorts were considered in the HKSAR government's 1997 policy address because the ageing population was considered to be one of the

challenges and opportunities for Hong Kong society. This demographic change was found in the increasing median age, the proportion of the population aged 65 and over, and the decreasing proportion of the population aged under 15 (Table 2.4).

According to the Hong Kong Census and Statistics Department (2007c), the proportion of older persons aged 65 and over is projected to increase from 12.4% in 2006 to 26.4% in 2036. In contrast, the proportion of children aged under 15 is projected to decrease from 13.7% in 2006 to 11.6% in 2036. The median age is projected to rise from 39.6 in 2006 to 46.1 in 2036. These figures highlight the ageing population and increasing dependency ratio.

Table 2.4: Hong Kong population, 1996–2036

	Year	Population (000s)	Older persons (65 and over) (000s)	% of older persons	Children (under 15) (000s)	% of children
Actual	1996	6 217.6	629.6	10.1	1 151.0	18.5%
	2006	6 864.3	852.8	12.4	939.7	13.7%
Projected	2016	7 450.0	1 129.6	15.1	883.2	11.9%
	2026	8 094.0	1 783.5	21.9	1 004.2	12.4%
	2036	8 570.2	2 261.0	26.4	989.5	11.6%

Sources: Hong Kong Census and Statistics Department, 2008 ;
Hong Kong Census and Statistics Department, 2007c

The increasing elderly dependency ratio is another indicator of the problem of an ageing population (Table 2.5). The dependency ratio is defined as "the number of persons aged 65 and over per 1000 persons aged between 15 and 64 (working population)" (Hong Kong Census and Statistics Department, 2008, p. 7). Table 2.5 shows that the elderly dependency ratio will increase from 168 in 2006 to 425 in 2036. This means that more than double the proportion of older persons will rely upon the working population in 2036.

It is widely believed that an increasing elderly dependency ratio will challenge the health care services, especially long-term care services, therefore the Hong Kong Food and Health Bureau (2008) is promoting the need for health care reform. However, some doubt the validity of reliance upon dependency ratios as an indicator, as it is only one aspect of demographic ageing (Phillips, 2000).

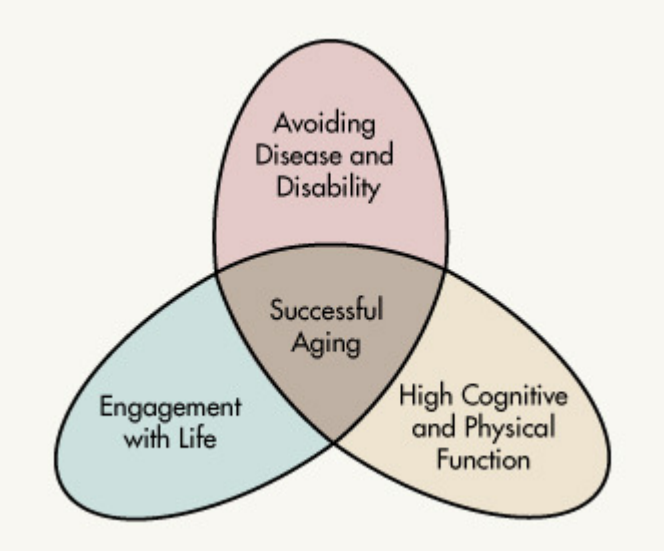
Table 2.5: Hong Kong dependency ratio, 1996–2036

	Year	Overall	Children (aged under 15)	Elderly (aged 65 and over)
Actual	1996	401	259	142
	2006	354	185	168
Projected	2016	370	162	208
	2026	525	189	336
	2036	611	186	425

Sources: Hong Kong Census and Statistics Department, 2008 ;
Hong Kong Census and Statistics Department, 2007c

As a result of population ageing, it is important to investigate how to enhance older persons' quality of life so that they can age successfully. Rowe and Kahn's (1998) model of successful ageing (Figure 2.1) provides a useful way to understand successful ageing. It includes three components: avoiding disease and disability, high cognitive and physical function, and engagement with life. Older persons are considered to be ageing successfully if they achieve a high level in each of these components. IT may be a way to help older persons to actively engage in society and achieve a high quality of life.

Figure 2.1: Model of successful ageing



Source: Rowe and Kahn, 1998, p. 39

Having reviewed the ageing situation in Hong Kong, IT development appears as one of the policy strategies highlighted by the HKSAR government in order to connect with the information age. In his 1997 Policy Address, the then Chief Executive of the HKSAR government Mr. Tung stated his vision of making "Hong Kong become a leader, not a follower, in the information world of tomorrow" (HKSAR government, 1997). This emphasis upon IT development is also found in many other Hong Kong Policy Addresses (HKSAR government, 1998, 1999, 2000a, 2001, 2003, 2004, 2005, 2006). The Digital 21 strategy was launched by the HKSAR government in 1998 in order to establish a blueprint for ICT development in Hong Kong (Digital 21 strategy, 2008).

With the aim of keeping older persons up to speed with global developments and reducing the digital divide, the IT Awareness Programme for the Elderly was jointly organised by the Hong Kong Information Technology Services Department and Social Welfare Department in 2000 (HKSAR government, 2000b). This programme aims to promote IT usage amongst older persons, providing free IT awareness courses to allow people aged 60 and over to experience basic computer operation and surfing the Internet.

After reviewing IT strategies in Hong Kong since 1997, a high IT penetration rate was discovered in Hong Kong, not only in the business sector but also amongst general households. The Hong Kong Census and Statistics Department (2007d) identified an increase in the percentage of households with PCs at home from 49.7% in 2000 to 74.2% in 2007. Rapid growth in the percentage of households with PCs connected to the Internet was also recorded, from 36.4% in 2000 to 70.1% in 2007. The rapid increase in the percentage of persons aged 10 and over who had used PCs and the Internet is also shown in Table 2.6. However, there was not only a rapid increase in the use of computers and the Internet, but also mobile phones, from 84.7 mobile subscriber units per 100 population in 2001 to 136.7 in 2006. This means that almost every citizen has more than one mobile phone.

Table 2.6: IT penetration and usage amongst households in Hong Kong

	2000	2001	2002	2003	2004	2005	2006	2007
% of households with a PC at home	49.7	60.6	62.1	67.5	71.1	70.1	71.1	74.2
% of households with a PC at home connected to the Internet	36.4	48.7	52.5	60.0	64.9	64.6	67.1	70.1
% of persons aged 10 and over who had used a PC in the 12 months before the census	43.1	51.9	54.0	56.2	59.5	58.8	62.9	66.4
% of persons aged 10 and over who had used the Internet in the 12 months before the census	30.3	43.3	48.2	52.2	56.4	56.9	60.8	64.8

Sources: Hong Kong Census and Statistics Department, 2007d, 2002

Having reviewed IT penetration in Hong Kong society, the following discussion focuses upon the different age groups of IT users (Table 2.7) and the challenges faced by older persons in an information society.

In 2007, the majority of IT users were young people, and there was a negative relationship between age and the use of computers and Internet services, as shown in Table 2.7. Persons aged 10–14 had the highest rate of having used computers and Internet services in the preceding 12 months. The lowest rates were recorded for

persons aged 65 or above in using computers (6.7) and the Internet (5.8; Hong Kong Census and Statistics Department, 2007b). As IT usage is increasingly popular in our community, older persons will become isolated from the community if they do not stay abreast of technical changes (McGinn, 1991). Therefore, more and more older persons are learning to use IT in order to respond to this social trend.

Table 2.7: Persons aged 10 and over with knowledge of using PCs, had used PCs, and had used the Internet in Hong Kong, 2007

	Persons aged 10 and over with knowledge of using PCs by age			Persons aged 10 and over who had used PCs in the past 12 months by age			Persons aged 10 and over who had used the Internet in the past 12 months by age		
	No. of persons (000s)	%	Rate	No. of persons (000s)	%	Rate	No. of persons (000s)	%	Rate
10–14	408.7	9.6	99.6	408.7	10.1	99.6	405.4	10.2	98.8
15–24	858.4	20.2	99.4	854.0	21.0	98.9	851.7	21.5	98.6
25–34	9.6.2	21.4	95.2	882.0	21.7	92.9	870.6	22.0	91.4
35–44	965.7	22.8	82.9	923.7	22.7	79.3	901.5	22.8	77.4
45–54	753.4	17.8	62.9	708.0	17.4	59.1	672.5	17.0	56.1
55–64	269.1	6.3	37.8	230.7	5.7	32.4	212.7	5.4	29.9
65+	79.3	1.9	9.7	54.5	1.3	6.7	47.0	1.2	5.8
Overall	4 240.7	100	69.3	4061.5	100.0	66.4	3961.4	100.0	64.8

Sources: Hong Kong Census and Statistics Department, 2007b

Notes: % is the percentage of people in the selected age group from the overall IT users of all ages.

Rate is the proportion of people in the selected age group from the population of the selected aged group.

As shown in Table 2.8, more and more older persons are using computers and the Internet in terms of total numbers, percentage of overall IT users, and proportion of the population of older persons (Hong Kong Census and Statistics Department, 2007d). There was a rapid increase in the percentage of persons aged 65 and over who used a PC in the preceding 12 months, from 0.6% in 2000 to 6.7% in 2007. In addition, there was a significant increase in the percentage of persons aged 65 and over who had used the Internet, from 0.2% in 2000 to 5.8% in 2007. This illustrates the increasing trend for older persons to use PCs and the Internet.

Table 2.8: The trends for persons aged 65 and over who had used PCs and the Internet in Hong Kong, 2000–2007

	Persons aged 65 and over who had used PCs in the past 12 months			Persons aged 65 and over who had used the Internet in the past 12 months		
	No. of persons (000s)	%	Rate	No. of persons (000s)	%	Rate
2000	4.4	0.2	0.6	1.7	0.1	0.2
2001	8.9	0.3	1.2	6.2	0.2	0.8
2002	20.8	0.6	2.8	14.4	0.5	1.9
2003	17.2	0.5	2.2	13.7	0.4	1.8
2004	31.3	0.9	4.0	23.6	0.7	3.0
2005	26.0	0.7	3.2	21.3	0.6	2.6
2006	42.9	1.1	5.3	34.2	0.9	4.2
2007	54.5	1.3	6.7	47.0	1.2	5.8

Sources: Sources: Hong Kong Census and Statistics Department, 2007d, 2002

Notes: % is the percentage of people in the selected age group from the overall IT users of all ages. Rate is the proportion of people in the selected age group from the population of the selected aged group.

Even though a high IT penetration rate was recorded for Hong Kong (69.9%, second in Asia; see Table 2.2), the IT usage rate for older persons is comparatively lower than other developed regions. In Hong Kong, 5.8% of people aged 65 and over had used the Internet in 2007 (Hong Kong Census and Statistics Department, 2008). This compares with 37% in the US (Pew Internet and American Life Project, 2008), 28.8% in Canada (Statistics Canada, 2008) and 29% in the UK (National Statistics, 2007). In Asia, 17.6% in Korea (National Internet Development Agency of Korea, 2008) and 12% in Singapore (Infocomm Development Authority of Singapore, 2008) of persons aged 60 and over had used the Internet in 2007. It is therefore interesting to investigate older persons' reasons for and barriers to accepting and using IT in Hong Kong.

2.4 A review of studies on IT and ageing

As mentioned in sections 2.2 and 2.3, the increasing penetration of IT may affect older persons' daily lives in an information society. Some research has been conducted into the relationships between IT and ageing in order to understand the impact of IT upon older persons' daily lives.

Four main themes can be summarised. Age-related (IT usage) studies form the first theme, comparing the computer and Internet usage of older persons and young persons (Roth Gibbons, 2003). Quantitative research methods are mostly applied in this type of research. Several projects and studies were found from different regions of the world that studied citizens' IT usage patterns, such as the Pew Internet and American Life project in the US (Fox, 2004), and the SeniorWatch (2002) project in the European Union.

Age-related (IT usage) studies also raise awareness amongst the general public about older persons' IT needs. The concept of a digital divide is mentioned in several studies (e.g., Sin, 2001), referring to the "divide between those with access to new technologies and those without" (US Department of Commerce, 2000, p. xiii). Sin (2001) identified five socioeconomic variables related to the emergence of a digital divide: income, age, education attainment, gender, and disability. As information has become crucial social capital in an information society, older persons who do not have the ability to access the Internet are "deprived of their resources for enhancing their lives" (Loges and Jung, 2001, p. 536). Older persons who are unable to successfully interact with IT are "at a disadvantage in most environments" (Czaja and Lee, 2003, p. 114). Therefore, the debate regarding digital inclusion amongst older persons is raised in order to investigate IT adoption amongst older persons, and

the impact and outcome of IT usage amongst older persons.

IT adoption studies is the second theme. Researchers aimed to examine the IT adoption behaviour of older persons in term of attitudes (Kelly and Charness, 1995; Eastam and Lyer, 2004), motivation (Melenhorst et al., 2001), reasons (Morrell et al., 2004), intentions, and barriers to using IT. These studies were conducted using qualitative, quantitative and mixed research methods. Most research on this theme tried to answer the question, why do older persons use or not use IT applications?

IT impact and outcome studies form the third theme. In those studies, researchers aimed to evaluate the impact of IT on older persons based on several outcomes, such as quality of life (Li and Perkins, 2007; Irizarry and Downing, 1997)

Studies of product design form the fourth and final theme of ageing and IT studies. Czaja and Lee (2003) highlighted that designers of most IT systems do not consider older persons as active IT users, therefore many designs are not consistent with older persons' needs. Researchers on this subject aimed to promote ageing-friendly IT products for older persons with age-related physical and cognitive problems. For example, Sangangam and Kurniawan's (2006, p. 261) study on older persons' web-browsing activities suggested the inclusion of assistive features in order to make

browsers more ageing-friendly, with "an automatic function which can remove the undesired content (such as pop-up windows and spams)" as the most desired features from older persons' perspectives.

In Hong Kong, few studies have focused upon understanding the relationship between the IT adoption behaviour of older persons and its outcome, especially in terms of quality of life. Some researchers expressed concern about the evaluation of computer courses, so focused upon their effectiveness, but not on the empirical relationships between IT and older persons' quality of life.

Sin's (2001) study on the digital divide in Hong Kong addressed the crucial impact of technology on the well-being of older persons. The main barriers to older persons' IT usage in Hong Kong were stereotype, limited income, language and literacy, and insufficient information. The study suggested that IT will benefit older persons through the more constructive use of their leisure time, as IT has the potential for providing a wider choice of leisure activities and more opportunities for lifelong learning, creating feelings of self-satisfaction and improving self-esteem. However, this study did not focus upon older persons, as older persons were only one of five population cohorts who faced the difficulties of the digital divide.

Chan et al.'s (2003) research on older persons' computer and Internet usage in Hong Kong could provide crucial insight. A total of 277 older persons completed the self-administered questionnaire, and two focus groups were conducted. The study identified self-enhancement as the main reason why older persons learned about computers, and weak memory was the main difficulty experienced. Computer learning could enhance the quality of life of older persons, boost their self-confidence, and improve their communication with others. However, this thesis focuses upon participants in IT courses from the Cyber Senior Network Development Association Limited. Therefore, a study on other older persons' cohorts is necessary in order to develop a comprehensive understanding of older persons' IT usage in Hong Kong.

Lam and Lee's (2005) study examined the roles of internet self-efficacy and outcome expectations towards older persons' computer and Internet learning in Hong Kong. Two studies were conducted to investigate the IT learning amongst older persons in terms of internet and outcome expectations. Totally, 555 respondents participated in study one and 338 respondents participated in study two. Free computer training courses were provided to the participants. In addition, a self reported questionnaire and a self-assessment on the capabilities in using computer and the Internet were administered after training courses. The study identified internet self-efficacy and

outcome expectations were significant to examine IT usage intention. This study acknowledges an application of IT acceptance theories and models for examining the IT usage amongst older persons in Hong Kong. However, this study focuses on evaluation of IT learning. Therefore, a study on the relationships between IT usage amongst older persons and their quality of life is will be variable in order to obtain further of understanding of IT impact towards older persons.

2.5 IT acceptance theories and models

Having reviewed different studies on IT and ageing, IT acceptance theories and models may provide a new direction in order to understand IT usage amongst older persons. These theories and models raise crucial concepts to aid in the development of the proposed integrated model. IT's impact upon older persons' daily lives includes recent trends and challenges in a modern information society. This has promoted the interest of different experts in different disciplines, including not only sociologists, gerontologists and policymakers, but also information system experts.

In this review of the literature from Hong Kong and other regions, some IT acceptance theories and models are commonly cited as they aid in understanding older persons' IT acceptance and usage. For example, Davis et al.'s (1989) integrated technology acceptance model was used to investigate the potential antecedents of

older persons' acceptance of e-government services in Singapore (Phang et al., 2006).

Four widely-cited theories and models of IT acceptance and usage behaviour are discussed in the following sections: innovation diffusion theory (IDT; Moore and Benbasat, 1991); theory of reasoned action (TRA; Fishbein and Ajzen, 1975); theory of planned behaviour (TPB; Ajzen, 1991); and the technology acceptance model (TAM; Davis, 1989).

2.5.1 Innovation diffusion theory (IDT)

Innovation diffusion theory (IDT) is grounded in sociology. Rogers (1995, p. 5) described diffusion as "the process by which an innovation is communicated through certain channels over time amongst the members of a social system". Individuals can make their own decisions about innovation through a five-step process – knowledge, persuasion, decision, implementation, and confirmation – with the rate of adaptation influenced by the five attributes (Rogers, 1995). Relative advantage, complexity, compatibility, observability, trialability and image are the perceived attributes of innovation, listed in Table 2.9. Moore and Benbasat (1991) adapted the characteristics of innovation from Rogers (1995) to the IS field and expanded the five attributes to eight: voluntariness, relative advantage, compatibility, image, ease

of use, result demonstrability, visibility, and trialability.

Table 2.9: Key constructs and definitions of the Innovation diffusion theory (IDT)

Core Constructs	**Definitions**
Relative Advantage	"The degree to which an innovation is perceived as being better than its precursor" (Moore and Benbasat, 1991, p. 195).
Ease of Use	"The degree to which an innovation is perceived as being difficult to use" (Moore and Benbasat, 1991, p. 195).
Image	"The degree to which use of an innovation is perceived to enhance one's image or status in one's social system" (Moore and Benbasat, 1991, p. 195).
Visibility	"The degree to which one can see others using the system in the organisation" (Moore and Benbasat, 1991, p. 195).
Compatibility	"The degree to which an innovation is perceived as being consistent with the existing values, needs, and past experiences of potential adopters" (Moore and Benbasat, 1991, p. 195).
Result Demonstrability	"The tangibility of the results of using the innovation, including their observability and communicability" (Moore and Benbasat, 1991, p. 203).
Trialability	"The degree to which an innovation may be experimented with before adoption" (Moore and Benbasat, 1991, p. 195).
Voluntariness of Use	"The degree to which use of the innovation is perceived as being voluntary or of free will" (Moore and Benbasat, 1991, p. 195).

Source: Moore and Benbasat, 1991

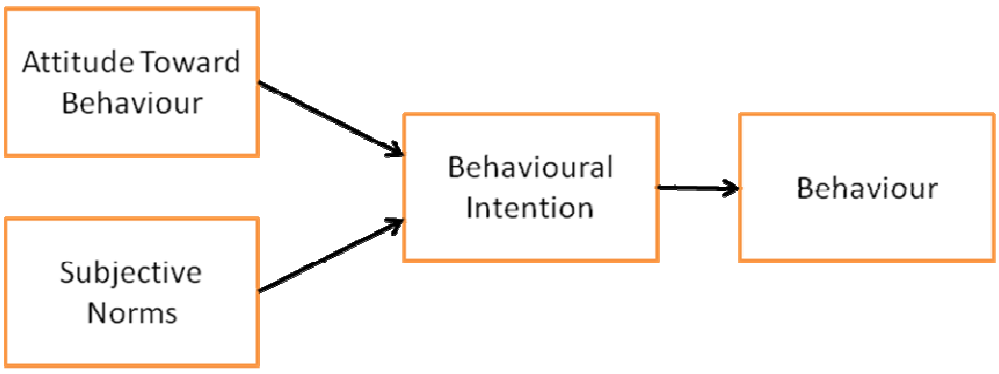
2.5.2 Theory of reasoned action (TRA)

The theory of reasoned action (TRA) arose in the field of social psychology. Fishbein and Ajzen (1975) developed TRA in order to examine individual behaviour, positing that individual behaviour is driven by behavioural intentions. Moreover, behavioural

intentions depend upon the individual's attitude toward the behaviour and subjective norms (Figure 2.2). The definitions of the key constructs of TRA are listed in Table 2.10.

TRA had been used to predict a wide range of behaviours. For example, Davis et al. (1989) applied TRA to explain the individual acceptance behaviour of using technology. The theory of planned behaviour (TPB) was then developed to resolve the limitations of TRA, which assumed that when individuals intend to act in a certain way, they are free to act without limitations.

Figure 2.2: Theory of reasoned action (TRA)



Source: Fishbein and Ajzen, 1975

Table 2.10: Key constructs and definitions of the theory of reasoned action (TRA)

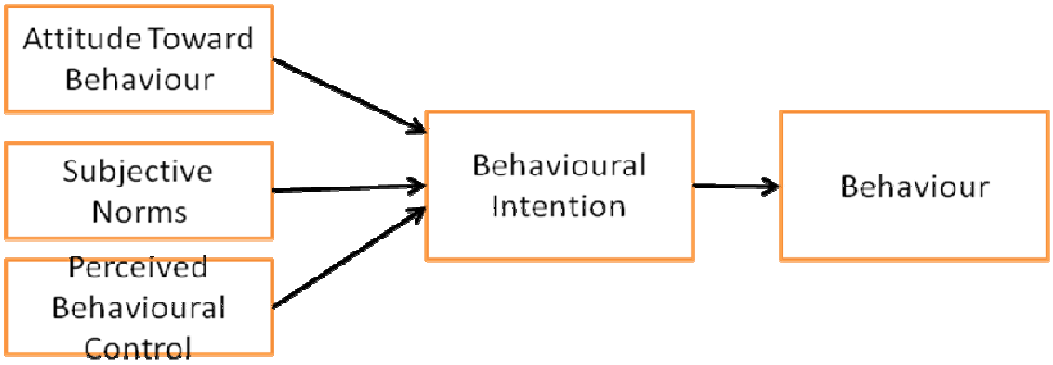
Core Constructs	Definitions
Attitude Towards Behaviour	"An individual's positive or negative feelings about performing the target behaviour" (Fishbein and Ajzen, 1975, p. 216).
Subjective Norms	"The person's perception that most people who are important to him/her think he/she should or should not perform the behaviour in question" (Fishbein and Ajzen, 1975, p. 302).

Source: Fishbein and Ajzen, 1975

2.5.3 Theory of planned behaviour (TPB)

The theory of planned behaviour (TPB) is an extension of TRA, intended to resolve TRA's limitations. Ajzen (1991) added perceived behavioural control as one of the antecedents to affect behavioural intention at the foundation of TRA. Therefore, TPB reveals that individual behaviour is driven by behavioural intentions, which are a function of an individual's attitude toward behaviour, subjective norms, and perceived behavioural control (Figure 2.3). The key constructs and definitions of TPB are listed in Table 2.11.

Figure 2.3: Theory of planned behaviour (TPB)



Sources: Ajzen, 1991

Table 2.11: Key constructs and definitions of the theory of planned behaviour (TPB)

Core Constructs	Definitions
Attitude Towards Behaviour	"An individual's positive or negative feelings about performing the target behaviour" (Fishbein and Ajzen, 1975, p. 216; adapted from TRA).
Subjective Norms	"The person's perception that most people who are important to him/her think he/she should or should not perform the behaviour in question" (Fishbein and Ajzen, 1975, p. 302; adapted from TRA).
Perceived Behavioural Control	"The perceived ease or difficulty of performing the behaviour" (Ajzen, 1991, p. 188).

Sources: Ajzen, 1991

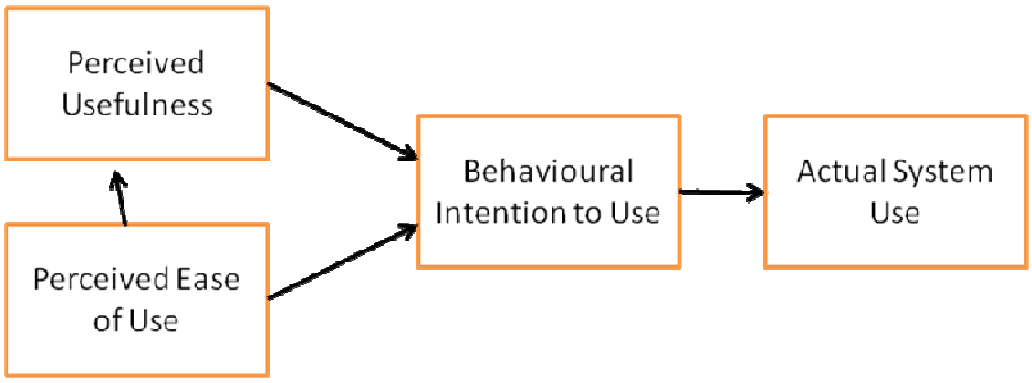
2.5.4 Technology acceptance model (TAM)

The technology acceptance model (TAM; Davis, 1989) was adapted from the theory of reasoned action (TRA) to the field of IS. Based on Legris et al. (2003), TAM is a widely cited theory in IS research, supported by different empirical studies.

Venkatesh et al. (2003) removed the attitude construct from TRA in order to simplify the TAM and emphasise the explanatory power of intention.

TAM reveals two important predictors determining the individual's behavioural intention to use a technology and subsequent use of that technology: perceived usefulness and perceived ease of use (these constructs are defined in Table 2.12). As shown in Figure 2.4, TAM posits that perceived usefulness and perceived ease of use are the determinant antecedents of an individual's behavioural intentions, which mediate actual system use. Perceived usefulness also seems to be directly affected by perceived ease of use.

Figure 2.4: Technology acceptance model (TAM)



Sources: Davis et al. (1989) and Venkastesh et al. (2003)

Table 2.12: Key constructs and definitions of the technology acceptance model (TAM)

Core Constructs	Definitions
Perceived Usefulness	"The degree to which a person believes that using a particular system would enhance his or her job performance" (Davis et al., 1989, p. 320).
Perceived Ease of Use	"The degree to which a person believes that using a particular system would be free of effort" (Davis et al., 1989, p. 320).

Sources: Davis et al., 1989

2.6 Summary of literature review

Having reviewing the literature, certain research directions have been identified in order to determine the relationships between IT usage and quality of life amongst older persons. Several concerns have been noted during the literature review process. Clear conceptualisation was necessary in order to define IT and IT-related quality of life from older persons' perspectives.

The rationale for this study was supported by reviewing global and Hong Kong trends of IT and ageing. The review of studies on IT and ageing showed that there are very few studies of ageing and IT in Hong Kong and Asia-Pacific cities in general, and group comparisons between participants and non-participants in IT courses could aid in the comprehensive understanding of IT adoption.

Chapter 3: Methodology

3.1 Research design

This study employed multiple research methods. Focus group discussions (FGDs), in-depth interviews with key informants, and face-to-face surveys were used in order to obtain a comprehensive understanding of the impact of IT usage on older persons and their quality of life.

According to Babbie (2001), both qualitative and quantitative approaches are useful and legitimate in social research. However, there are different advantages to each approach: "Quantitative research is thought to be more concerned with the deductive testing of hypotheses and theories, whereas qualitative research is more concerned with exploring a topic, and with inductively generating hypotheses and theories" (Punch, 1998, p. 240).

After reviewing different studies on IT and ageing, it was found that few studies focused on IT usage amongst older persons and their quality of life in Hong Kong. Primarily, qualitative methods were used in this current research in order to start from scratch to explore the meaning of IT, and in-depth reasons for and barriers to using IT, and the relationships between IT usage amongst older persons and their

quality of life. A quantitative method (a face-to-face survey) was used as a supplement to explore the statistical relationships between IT usage and quality of life amongst older persons, especially for older persons in the types of organisation servicing the IT awareness programme.

3.2 Qualitative research methods

In-depth interviews with key informants and focus group discussions (FGDs) were employed in three phases (see Figure 3.1). The purpose of phase 1, in-depth interviews with key informants, was to acquire a general impression and understanding of the impact of IT on older persons from a professional point of view. In-depth interviews with key informants were employed. In-depth interviews are a data-collection technique that is used 'to collect detailed, richly textured, person-centred information from one or more individuals' (Punch, 1998, p.176). An informant is "a member of the group who can talk directly about the group" (Babbie, 2001, p.181). Thus, in-depth interviews with key informants have the advantage to access 'people's perceptions, meanings, definitions of situations and constructions of reality' (Punch, 1998, p.176). Hence, in-depth interviews with key informants were adopted to explore a general impression and understanding of the impact of IT on older persons from a professional point of view.

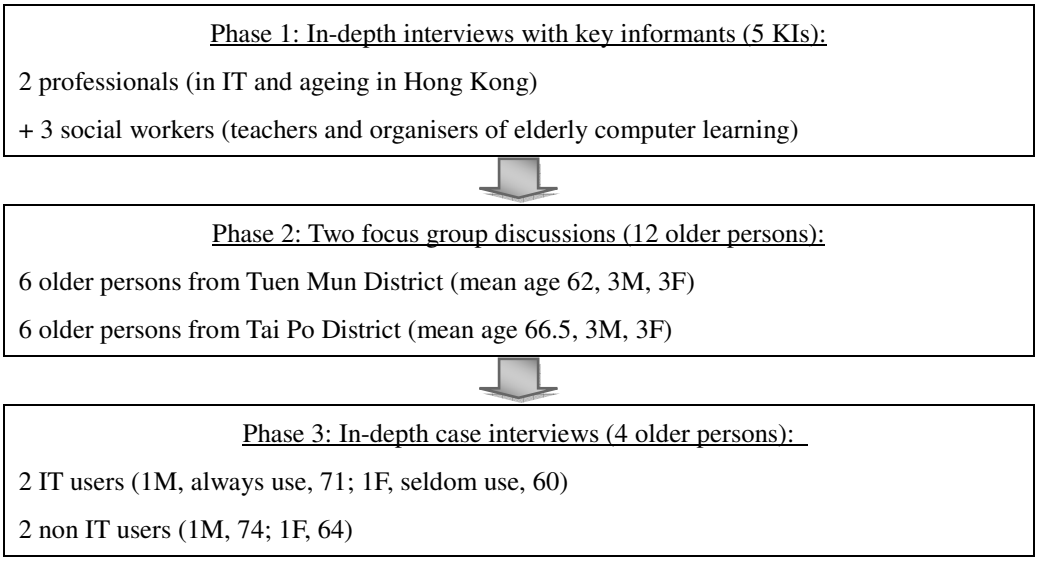
The purpose of phase 2, FGDs, was to understand the general concepts of IT held amongst older persons, their reasons for using IT, and the impact of IT on their quality of life from their own perspective. According to Phillips (1998, p.32), FGDs involve "planned meetings of groups of people, who possess certain characteristics that provide data of a qualitative nature usually through a series of focused discussions". FGDs allow researchers to "figure out what the key issues, ideas, and concerns are from multiple respondents at once" (Hesse-Biber and Leavy, 2006, p.196). FGDs have the advantages of flexibility, low in cost, high face validity and speedy results (Babbie, 2001). They are a very useful research tool to assist an individual researcher to understand issues such as the general concepts of and attitudes to IT amongst older persons.

Finally, the purpose of phase 3, in-depth case interviews, was to discover the actual situation with regard to IT usage amongst real people, their reason for using or not using IT, and their perspectives on IT and quality of life. In- depth interviews were employed to provide a more in-depth context on IT usage amongst older persons and their perception of IT impact on quality of life.

Therefore, this qualitative research aimed to examine the patterns and variables of older persons using IT; to establish the meaning of IT amongst older persons (what

they understand by IT); to identify older persons' intentions for using or not using IT; and to carry out an initial exploration of the relationships between IT and the quality of life amongst older persons.

Figure 3.1: Phases of conducting the qualitative research



3.2.1 Sampling and case selection for the qualitative research

In the qualitative research, in-depth interviews with key informants (KIs) and focus group discussions (FGDs) made use of purposive sampling to select the relevant cases. Purposive sampling means that the researcher chooses subjects who are relevant to the project (Sarantakos, 2005), which is not based on probabilistic theory. Thus, five KIs were invited to participate in the in-depth interviews. The professional groups from which the KIs were drawn included IT experts, researchers on ageing, and social workers who organised and taught computer learning to older persons.

The KIs offered some useful background and professional insight to this research, creating a picture of IT usage and impact amongst older persons in Hong Kong.

After seeking the KIs' opinions, a purposive sampling method was used to invite 12 older persons to participate in two FGDs. Older persons aged 60 or above who had participated in IT awareness courses within the previous year were recruited from elderly community centres. Their contribution was to explore IT usage (practical and situational) amongst older persons, as well as their experiences of and perspectives on IT usage and quality of life.

Next, theoretical sampling was applied in the selection of in-depth case interviews. According to Glaser and Strauss (1967), theoretical sampling involves gathering data used to choose new research sites or research cases in order to make a comparison with those that have already been studied. Indeed, this research aimed to explore the meaning of and motivations for using or not using IT amongst older persons. Therefore, a theoretical sampling approach maximised the opportunities for discovering more contexts. Four cases were purposively selected using theoretical sampling in order to investigate the different motivations of older persons for using or not using IT. These older persons were divided into four groups: people who always, seldom (fewer than three times a month), or never use a computer, and those

who have never used IT as it is broadly defined (including mobile phones). Frequencies of IT usage were an worthwhile indicator to classify IT usage amongst older persons. Chan et al.'s (2003) research revealed the significant differences between frequent and infrequent computer users in term of subjective well-being. Frequent computer users had a sense of achievement and self-esteem, which in turn helped to improve their quality of life in general.

3.2.2 Qualitative data collection

The qualitative research was carried out using semi-structured interview guides (see Appendix I and II) from May to November 2007: phase 1 in May, phase 2 in September, and phase 3 in November. The semi-structured interview guides included four "What" questions: 1) What is the meaning of IT from an older person's perspective? 2) What are the reasons for older persons to use or not use IT? 3) What are the perceived difficulties and benefits of older persons' using IT? and 4) What is the relationship, if any, between IT usage amongst older persons and their quality of life?

Five in-depth interviews were carried out with the KIs (professionals and social workers), then two focus groups were carried out with 12 older persons aged 60 or above who had participated in a computer course within the previous year, and then

four in-depth case interviews were carried out with four older persons representing different frequencies of IT usage.

3.3 Quantitative research methods

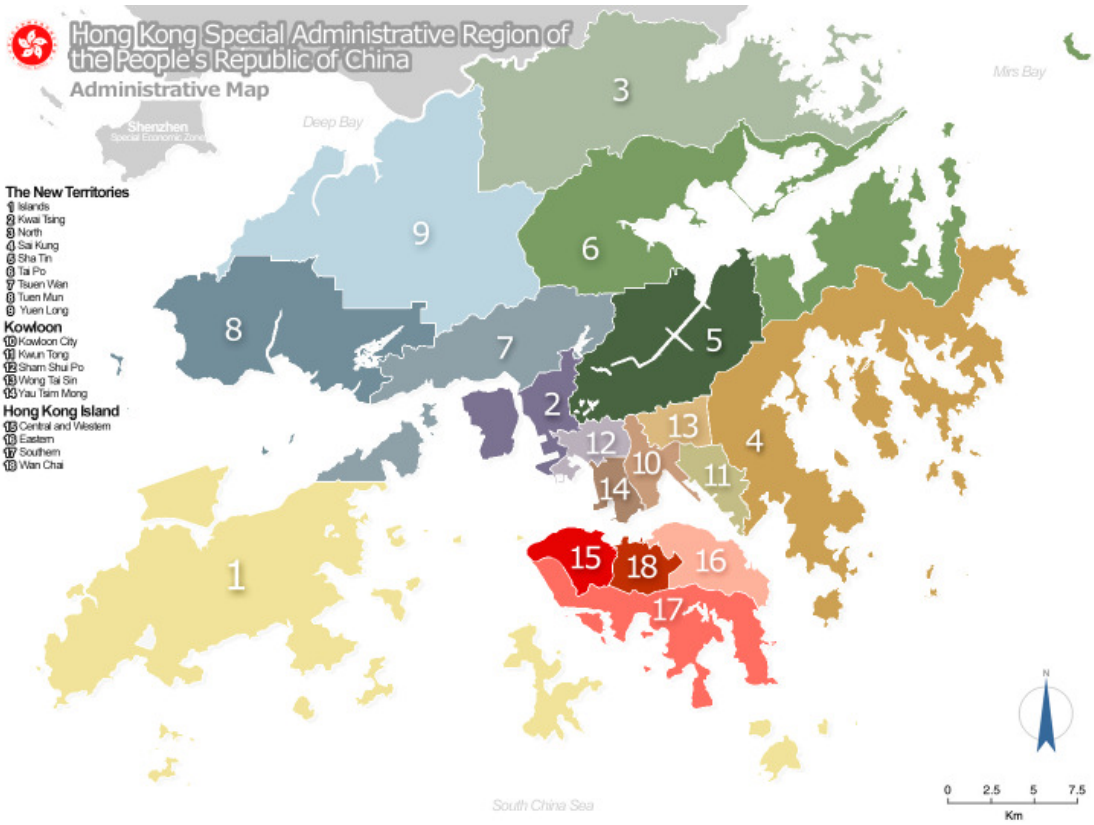
A face-to-face survey was conducted to investigate the relationships between IT usage amongst older persons and their quality of life. A questionnaire was designed to measure older persons' IT usage, intentions for using IT, perception of IT usage, and quality of life. The questionnaire was based on the answers obtained from the qualitative findings and provided a supplementary perspective on the topic.

3.3.1 Quantitative sampling method and case selection

In the quantitative phase of the research, a face-to-face survey was conducted with older persons from a sample drawn using quota sampling methods. Ideally, all the older persons who participated in computer courses in Hong Kong should be sampled randomly. However, it was impractical to collate an exhaustive list of older persons who participated in computer courses in Hong Kong, therefore quota sampling was useful and practical for this research. Quota sampling is "a type of non-probability sampling in which units are selected into a sample on the basis of prespecified characteristics, so that the total sample will have the same distribution of characteristics assumed to exist in the population being studied" (Babbie, 2001,

p.185). It was adopted as it was impossible to sample 18 districts in Hong Kong because of the time and resource limitations placed on an individual researcher. Thus, four selected districts were selected based on their population characteristics: Central/Western, Wong Tai Sin, Yuen Long, and Tuen Mun (Map 3.1 and Table 3.1).

Map 3.1: The 18 districts of the Hong Kong Special Administrative Region of the People's Republic of China



Source: Hong Kong Atlas, 2008

Table 3.1: Selected characteristics of the districts of Hong Kong

		Median age	Educational attainment (% of population aged 15 and over)	
			No schooling / pre-primary	Degree course
	Hong Kong	39	7.1	15.4
1	Islands	37	9.6	17.5
2	Kwai Tsing	39	8.6	10.5
3	North	38	7.3	10.9
4	Sai Kung	36	5.2	17.3
5	Shatin	39	5.8	16.2
6	Tai Po	38	6.8	13.8
7	Tsuen Wan	39	6.6	17.5
8	Tuen Mun	38	7.1	10.3
9	Yuen Long	35	5.8	10.6
10	Kowloon City	40	5.7	21.3
11	Kwun Tong	40	8.6	10.8
12	Sham Shui Po	41	8.1	13.7
13	Wong Tai Sin	42	10.4	8.9
14	Yau Tsim Mong	39	5.9	19.7
15	Central and Western	39	5.6	31.7
16	Eastern	41	6.4	20.4
17	Southern	40	10.7	18.0
18	Wan Chai	41	4.0	30.4

Source: Hong Kong Census and Statistics Department, 2007a, p. 77

According to the Hong Kong Census and Statistics Department (2007a), Wong Tai Sin district has the highest median age (42) and Yuen Long district has the lowest median age (35). In 2006, 31.7% of residents in the Central and Western district had a bachelor degree, which is the highest level of education in Hong Kong (Hong Kong Census and Statistics Department, 2007a). It seems that older persons with a higher

level of education have greater motivation to learn about computers (Chan et al., 2003). Therefore, it was interesting to include the Central and Western district. The qualitative research also included the Tuen Mun district for comparative purposes.

After choosing the four districts, four neighbourhood elderly centres (NECs) from each selected district were randomly chosen from the official list issued by the Hong Kong Social Welfare Department (SWD) on 1 October 2007, which was the most recent list available. Each centre in the four selected districts was allocated a number randomly; two were approached first, and two were held in reserve in case the first two were unable to participate. Although both NECs, social centres for the elderly (SCEs) and district elderly community centres (DECCs) provide IT awareness courses for older persons, NECs were chosen because they offer the highest number of service units (115) and members served (79,973; see Table 3.2; Hong Kong Social Welfare Department, 2007). That means NECs provide more potential targets for this research.

Table 3.2: Services for older persons (subsidised agencies)

	No. of service units, 2006/2007	No. of members, 2006/2007
Social centres for the elderly (SCEs)	58	42048
Neighbourhood elderly centres (NECs)	115	79973
District elderly community centre (DECCs)	41	63550

Source: Hong Kong Social Welfare Department, 2007

Based on the aim of investigating the relationships between IT usage and quality of life amongst older persons, older persons who had participated in computer courses were selected at each selected centre to complete the questionnaire at the centre. It would be ideal to draw samples randomly. However, a total of 96 respondents who fitted the inclusion criteria were selected and invited by the senior staff member in the survey. Therefore, a non-probability sample was employed finally in this survey because of a consideration for personal information security. This was more than the minimum number required from the modest sample estimate (see Table 3.3) in order to offer adequate data for statistical analysis. This increased the probability of acquiring information on all parameters.

Table 3.3: Minimum samples for all parameters

	Educational level											
	Primary or below				Secondary				Tertiary or above			
	Income Level											
	High		Low		High		Low		High		Low	
	Frequency of IT usage											
	f	Nf	f	Nf	f	Nf	F	Nf	f	Nf	f	Nf
60–74 (F)	1	1	1	1	1	1	1	1	1	1	1	1
60–74(M)	1	1	1	1	1	1	1	1	1	1	1	1
75 or above (F)	1	1	1	1	1	1	1	1	1	1	1	1
75 or above(M)	1	1	1	1	1	1	1	1	1	1	1	1
Total	4	4	4	4	4	4	4	4	4	4	4	4
Grand total	48											

Notes: M= Male; F=Female

f= frequent IT users; Nf= non-frequent IT users

3.3.2 Quantitative data collection

The quantitative research was undertaken using questionnaires from January to March 2008. A pilot study was conducted in December 2007, in which 10 older persons in the Tuen Mun district were invited to complete the pilot questionnaire. A revised questionnaire (see Appendix III or IV) was designed in order to investigate IT usage and quality of life amongst older persons.

The questionnaire comprised four main parts: 1) IT usage; 2) intentions of using or not using IT; 3) IT and quality of life; and 4) personal profile. Most of the questions

were closed, using a five-point Likert scale (ranging from 1 = totally disagree to 5 = totally agree).

First, part-measures of IT usage were modified from the research concerning IT usage in Hong Kong, conducted by the Hong Kong Census and Statistics Department in 2005 and 2006 and Chan et al. in 2003.

Second, part-measures of intentions of using or not using IT were adopted and modified from four IT acceptance models and theories (see Chapter 2): innovation diffusion theory (IDT; Moore and Benbasat, 1991); theory of reasoned action (TRA; Fishbein and Ajzen, 1975); theory of planned behaviour (TPB; Ajzen, 1991); and the technology acceptance model (TAM; Davis, 1989). A revised measure was developed from the qualitative findings (see Chapter 4), which comprised eight variables: intention (two items), attitude towards behaviour (three items), perceived usefulness (two items), perceived ease of use (two items), image (two items), visibility (two items), subjective norms (three items) and perceived control (two items).

Third, part-measures of IT and quality of life were mainly combined from two sections. The first section was the 10-items perceived quality of life measurement, conducted by Siu and Phillips in 2005. The second section was based on variables of

IT related quality of life from the qualitative findings (see Chapter 4). Six variables were used to measure IT related quality of life: self-esteem (two items), positive feeling (two items), personal relationship (two items), social support (two items), opportunities for acquiring new information and skills (two items) and participation in and opportunities for recreation/ leisure (two items). In total, twenty-three items were used to measure the quality of life.

The reliability of the measurement was assessed in term of Cronbach's alpha in Table 3.4. According to Aron and Aron (1999, p.630), Cronbach's alpha is "the most widely used measure of reliability", which is "a measure of what is called the internal consistency reliability".

Table 3.4: Cronbach's alpha of variables

Scale	Items	Cronbach's alpha
Attitude	3	0.82
Behaviour	6	0.75
Intention	2	0.60
Perceived control	2	0.79
Quality of life	23	0.84
Subjective norms	3	0.60

In total, 96 respondents were recruited from nine NECs in the four selected urban districts in Hong Kong outlined previously.

3.4 Summary of methodology and methodological limitations

Two focus group discussions, five in-depth interviews with key informants, four in-depth case interviews, and 96 respondents completed a face-to-face questionnaire survey. The qualitative and quantitative research findings are discussed in Chapters 4.

As with any research project, a number of limitations can be identified. For example, during the quantitative stage, although this research attempted to recruit its samples systematically from each chosen centre, it is not pure probability sampling as respondents were identified by senior staff members at each selected centre. Next, older persons with a higher education level and who belong to a high-income class may not have been included because they may not attend community centres for the elderly. These limitations are discussed in more detail in Chapter 5.

Chapter 4: Results

4.1 Qualitative analysis

The qualitative stage of the research was undertaken from May to November 2007. As noted in Chapter 3, qualitative research was conducted in order to explore the meaning of IT from older persons' perspectives; to examine the patterns and variables associated with older persons using IT; to identify older persons' major intentions for using or not using IT; and to explore the relationships between IT and quality of life. In total, five in-depth interviews with key informants, two focus group discussions involving 12 older persons, and four in-depth case interviews were conducted. Table 4.1 outlines the profiles of the qualitative research participants in terms of their sex, age, level of education, frequency of IT usage, ownership of IT applications and perceived relationships between IT usage and their quality of life.

4.1.1 Qualitative findings

Analysis of the qualitative data demonstrated a consistency of views between the professionals and older persons. For example, they expressed similar views regarding the meaning of IT and gave similar examples. Although most respondents expressed a positive attitude toward IT, they reported different usage patterns, particularly in the in-depth case interviews. It is therefore important to understand the major

motivations and barriers to the use of IT amongst older persons.

"Perceived usefulness" became relatively important in illustrating the major reasons for using IT from the older persons' perspectives. In addition, the qualitative findings provided new insights into developing a conceptual framework and an appropriate instrument for investigating the correlation between IT usage and quality of life.

Table 4.1: Personal profiles of qualitative research participants

	Professionals' group In-depth interview with key informants (KIs)					Older persons' group Focus group discussions (FGD)		In-depth interview			
	KI1	KI2	KI3	KI4	KI5	FGD1	FGD2	OP1	OP2	OP3	OP4
Sex	M	M	F	F	F	3M:3F	3M:3F	M	F	M	F
Age	NIA	NIA	NIA	NIA	NIA	Average: 62	Average: 66.5	71	60	74	64
Level of education	T	T	T	T	T	4P:2S	6P	T	P	P	P
Frequency of IT usage	A	A	A	A	A	3A:3S	1A:5S	A	S	N	N
Have computer at home	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Access Internet	Y	Y	Y	Y	Y	6Y	5Y:1N	Y	Y	Y	Y
Own Computer	Y	Y	Y	Y	Y	3Y:3N	1Y:5N	Y	N	N	N
Own mobile phone	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y
IT impact on daily life	Y	Y	Y	Y	Y	6Y	6Y	Y	Y	N	N
IT and QoL	P	P	P	P	P	6P	6P	P	P	P	P

Notes: Sex: M = Male; F = Female

Level of education: N = No formal education; P = Primary; S = Secondary; M = Matriculation; T = Tertiary

Frequency of IT usage: A = Always; S = Seldom; N = Never

Have computer at home, Access Internet, Own computer, Own mobile phone, IT impact on daily life: Y = Yes; N = No

IT and QoL (Quality of life): P = Positively related; N = Negatively related

4.1.2 Indefinite meaning and consistent examples of IT

Respondents from both the professionals' and older persons' groups held similar views on the meaning of IT and gave similar examples of IT applications. The professionals' group summarised that IT is used to spread new information. Although older persons expressed an indefinite meaning of IT, some older persons agreed that IT is used to diffuse information quickly across the world. Moreover, updated information can be acquired easily though using IT. One older person expressed the function and meaning of IT as follows:

> "The largest function of IT is spreading newfound knowledge. For me, it is information searching through the Internet." (FGD1)

The most commonly cited examples of IT were computers, the Internet and mobile phones, which was consistent between the professionals and older persons. These applications have been noted in other research, such as Brynin and Kraut (2006), who investigated the social impact of IT in terms of computers, the Internet and mobile phones. Respondents from both the professionals' and older persons' groups agreed that computers, the Internet and mobile phones are representative examples of IT:

> "Information technology means easy access to other knowledge and information, such as computers, the Internet and cell phones!" (KI2)

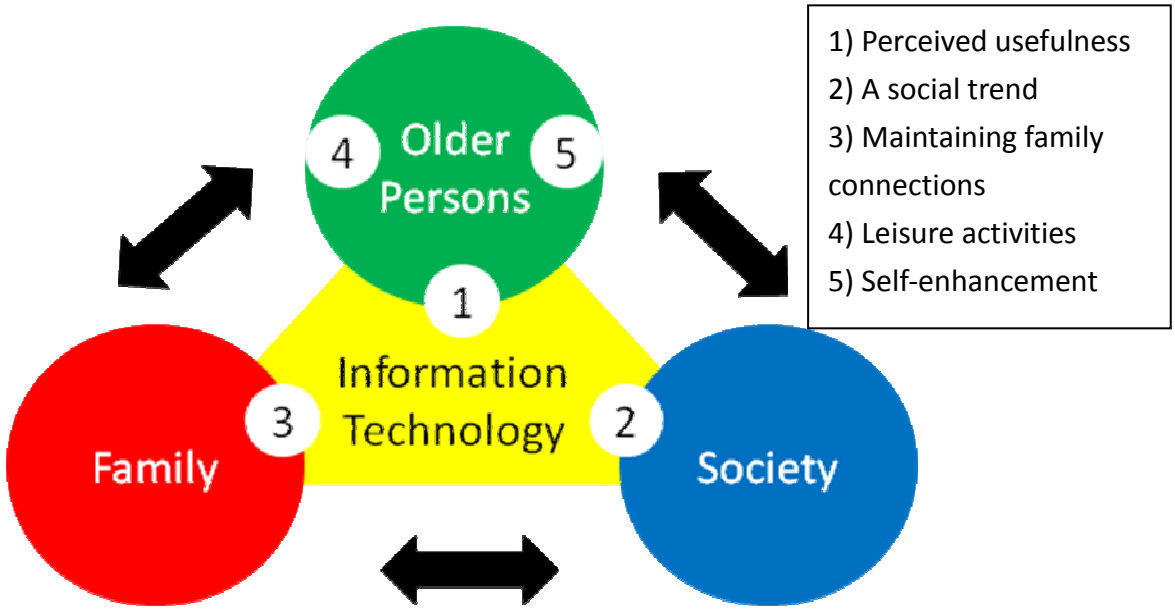
> "I think computers, Internet services and mobile phones are the best examples of information technology, which is popular in our society." (OP2)

4.1.3 Reasons for using IT

Four reasons for using IT were expressed by respondents from both the professionals' and older persons' groups: a social trend, maintaining family connections, leisure activities, and self-enhancement. However, older persons also provided another reason for considering IT usage: perceived usefulness in daily living. Therefore, in total, five major reasons explained IT usage amongst older persons, as shown in Figure 4.1.

In Figure 4.1, three main components (older persons, family and society) are important for older persons' daily living. These three components then interact with each other, and the five major reasons arise from the interaction between the three components and IT. For example, the interaction between society and IT leads to IT creating a social trend; this encourages older persons to interact with IT in order to avoid social isolation.

Figure 4.1: Major reasons for IT usage identified by older persons



4.1.3.1 Perceived usefulness

Perceived usefulness is the main motivation behind IT acceptance amongst older persons. According to Davis (1989, p. 320), perceived usefulness means "the degree to which a person believes that using a particular system would enhance his or her job performance". Retired older persons are not concerned with job performance, so their concepts of perceived usefulness will focus upon their daily living. Therefore, older persons believe that using IT will enhance their daily living. Some respondents mentioned that IT applications are useful to their daily living in terms of obtaining information, communicating and using e-services conveniently, especially for the delivery of public services, so e-services are widely provided and promoted by the HKSAR government:

> "The Internet is useful when you need information. Older persons can acquire much of the information that they want and they can learn whatever they want to. For example, they can access some websites about handicrafts that they are interested in." (KI4)

> "Learning computers is useful as I can communicate with my children through the Internet if they have to work abroad." (FGD2)

> "Through the Internet I can renew books borrowed from the public library. It is also possible for me to check the bill of my mobile." (FGD2)

By contrast, the perceived usefulness not only encourages older persons to use IT, but can also cause older persons to refrain from using IT. They may see it as less relevant if they believe that IT usage is useless in their daily living. Thus, older persons may not desire to learn or use IT. Some respondents expressed the view that IT seems useless for their daily lives, therefore they do not desire to use IT:

> "I do not need to use IT. I live with my son and daughter. I am responsible for taking care of them; I cook meals for them every day. IT is of no use in my daily life." (OP3)

> "I am old, so it is useless for me to learn. My grandson should learn and use IT, but it is not my cup of tea." (OP4)

Consequently, perceived usefulness is a crucial factor for both IT use and non-use amongst older persons, which supports the findings of Eisma et al. (2004). Moreover, after compiling respondents' motivations for and barriers to using IT in this research, perceived usefulness was identified as a significant factor determining IT usage amongst older persons. For example, older persons desire to learn and use IT when they perceive IT as useful in their daily life. By contrast, if IT is perceived as useless in older persons' daily lives, they will refuse to use it.

4.1.3.2 "A social trend"

Being a social trend is the second common motivation for older persons to use IT. As mentioned in the previous chapter, the high IT penetration rate is reshaping the medium of communication amongst family members and social connections in modern society. The respondents in the professionals' group mentioned that older persons will be isolated from society when they are mismatched with this social trend. Therefore, more and more older persons use IT because of its popularisation. The professionals considered the popularisation of IT to enhance older persons' daily interaction with IT, increasing their curiosity about using IT. This becomes a "pull" factor leading older persons to use IT, since their family members always use IT at home:

> "They are curious and want to know more about the computer since their grandchildren who they live with often play with it without allowing their involvement." (KI3)

Respondents in the older persons' group held similar views to the professionals on the popularisation of IT. They believe that IT is popular in Hong Kong; therefore they wish to know how to use IT just as their family members and friends do. They expressed that they feel isolated because they do not know how to use IT. Thus, they expressed the desire to connect with society by using IT, as it contains much useful information for their daily living:

> "Relatives and friends are using computers and it seems convenient. Moreover, even my wife knows how to use it but I do not. This drove me to learn computers." (FGD1)

> "It is wise not to be ignorant about anything. Computers are now popular and widely adopted. I would like to know more about this new technology." (OP1)

> "IT plays an important role in our living. If you cannot connect with society, you will be left behind." (FGD2)

Respondents from both the professionals' and older persons' groups agreed that using IT is a social trend. This increases the interaction between IT and older persons in daily life. IT becomes a means of social integration, though which older persons are

willing to use IT in order to avoid social isolation and remain active. In social gerontology's activity theory, older persons seek to maintain their status as an extension of middle age into their later life for as long as possible (Havighurst, 1963, 1968; Hooyman and Kiyak, 2007). As a result, older persons with strong social integration tend to be healthier and happier (Diener et al., 2002).

Communicating online using IT may reduce social isolation by offering an important means of social interaction (White et al., 2002). Thus, older persons become more socially interactive and less isolated through using IT (Li and Perkins, 2007). The popularisation of IT also provides a new medium for fostering family connections.

4.1.3.3 Family connections

The maintenance of family connections is the third common reason why older persons are encouraged to use IT. Respondents from the professionals' group stated that older persons want to keep in touch with their family in foreign countries. Older persons try to maintain their strong ties with both society and family; if communication is cheap, they can maintain these relationships through frequent communication (Kraut et al., 2006). IT applications provide a cheap and convenient way to communicate with their family members living abroad:

> "They (older persons) think it is a useful tool to keep in touch with families and can establish a better communication and thus stronger ties." (KI1)

> "The Internet is convenient to them. They (older persons) can keep in touch with their relatives in foreign countries by sending them emails with digital photos." (KI5)

Older persons also reported that they would like to keep in touch with their family through IT because of the rapid social change. Nowadays, the nuclear family form is popular in Hong Kong, as it is in many modern societies. According to the Hong Kong Census and Statistics Department (2007a), the average household size dropped from 3.4 persons in 1991 to 3.0 persons in 2006. Therefore, some older persons do not live with their children, and indeed seldom meet with their children because of their children's busy working lives. IT provides a convenient and simple platform for interaction amongst older persons and their children. This is similar to the finding of Morrell et al. (2003), that one of the most popular uses of computers reported by older persons was communicating with family and friends. Respondents voiced their willingness to communicate with local family members using IT:

> "I meet my son once a week. We both have our own lives. After I adopted IT, he sent emails of greeting to me. No need for face-to-face meetings and the possibility of communicating through the Internet is the biggest benefit." (OP1)

> "IT acts as a bridge for communication between me and my son, because my son will only focus on the computer at home and he rarely talks to me. Thus, IT can provide a medium for me to communicate through the use of text or sharing photos." (FGD2)

Thus, both professionals and older persons agreed that communication with the family is a main motivation for older persons to accept IT. Furthermore, in the older persons' opinions, IT is not only a tool of communication, but also a way to share their happiness and connect with their family because of the high IT penetration rate in Hong Kong society. However, older persons not only use IT products for social and family interaction, but also for individual benefits: self-enhancement and leisure activities.

4.1.3.4 Self-enhancement

Self-enhancement was consistently identified as a reason for older persons' IT usage. It refers to the transformation of self-appraisal in order to maintain the most favourable self-view (Mikulincer and Shaver, 2005), and is a basic motive that drives people's cognition, affect and behaviour. People will continuously equip themselves with updated knowledge and skills in order to augment a positive view of the self.

The professionals observed that older persons are willing to take part in life-long learning in order to make their life more colourful and enjoyable. This is a little

different from the findings of some research studies on the major reasons for using the Internet, which found that older persons would like to benefit from health information accessible via the Internet (Morrell, 2002; Echt and Morrell, 2003). However, in Hong Kong, a similar finding on the main reason for self-enhancement was also found by Chan et al. (2003). Therefore, older persons would like to obtain more skills and knowledge. IT also seems to be a powerful tool to help older persons obtain information on further learning:

> "The Internet is useful when you need information. Older persons can acquire as much information as they want and they can learn whatever they want to. For example, they can access websites about the handicrafts that they are interested in." (KI4)

However, professionals also suggested that some older persons have not had the time and opportunities to learn IT before because of being busy with work and caring for their family. Therefore, older persons would like to learn IT after their retirement. The older persons also held similar views. They have more time after retirement, as their social roles have changed. Role theory recognises that role is important in defining us and our self-concept (Cottrell, 1942; Hooyman and Kiyak, 2007). Therefore, older persons' interest in learning increases for the purpose of role replacement and self-enhancement. For this reason, old persons believe that IT not only enriches their abilities, but also enhances their confidence and self-image. In

fact, old persons have multiple interests in learning, such as drawing, handicraft, dance, and so on. IT learning is a milestone of their life-long learning.

> "It is convenient when I can instantly access the Internet so whenever I wish I can get information on some course." (FGD1)

> "I want to learn IT for continuing education so as keep ourselves up to date with the current world. In fact, I can conveniently search for course information by using IT." (FGD2)

Respondents from both the professionals' and older persons' groups shared the view that self-enhancement is one of the main reasons for IT usage, and is a milestone of life-long learning. Older persons would like to enrich their life by acquiring current knowledge and skills, and IT is a popular medium for self-enhancement. However, some respondents also mentioned that using IT has provided older persons with a good leisure-time activity, because older persons regard IT usage as a fashionable way to kill time. In this way, perhaps they view themselves as more modern, up to date, and part of contemporary society.

4.1.3.5 Leisure activities

Last but not least, leisure activities were cited as another popular motivation for older persons to use IT. Respondents from the professionals' group mentioned that older

persons have more time after retirement. Therefore, older persons welcome the use of IT and accept it as a good leisure-time activity, from which they can derive great enjoyment.

> "IT is good for killing time. They have more things to do after learning computers. Some older people always play computer games here." (KI3)

> "Older persons are happy to play computers here as they have nothing to do at home. They enjoy using computers to kill time." (KI4)

Moreover, older persons agreed that they have more things to do after using IT. For example, they enjoy computer games, which are amusing and interesting for them. The Internet also provides a valuable platform for killing time. Older persons enjoy web browsing and playing simple online games.

> "I play with the computer when I have spare time. I am best at playing Mahjong with it." (FGD2)

> "I like to play computer games mainly to kill time." (FGD1)

Therefore, leisure activities were recognised as a benefit of IT by both professionals and older persons. In a study by Chan et al. (2003), about 40% of the elderly respondents used their computer for word processing and entertainment, such as

playing computer games. IT is not only a fashionable way to kill time, but it also benefits older persons in several ways. An early survey by Peniston (1990) indicated that playing computer games encouraged a more positive outlook on life amongst older persons, and allowed them to develop a greater sense of emotional well-being and self-worth. Schiesel (2007, p. 1) highlighted that "anxious about the mental cost of aging, older people are turning to games that rely on quick thinking to stimulate brain activity."

4.1.4 Difficulties with using IT

After reviewing the main reasons for using IT, it was also important to review the major difficulties that older persons experienced with using IT. Four main difficulties were faced: physical and cognitive deterioration, language barriers, complicated to use, and lack of resources. These difficulties were recognised by both older persons and professionals, and can be summarised as the "four Ps": problems with declining health, problems with language, problems with design, and problems with resources. Although those difficulties are somewhat interrelated, and more than one might affect individual older persons, this section will first focus upon the content and meaning expressed by the respondents.

4.1.4.1 Problem of declining health

The first barrier to using IT amongst older persons is related to physical and cognitive deterioration (health status), such as poor eyesight, shaking hands and forgetfulness. The respondents from the professionals' group stated that age-related declines in health, especially in vision and memory, are a common barrier to IT usage amongst older persons:

> "There are difficulties, especially physically. Some have poor eyesight whilst a number of them cannot control the mouse stably." (KI2)

> "They have short memories and are afraid that what they have learned in one lesson will not be remembered until the next one." (KI3)

Respondents from the older persons' group agreed that physical deterioration is one of their major barriers to using IT applications, especially for older persons aged 75 and above. Poor eyesight can make it difficult to focus on the screen for a long time because of feeling tired. Declining eyesight also makes it difficult for older people to identify and comprehend visual information on websites (Czaja, 2005).

> "The twinkling screen and small front size make me tired. I feel tired and dizzy because of four hours' web searching." (FGD2)

Respondents from the older persons' group also supported the idea that forgetfulness is a barrier for them to use IT, especially multi-function IT applications. Older persons feel that they easily forget the complex steps to operate some applications. According to Czaja (2005), a decline in working memory may create difficulties for older persons to learn new concepts or recall complex operational procedures.

> "There are difficulties in using computers. Mine is forgetfulness. For example, I forget the operating sequence when I want to do something with the computer." (OP2)

4.1.4.2 Problems with language

A second barrier for older persons using IT is problems with language. Respondents from both the professionals' and older persons' groups mentioned that older persons face language barriers in using IT because of their relatively low level of educational attainment and problems with English. According to the Hong Kong Census Department (2008), the majority of older persons (aged 65 and above) have relatively low levels of educational attainment, and the proportion of older persons with no schooling or pre-primary education and primary education only were 35.8% and 39.2% respectively in 2006. These figures are indicative of the lack of educational opportunities during the 1930s to 1950s and the disruption of the war between 1941–45 and beyond in Hong Kong. It is difficult for some semi-literate older

persons to use complicated IT applications because of their lower level of education and lack of mastery of English or Chinese script.

Problems with English are one of the crucial barriers for older persons to use IT in Chinese society. In foreign research, the most significant language barrier is usually identified as terminology, which impedes both technology use and communication about technology (Eisma et al., 2004). However, in this study, the most significant language barrier was found to be gaps in or a lack of English learning in Chinese society. Respondents from the professionals' and older persons' groups mentioned that some older persons are weak in English; therefore they find it difficult to use some software or to search for information using the Internet. In addition, some older persons find it difficult to use the keyboard because they are not proficient in the English alphabet:

> "Since our applications only require being able to read Chinese, some are not good at English reading and have difficulties in even using the keyboard." (KI4)

> "It is not possible to register for an email account if you do not know English as there are no Chinese characters in email addresses." (OP1)

4.1.4.3 Problems with IT design

The third barrier to using IT amongst older persons is that the design is too complicated to use. IT applications are complicated for older persons to use because of a mismatch in design. In general, the majority of IT users are younger people, and the major of developers of IT applications are also younger people. Thus, at the product design stage, little or no consideration is given to "different cohorts with different technological competencies" (Walker, 2005), such as older persons. Therefore, the cultural and experiential gap between developers and older persons means that IT products are distant from older persons' needs (Eisma et al., 2003, 2004; Preece et al., 2002). Respondents from the professionals' and older persons' groups also agreed that IT products are multi-function applications and not specifically designed for older persons:

> "IT products are not designed for older persons, so they are complicated for them to use. Although some IT products are designed specifically for students or businessmen, this is rarely so for older persons." (KI2)

> "They are not designed for us, but my grandson uses IT easily. However, it is complicated and difficult for me to use IT." (FGD2)

> "The computer is complicated to use. Many steps need to be memorised before using it; in addition, the mouse is hard to control." (FGD1)

4.1.4.4 Problems with resources

A fourth barrier to the use of IT amongst older persons is the lack of resources. Respondents from the professionals' and older persons' groups agreed that the problems with resources in terms of IT ownership and access mean that older persons have fewer opportunities to learn and practice their IT skills. Lack of practice makes them liable to forget what they already perceive to be complicated steps to use IT. Some feel that the key distinction that determines the use or non-use of IT is not age itself but resources (Raban and Brynin, 2006). In fact, age is correlated with both reduced health and resources, especially cash income. According to the Hong Kong Census and Statistics Department (2008), 93% of older persons belong to the economically inactive population: retired persons (86.8%), homemakers (5.1%) and other economically inactive persons (8.1%). Therefore, many older persons cannot readily afford to buy their own computers or pay Internet service charges:

> "My neighbour (Mr. Chow), for example, is 81. He only reads the newspaper daily, so purchasing a computer costing a few thousand dollars and subscribing to an Internet service for a hundred and something per month is not affordable for him." (OP1)

Moreover, although some older persons have a computer at home, they still face difficulties in accessing IT because the IT hardware is usually owned by their

younger family members. Thus, older persons are reluctant to use the computer:

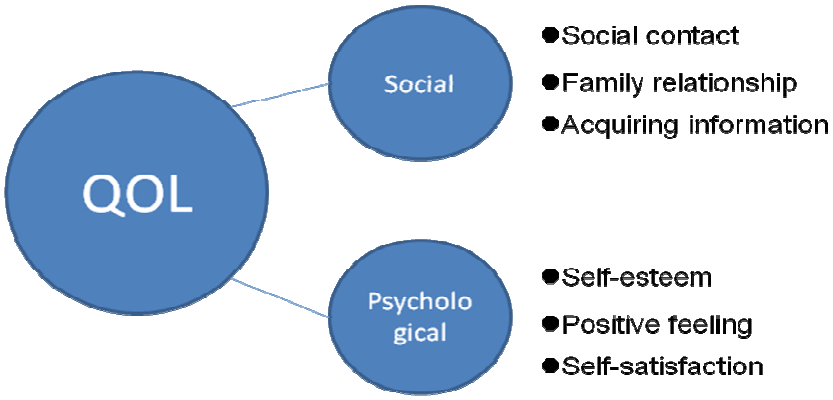
> "They forget what they have learned in a short period of time. Even if the older citizens have a computer at home they are reluctant to use it as such an appliance is usually owned by their family. If there was any malfunction, it would create a negative impact upon their relationships with their families. It is normal to forget what you have learned without practice." (KI5)

4.1.5 Possible relationships between IT usage and quality of life

Respondents from both the professionals' and older persons' groups accepted IT usage as positively related with older persons' quality of life (Table 4.1), particularly when older persons know how to use IT and can use IT in their daily life. The respondents also gave their opinions on how IT affects quality of life amongst older persons.

The six points are summarised into two aspects: social and psychological (see Figure 4.2). In terms of the social aspect, it was felt that quality of life will be improved by increasing social contact, enhancing family relationships and acquiring information. In terms of the psychological aspect, using IT can enhance self-esteem, encourage positive feelings, and help older persons to achieve self-satisfaction. It may also indirectly raise the image of older persons, who are often stereotyped as being IT-illiterate.

Figure 4.2: Perceived relationship between IT usage and quality of life



4.1.5.1 Quality of life: social aspect

In terms of the social aspect, respondents from both the professionals' and older persons' groups believed that IT usage amongst older persons can enhance their quality of life through acquiring information, maintaining social contacts, and improving their family relationships, which impact upon their social life.

First, the respondents believed that acquiring more information through the Internet can enhance the quality of life of older persons. In general, acquiring new information, knowledge and skills can develop older persons' confidence and image, improving their quality of life:

> "Older persons and young people are alike. If we complete a task or acquire new knowledge, our confidence will be built up. Overcoming

their fear of IT can enhance their quality of life." (KI2)

Older persons can also acquire information about health services and life-long learning, which is important for their physical and psychological health. The respondents supported the idea that acquiring information about society is important in their daily life, especially in an information-rich society like Hong Kong:

> "The Internet is good for me; it enriches my quality of life. I believe that information is power and wealth. It makes me tie in with my society." (OP1)

Secondly, the respondents mentioned that IT usage amongst older persons can benefit their social interaction and integration, which enhances their quality of life. This is especially significant for older persons who are isolated or who have mobility problems, as they can take advantage of using the Internet to gather information from a wide range of services (Walker, 2005). Moreover, according to Diener et al. (2002), wider social networks are positively associated with health and happiness. Therefore, older persons can remain in touch with society though IT in order to have a better quality of life:

> "Mastering technologies can lift their self-esteem to a great extent, thus allowing them to become more active and get in touch with society. For example, reading newspapers and communication through

> the Internet; learning such skills will undoubtedly improve their quality of life." (KI2)

Thirdly, the respondents believed that IT usage can improve the relationship between older persons and their family, which will improve older persons' quality of life. For this reason, personal relationships are important for well-being, especially family solidarity, which is a significant determinant of quality of life in old age (Walker, 2005). In fact, IT is not only a useful tool to communicate with overseas relatives, but is also a means to communicate with immediate family, which can provide more topics to discuss with their family members:

> "Communication increased between me and my grandchildren after I started learning computers because I occasionally seek help from them when I have difficulties in searching for certain information. They would usually respond by asking my reason. This gives more opportunities for interaction, and thus improves our relationship." (OP2)

4.1.5.2 Quality of life: psychological aspects

In terms of the psychological aspects, respondents from both the professionals' and older persons' groups supported the contention that IT usage amongst older persons can improve their quality of life through the enhancement of self-esteem, positive feelings and self-satisfaction, which are associated with psychological health. Gabriel and Bowling's (2004) study supported the contention that psychological well-being,

such as having a positive attitude and being optimistic, benefits the quality of life of older persons.

First, the respondents agreed that IT usage can enhance the self-esteem of older persons, which will improve their quality of life. A study by Chan et al. (2003, p. 17) had similar findings: "older persons feel more confident and have feelings that they were better than their counterparts once they acquired basic computer skills". Therefore, if older persons have knowledge about how to use IT, it provides them with a sense of achievement and increases their self-esteem, which improves their general quality of life:

> "IT users are smart. If you are not smart enough, you will find it difficult to use IT products, which belong to a younger generation. Therefore, I have more confidence after learning and using IT, since I can do something which many older persons cannot do." (FGD1)

The respondents also reported that using IT can widen older persons' horizons, promoting older persons to hold positive feelings about their life, raising their self-esteem. Positive feelings and optimism are also positively associated with quality of life:

> "Sure, I think I have a better self-image since I have known how to use IT. After accessing the Internet, I searched for many interesting things, which has widened my horizons. I think positively and I would like to live longer to know more about the world." (OP1)

Moreover, respondents agreed that IT usage amongst older persons could lead to self-satisfaction, enhancing their quality of life:

> "I enjoy playing online games that are interesting and funny. I play chess with my grandson though the Internet sometimes. Moreover, I like taking photos very much. The Internet is convenient. I love sharing my experiences and searching photo albums though the Internet." (FGD2)

4.1.6 Summary of qualitative analysis

These qualitative findings provide useful insight into older persons' perspectives on IT. These findings also revealed the reasons for and barriers to using IT, and the perceived correlation between IT usage and quality of life amongst older persons.

After analysing the qualitative data, some elements of the reasons for, and barriers to, using IT appeared to be valuable in explaining IT usage amongst older persons. To a certain extent, findings about perceived quality of life are similar to some of the domains in the WHOQoL, which are useful to illustrate the quality of life amongst older persons.

In terms of IT acceptance behaviour, Table 4.2 shows the elements common to both the qualitative findings (reasons and barriers) and IT acceptance models and theories. Perceived usefulness, family connection, self-enhancement, and leisure activities were grouped together as perceived usefulness from TAM (Davis, 1989), because these elements from the qualitative findings are highly related to utility and usefulness in the daily lives of older persons. For example, the Internet is useful for older persons to keep in touch with their family and also to search for learning and recreational information.

Being a social trend, seen from the qualitative findings, is similar to subjective norms from TPB (Ajzen, 1991) in terms of social influence. Moreover, image and visibility from IDT (Moore and Benbasat, 1991) are also shaped by social influences. Physical deterioration, complicated to use, and language barriers, seen from the qualitative findings, are negatively related to ease of use. For example, some older persons find it difficult to use the computer when they forget the complicated steps to use computer software. Therefore, physical deterioration, complicated to use and language barriers are also shown to be significant in terms of perceived ease of use in TAM (Davis, 1989) in order to explain IT usage. Lack of resources from the qualitative findings corresponds with perceived control from TPB, because both

reflect the constraints upon IT usage. Table 4.2 provides a synthesis of the combined results

.

Table 4.2: Synthesis of the qualitative findings and IT acceptance models and theories

Qualitative findings	**IT acceptance models and theories**
Perceived usefulness	Perceived usefulness
Family connection	
Self-enhancement	
Leisure activities	
Social trend	Subjective norms
	Image
	Visibility
Physical deterioration	Perceived ease of use
Complicated to use	
Language barriers	
Lack of resources	Perceived control

After devising the synthesis of the qualitative findings and IT acceptance models and theories, the importance of several variables emerged in understanding IT usage amongst older persons. Those variables were the intention, attitude, subjective norms and perceived control.

First, intention is crucial to examine IT usage amongst older persons. The basic assumptions of TAM and TPB are adopted from the theory of reasoned action (TRA),

whereby individual behaviour is driven by behavioural intention (Fishbien and Ajzen, 1975; see also Fishbein, 1967, and Ajzen and Fishbein, 1973). This means the greater the intention of older persons to use IT, the more they will use IT.

Second, attitude, subjective norms and perceived control are also crucial to illustrate IT usage amongst older persons. This is based on TPB assumptions that behavioural intention is a function of an individual's attitude towards behaviour, subjective norms and perceived control (Ajzen, 1985, 1991). In addition, perceived usefulness, perceived ease of use, image and visibility are determinants of the attitude construct. In Fenech's study (1998), perceived usefulness and perceived ease of use from TAM were adopted as determinants of the attitude construct. Additionally, in Mao and Palvia's research (2006), the two constructs from IDT, image and visibility (Roger, 1962; Moore and Benbasat, 1991) were also adopted as determinants of attitude.

On the other hand, some qualitative findings are consistent with the facets from WHOQoL, which is useful in illustrating IT-related quality of life. Although the WHOQoL is well developed and it measures quality of life comprehensively, it is weak in terms of assessing specific populations in detail. Therefore, the World Health Organization is still developing different modules for specific populations, such as people with certain diseases (HIV/AIDS), and different instruments to measure

quality of life are being formulated to fill the gap.

Recently, rapid developments in IT have shown the potential to transform the lives of older persons. Therefore, it is crucial to investigate the impact of IT upon the quality of life of older persons. After summarising the common instruments to measure quality of life in Chapter 2, no instrument was found for IT-related quality of life. Thus, constructs for IT-related quality of life were formulated based on the qualitative findings and facets from the WHOQoL. Six facets from the WHOQoL were used based on the similarity with the qualitative findings, shown in Table 4.3.

Table 4.3: Comparison of qualitative findings and facets from the WHOQoL

Qualitative findings	**Facets from the WHOQoL**
Social contact	Social support
Family relationship	Personal relationship
Acquiring information	Opportunities for acquiring new information and skills
Self-esteem	Self-esteem
Positive feeling	Positive feeling
Self-satisfaction	Participation in and opportunities for recreation/leisure

Some constructs are the same in both the qualitative findings and the facets from the WHOQoL, such as self-esteem and positive feelings. Social contact from the qualitative findings is similar to social support from WHOQoL, as both terms consider the effect of social interaction. Furthermore, family relationship from the

qualitative findings resembles personal relationship from the WHOQoL, as family relationship is a type of personal relationship. Moreover, acquiring information from the qualitative findings presents opportunities for acquiring new information and skills from WHOQoL, as they share the same concepts about obtaining new information. Self-satisfaction from the qualitative findings is similar to participation in and opportunities for recreation/leisure, because self-satisfaction is the result of participation in leisure activities.

Key variables (Intention, attitude, subjective norms, perceived control, behaviour and quality of life) helped to understand the relationships between IT usage amongst older persons and their quality of life. Therefore, a face-to-face survey was conducted to explore the correlation amongst those key variables and to sketch a description of the people in the types of organisation servicing the IT awareness programme.

4.2 Profile of participants for the survey

A face-to-face survey was conducted between January and March 2008. A quota sampling method was adopted, through which 96 respondents were recruited from nine neighbourhood elderly centres (NECs) in four selected urban districts in Hong Kong, selected based on their population characteristics in order to understand the extent IT usage influences quality of life.

After analysing the data using SPSS, IT usage amongst older persons was examined based on demographic characteristics. In general, IT usage patterns amongst older persons were addressed in terms of computers, the Internet, and mobile phones. Next the correlation amongst key variables was addressed.

4.2.1 Demographic characteristics

There were 96 respondents in this phase of the research. In Table 4.4, more females (61.5%, n = 59) than males (38.5%, n = 37) participated in the survey. In addition, more young-old persons (aged 60–74; 84.4%, n = 81) than old-old persons (aged 75 or above; 15.6%, n = 15) participated in the survey. The majority of participants mainly had primary (39.6%, n = 38) and secondary (31.3%, n = 30) levels of education. The majority of participants mainly had low monthly income of $1000 or less (28.1%, n=27). However, 22.9 % (n=22) of participants had high monthly

income of $5000 or above.

Table 4.4: Demographic characteristics of the respondents (N=96)

	No. of Case	%
Gender		
Male	37	38.5
Female	59	61.5
Age		
Young old (60-74)	81	84.4
Old old (75+)	15	15.6
Education level		
No education	11	11.5
Primary	38	39.6
Secondary	30	31.3
Matriculation	7	7.3
Tertiary	10	10.4
Monthly income		
$1000 or under	27	28.1
$1001–$2000	11	11.5
$2001–$3000	17	17.7
$3001–$4000	7	7.3
$4001–$5000	4	4.2
$5001 or above	22	22.9
No answer	8	8.3

4.2.2 IT usage patterns amongst older persons

Three IT products' usage patterns were addressed in this research: computers, the Internet, and mobile phones.

In terms of computer usage, the majority of respondents seldom (n = 39, 40.6%) or sometimes (n = 28, 29.2%) used computers. Moreover, most respondents who accessed computers themselves were not familiar with computer use (n = 58, 60.4%). The average days and hours that older computer users used a computer per week were 2.6 (SD = 2.2) and 4.4 (SD = 5.4) respectively. Although the majority of respondents had one (n = 48, 50.1%) or more than one (n = 26, 27.1%) computer at home, most did not own their own computer (n = 56, 58.3%). Most of the respondents used a computer for playing games (n = 54, 56.3%) or searching the Internet (n = 45, 46.9%).

In terms of Internet usage, the majority of respondents who used the Internet before the interview reported that they sometimes (n = 20, 20.8%) and seldom (n = 19, 19.8 %) used the Internet. Moreover, those respondents not familiar with using the Internet mostly accessed the Internet themselves (n = 28, 29.2%). Older Internet users spent an average of 2.9 hours (SD = 4.0) surfing the web. Most older Internet users used the Internet to search for news (n = 36, 37.5%), search for leisure information (n = 17, 17.7%) and play online games (n =11, 11.5%).

In terms of mobile phone usage, the majority of respondents stated that they always used their mobile phone (n = 57, 59.4%). Most respondents deemed themselves to have "average" familiarity with using a mobile phone (n = 53, 55.2%). Most respondents reported that they had one mobile phone (n = 39, 40.6%), which was most often given to them by their sons or daughters (n = 49, 51.0%).

4.2.3 Correlations amongst variables

The mean, standard deviation and correlation amongst variables were listed in Table 4.5. The findings depicted in Table 4.5 show that attitude(r = 0.37, p <0.01), perceived control (r = 0.40, p <0.01) and subjective norms (r = 0.39, p <0.01) are positively significantly to intention. However, intention is related positively significantly to behaviour (IT usage) (r = 0.44, p <0.01). Most important of all, IT usage related positively significantly to quality of life (r = 0.20, p <0.01).

Table 4.5: Inter-correlations, mean and standard deviation amongst key variables (N=96)

Variables	A	B	I	PC	QoL	SN
Attitude (A)	4.13(0.58)					
Behaviour (B)	0.22**	2.90(0.50)				
Intention (I)	0.37**	0.44**	3.78(0.69)			
Perceived control (PC)	0.40**	0.25*	0.46**	3.39(0.64)		
Quality of life (QoL)	0.38**	0.38**	0.32**	0.30**	3.65(0.33)	
Subjective norms (SN)	0.39**	0.20**	0.30**	0.36**	0.40**	3.52(0.64)

Note: * = significant at 0.05 level; ** = significant at 0.01 level.

Diagonals are mean and standard deviation (in bracket)

4.2.4 Summary of quantitative findings

The quantitative findings indicate the demographic characteristics and IT usage patterns amongst older persons who had participated in the IT awareness courses. Next, positive significant correlations amongst some variables were found. In addition, IT usage is related positively and significantly to quality of life. Further discussion on the quantitative findings is found in Chapter 5.

Chapter 5: Discussion and Conclusion

This study investigated IT usage and the relationships between IT usage and quality of life amongst older persons in Hong Kong. One aspect was to be able to suggest how to improve any issues identified between older persons and the rapid development of an IT-based society. Focus group discussions, in-depth interviews with key informants, and face-to-face surveys were employed in this research. First, two focus groups involving 12 older persons were conducted, and nine respondents (five professionals and four older persons) were invited to participate in the in-depth interviews. Further, 96 respondents recruited from nine neighbourhood elderly centres in four selected districts completed the questionnaires. The findings were then used to address the three main research questions posed in Chapter 1 as follows:

1) What is the meaning of IT amongst older persons?
2) For what reasons do older persons accept or not accept the use of IT, and what barriers do they meet if they attempt to use IT?
3) To what extent does IT usage influence quality of life?

5.1 Research findings and discussion

The first step was to understand the meaning of IT from older persons' perspectives in order to investigate IT usage amongst older persons. The meaning of IT was mainly investigated in the qualitative research stage, as "qualitative data can be richer in meaning than qualified data" (Babbie, 2001, p. 36). In Chapter 4, the qualitative research findings demonstrated that from older persons' perspectives, IT is used to diffuse information quickly and globally. The most commonly cited examples of IT in daily use were computers, the Internet and mobile phones. The emphasis upon information diffusion in their definition of IT revealed the information needs of older persons in modern society. This was supported by the survey findings, with most respondents using a computer for playing games (n = 61, 36.7%) and searching the Internet (n = 49, 29.5%). Most Internet users used the Internet to search for news (n = 38, 22.9%) and leisure information (n = 19, 11.4%). This is broadly in line with Fox's (2004) study of the USA, which found information gathering is one of the major uses of the Internet, with 82% of online older persons using the Internet to search for information. Surprisingly, different types of information were sought between older persons in the US and Hong Kong. American older persons mainly sought information about health (Morrell, 2002; Fox, 2004) whilst. In this research, older persons in Hong Kong mainly sought information about news and leisure activities. Therefore, the information needs of older persons

were the underlying motivation behind IT usage, which may influence their quality of life.

Secondly, understanding the reasons for and barriers to using IT amongst older persons was crucial to examining IT usage amongst older persons. The qualitative research stage was conducted in order to explore the reasons for and barriers to using IT from an older persons' perspectives.

At the qualitative stage, five major reasons for using IT and four major barriers to using IT were addressed in the exploration of IT acceptance behaviour amongst older persons. The five major reasons for older persons using IT were perceived usefulness, social trends, maintenance of family connections, self-enhancement, and leisure activities. The four major barriers to older persons using IT were problems with declining health, problems with language, problems with IT design, and problems with resources (financial).

A survey was conducted to investigate older persons' IT usage in terms of their intentions to use and actual use of IT. The results showed that IT usage amongst older persons can be examined through respondents' demographic characteristics, especially age, education level and monthly income. These results corroborate

Cluster's (2006, p. 267) work, who noted that "socioeconomic and demographic variables play a key and consistent role in explaining variation in access to and use of computers and the Internet". Therefore, older who are younger (aged 60-75), have a higher educational attainment and higher monthly income, are more willing to accept and use IT applications in Hong Kong and Western societies.

Based on the overall analysis, the respondents' top three reasons for using IT were self-enhancement (n = 37, 38.5%), acquiring new information (n = 33, 34.4%) and entertainment (n = 28, 29.2%). By contrast, the top three difficulties experienced in using IT amongst the respondents were forgetfulness (n = 43, 44.8%), its being complicated (n = 35, 36.5%) and problems with English (n = 27, 28.1%). Therefore, some of the major reasons for IT usage amongst older persons were consistent between the qualitative findings and survey's results. Self-enhancement, entertainment, and perceived usefulness (acquiring information) are relatively crucial reasons for IT usage amongst older persons.

However, not only the reasons for and barriers to using IT, but also the intention for IT usage amongst older persons is also important to understanding IT acceptance behaviour. In the survey's results, behavioural intention was significant correlated with IT usage ($r = 0.44$, $p < 0.05$).

Thirdly, both the qualitative and quantitative findings supported the idea that IT usage amongst older persons affects their daily lives, especially their quality of life. The qualitative research stages were conducted in order to explore the perceived relationships between IT usage and quality of life from an older persons' perspective. Then, the survey was conducted in order to examine the correlations between IT usage amongst older persons and their quality of life.

At the qualitative stage, respondents from both the professionals' and older persons' groups agreed that IT usage is positively related to older persons' quality of life. The six points were summarised into two aspects: social and psychological. From a social aspect, the respondents believed that by using IT, older persons could increase their social contacts, enhance their family relationships, and allow them to acquire information in order to improve their quality of life. In terms of the psychological aspect, the respondents reported the contention that IT usage can help older persons to enhance their self-esteem, encourage positive feelings in their life, and achieve self-satisfaction.

In addition, the survey findings showed that IT usage amongst older persons is positively related to their quality of life ($r = 0.38$, $p < 0.01$), which is supported by

Chan et al.'s study. Chan et al. (2003, p. 19) concluded that "learning and using computers are able to enhance the subjective well-being of the users by giving them a sense of achievement and self-esteem, which in turn helps to improve their quality of life in general". Therefore, both the qualitative and quantitative findings revealed that IT usage amongst older persons was positively related to their quality of life.

5.2 Conclusions

This study provided insight into the meaning of IT to older persons, which contributed to the further studies. It also investigated the reasons for, barriers to and intentions for IT usage amongst older persons, as well as the correlation between their IT usage and quality of life. A survey was employed to help understanding IT usage amongst older persons and the relationships between their IT usage and quality of life. This survey provided a systematic and practical means to investigate IT adoption and use amongst older persons. However, the survey's result was limited by its non-probability sampling. Therefore, the findings cannot be generalized to the whole older population in Hong Kong.

This study has advanced knowledge and theory in social gerontology as "theory development in social gerontology has for the most part neglected technological change" (Cutler, 2006, p. 258). In addition, this study also revealed the direction of

establishment of IT-related quality of life amongst older persons, and provided an Asian case study in the field of gerontechnology, which is a relatively new and emerging area of study in both Western and Chinese societies (Bouma et al, 2008).

5.3 Policy recommendations

This study has demonstrated that IT usage is positively and significantly related to older persons' quality of life, especially in terms of providing social support and acquiring new information and skills. Moreover, this study indicated that perceived usefulness and perceived control are significant reasons for the intended and actual IT usage amongst older persons. Hence, the following policy recommendations mainly focus upon perceived usefulness and perceived control in order to encourage older persons to use IT regularly and to keep then using IT.

Firstly, as IT usage is positively related to quality of life amongst older persons, the HKSAR government should continue the "IT Awareness Programme for the Elderly" in order to encourage more older persons to learn about and experience IT. There are currently 32 elder academies, launched by the Elderly Commission in Hong Kong (2008) and jointly run by primary and secondary schools, tertiary institutions, and partner and non-governmental organisations (NGOs), in order to promote active ageing and to enable older persons to lead a flourishing life through life-long

learning. These elder academies provide some IT courses for older persons, therefore course design should focus upon usefulness to older persons' daily lives (entertainment and acquiring information) in order to attract more older persons to learn and use IT.

Secondly, as perceived control is one of the major reasons for IT acceptance amongst older persons, the government should devote more resources to make it easier for older persons to use IT continuously. For example, more resources could be provided in order to replace malfunctioning or old model computers in community centres for the elderly, and IT assistants should be employed to help older persons use IT. Malfunctioning computers are obstacles to regular IT usage amongst older persons, because the majority of respondents mostly used computers at community centres for the elderly (n = 52, 31.3%). IT assistants should be employed in order to help older persons use IT, and to maintain the IT applications in good order.

Thirdly, support from family is important in order to encourage IT acceptance amongst older persons. Many respondents reported that although they have computers at home, they seldom use these computers because they belong to their family members. In addition, they cannot use the computers at community centres for the elderly, as many of these computers are malfunctioning and require

maintenance. A lack of practice with using computers makes older persons lose interest. Therefore, family members may take on the role of providing a comfortable environment in order to encourage older relatives to use the computer at home. Some software can be valuable in order to maintain a balance between data safety and IT usage amongst older persons, such as virtual desktops.

Last but not least, older persons who live alone or want to own their own computers may be able to make use of the computer recycling and wireless city schemes in order to obtain recycled computers and to access the Internet freely. The HKSAR government was collaborated with the Hong Kong Council of Social Service to implement a computer recycling scheme (2005–2007) for students from low-income and indigent families (Digital 21 strategy, 2008). In addition, the Hong Kong Caritas computer recycling project was organised by Caritas Hong Kong and sponsored by the Hong Kong Environmental Protection Department (Caritas Hong Kong, 2008). Although these schemes recycled and refurbished computers and provided them to the needy, they mainly focused upon students from low-income and indigent families rather than older people. Thus, the extension of the computer recycling scheme to older persons is necessary in order to provide them with basic computer systems.

The utilisation and extension of the wireless city scheme can provide free wireless

Internet access for older persons who cannot afford monthly broadband access fees. Government Wi-Fi Programme (GovWiFi) is one of the major initiatives under the 2008 Digital 21 Strategy to build Hong Kong into a wireless city in order to provide free, basic wireless Internet access in 350 government premises (including public libraries and many public buildings) and about 120 designated public rental housing estates by 2009 (Digital 21 strategy, 2008). Free wireless adaptors and user-friendly, step-by-step installation guides could be provided to help older persons to help them utilise this service.

5.4 Limitations of the study and recommendations for future study

There were two main limitations in both the qualitative and quantitative stages, which resulted from limited resources for an individual researcher. In the qualitative stage, sampling size was restricted, especially in the focus group discussions and in-depth interviews in the older persons' group. The two focus groups involving 12 older persons were rather a small number to reveal the general picture of IT usage amongst older persons. The four in-depth interviews with older persons, who represented different frequencies of IT usage (always, seldom, never, and never with a mobile phone), were insufficient from which to make any generalisations about IT usage amongst older persons.

Thus, future studies could be conducted using larger samples, especially different frequencies of IT usage amongst older persons, which will be useful to understand in-depth IT usage amongst older persons via a qualitative approach. Further quantitative study could be conducted in order to obtain a more comprehensive understanding of IT usage amongst older persons. In this study, the quantitative approach was used to understand the correlation between IT usage amongst older persons and their quality of life.

However, some limitations were noted in the quantitative stage. Although the researcher tried to recruit the respondents in the samples systematically from each chosen centre, the findings cannot be generalized to the entire older population in Hong Kong. In this stage, the main limitation was that the sample was mainly drawn from members of selected neighbourhood elderly centres (NECs), which meant that older persons who did not participate in the NECs were not included in this study. These older persons who do not attend NECs may include those with a higher education level and those who belong to a higher income class. Therefore, this study would not include older persons with higher education levels and belonging to high income brackets. However, education level and income are apparently important in order to understand IT usage amongst older persons, which is supported by this study (see Chapter 4) and other studies (e.g., Chan et al., 2003).

Therefore, future research could usefully focus upon older persons from higher education and higher income groups in Hong Kong in older to find if there are any differences in IT acceptance behaviour amongst such groups of older persons. Moreover, future studies on IT-related quality of life are necessary in order to understand the impact of IT on older persons' quality of life. This will help to provide more comprehensive picture of older persons' IT usage, as well as ways of enhancing usage, in Hong Kong.

Appendix I

In-depth interview guide (Professional)

1) What do you think about the Information Technology in general, but with older person in mind? Can you give me some examples?

2) What are your observations on the older persons and their use / non-use of the Information Technology? (e.g. Computer, Internet, Mobile Phones and etc)

3) In your experience, why do older persons use Information Technology?

4) What difficulties have you seen/thought of in older persons using Information Technology?

5) Do you think there is any relationship between the Information Technology, Older Persons and their Quality of life? If so, why?

6) Do you think there are any positive impacts or benefits of using Information Technology for older persons? If so, what might they be?

Appendix II

In-depth interview guide (Older persons)/ Focus group question guidelines

1) Do you know what information technology is? Can you give me some examples?

2) In your experience, why do older persons use and learn the information technology?

3) Do you personally own or use of any products of information technology? Why? How about your older or younger friends?

4) If you have learnt to use any IT products, what was your experience in learning? How often do you use those IT products?

5) Have you got any suggestions as to what might make it easier for you (or your friends) to learn and use IT?

6) It is necessary for you to use the IT products in your daily life? (ranking: highest 10-lowest 1) If so, Why?

7) If you could get use of IT, how do you think it might change your life?

8) Do you think your use of or access to information technology has affected your quality of life? If so, Why?

Appendix III

Questionnaire (Chinese Version)

資訊科技使用與長者生活質素:
香港的質量與數量研究

訪問員:_____ 訪問地點:_____ 電腦班 Y/N 問卷編號:_____

你/妳好，我是嶺南大學的學生，我現正進行一個有關資訊科技使用與長者生活質素關係的研究。多謝大家的幫忙，請放心你所提供的資料會絕對保密。

Part A 資訊科技的使用情況 IT Usage

1 請問你/妳有幾經常使用以下的科技產品呢?

1.1 電腦	1.從不	2. 很少	3.有時	4.時常	5. 經常
1.2 互聯網	1.從不	2. 很少	3.有時	4.時常	5. 經常
1.3 手提電話	1.從不	2. 很少	3.有時	4.時常	5. 經常

如果第 1.1 題(幾經常使用電腦)，答案是(1.從不)，請跳到第 15 題繼續回答其餘的問題。
如果第 1.1 至 1.3 題(幾經常使用電腦、互聯網和手提電話)，答案是(1.從不)，請跳到第 19 題繼續回答其餘的問題。

2 請問你/妳認爲自己有多熟悉使用電腦?
1 完全不懂 2. 不熟悉 3. 一般 4. 熟悉 5. 十分熟悉

3 請問你/妳用了電腦多久?
_____年/月(請填上適當的答案)

4 請問你/妳每星期會用多少天電腦?
0 1 2 3 4 5 6 7

5 請問你/妳每星期會花多少時間來使用電腦?
_____小時(請填上適當的答案)

6 請問你/妳家中有多少部電腦?(包括手提電腦)
0 1 2 3 4 5 6 部或以上

7 請問你/妳自己擁有多少部電腦? (包括手提電腦)

0　　1　　2　　3　　4　　5　　6 部或以上

8 請問你/妳最經常在那兒使用電腦?

1. 家中 2. 社區中心 3. 朋友家中 4. 親友家中 5. 辦公室
6. 其他_____

9 請問你/妳主要用電腦來做甚麼? (可選舉多項答案)

1. 上網 2. 玩遊戲 3. 看影像 4. 看相片 5. 圖像處理
6. 工作 7. 文書處理 8. 聽音樂 9. 其他_____

10 請問你/妳的電腦能連結上網嗎?

0. 沒有電腦　　1. 不能上網　　2. 能夠上網

如果第 10 題(有沒有連結上網)，答案是(1. 不能上網)，請跳到第 15 題繼續回答其餘的問題。

11 請問你/妳認爲自己有多熟悉使用電腦來上網?

1 完全不懂　　2. 不熟悉　　3.一般　　4. 熟悉　　5. 十分熟悉

12 請問你/妳用了互聯網多久?

_____年/月(請填上適當的答案)

13 請問你/妳每星期會花多少時間來上網?

_____小時(請填上適當的答案)

14 請問你/妳主要上網做甚麼? (可選舉多項答案)

1. 查閱新聞資訊 2. 查閱股票資訊 3. 查閱消閒資訊
4. 與家人聯絡 5. 與朋友聯絡 6. 與親友聯絡
7. 照片分享 8. 使用網上銀行服務 9. 使用電子購物服務
10. 玩網上遊戲 11. 上網閱讀雜誌/報章
12. 使用網上政府服務 13. 其他_____(請填上適當的答案)

15 請問你/妳認爲自己有多熟悉使用手提電話?

1 完全不懂　　2. 不熟悉　　3.一般　　4. 熟悉　　5. 十分熟悉

16 請問你/妳用了手提電話多久?
_____年/月(請填上適當的答案)

17 請問你/妳自己曾經擁有多少部手提電話?
0 1 2 3 4 5 6 部或以上

18 請問你/妳的手提電話是從何途徑得到的?
1.自己 2.兒女 3.配偶 4.孫子孫女 5.親戚 6.朋友 7.其他_____(請填上適當的答案)

Part B 資訊科技使用意向 Intentions of using IT
19 請問你/妳爲什麼要用資訊科技? (可選舉多項答案)
1. 自我增值 2. 消遣 3. 學習新技能 4. 得到新資訊 5. 覺得有趣 6. 越來越多人用 7. 家人朋友鼓勵 8. 其他:_____ (請填上適當的答案)

20 以下是一些形容你/妳使用資訊科技意向的句子，請問你/妳有幾同意以下的句子?

20.1 使用資訊科技是好事	1.十分不同意	2. 不同意	3.一般	4. 同意	5. 十分同意
20.2 使用資訊科技是有好處的	1.十分不同意	2. 不同意	3.一般	4. 同意	5. 十分同意
20.3 使用資訊科技是有價值的	1.十分不同意	2. 不同意	3.一般	4. 同意	5. 十分同意
20.4 資訊科技對我的生活有用	1.十分不同意	2. 不同意	3.一般	4. 同意	5. 十分同意
20.5 使用資訊科技使我更有效率	1.十分不同意	2. 不同意	3.一般	4. 同意	5. 十分同意
20.6 資訊科技是容易使用的	1.十分不同意	2. 不同意	3.一般	4. 同意	5. 十分同意
20.7 資訊科技是容易學習的	1.十分不同意	2. 不同意	3.一般	4. 同意	5. 十分同意

20.8 使用資訊科技是無困難的	1.十分不同意	2. 不同意	3.一般	4. 同意	5. 十分同意
20.9 使用資訊科技能提升我的形象	1.十分不同意	2. 不同意	3.一般	4. 同意	5. 十分同意
20.10 用資訊科技的人是醒目的	1.十分不同意	2. 不同意	3.一般	4. 同意	5. 十分同意
20.11 我經常看到他人使用資訊科技	1.十分不同意	2. 不同意	3.一般	4. 同意	5. 十分同意
20.12 我經常看到家人使用資訊科技	1.十分不同意	2. 不同意	3.一般	4. 同意	5. 十分同意
20.13 我容易觀察家人使用資訊科技的情況	1.十分不同意	2. 不同意	3.一般	4. 同意	5. 十分同意
20.14 朋友都認爲我能使用資訊科技	1.十分不同意	2. 不同意	3.一般	4. 同意	5. 十分同意
20.15 家人都認爲我能使用資訊科技	1.十分不同意	2. 不同意	3.一般	4. 同意	5. 十分同意
20.16 社會上有很多人使用資訊科技	1.十分不同意	2. 不同意	3.一般	4. 同意	5. 十分同意
20.17 我有信心使用資訊科技	1.十分不同意	2. 不同意	3.一般	4. 同意	5. 十分同意
20.18 我有能力控制資訊科技	1.十分不同意	2. 不同意	3.一般	4. 同意	5. 十分同意
20.19 我會繼續使用資訊科技	1.十分不同意	2. 不同意	3.一般	4. 同意	5. 十分同意
20.20 我會用更多時間，學習怎樣使用資訊科技	1.十分不同意	2. 不同意	3.一般	4. 同意	5. 十分同意

21 請問你/妳使用資訊科技是遇到的最大困難是什麼?
1.太複雜 2.經常忘記 3.害怕弄壞 4.看得不太清楚 5.很難控制 6.不太懂英
7.其他:_____

Part C 生活質素 Quality of life

22 以下是一些形容你/妳資訊科技與生活質素的句子，請問你/妳有幾同意以下的句子?

22.1 使用資訊科技能提升我的生活質素	1.十分不同意	2. 不同意	3.一般	4. 同意	5. 十分同意
22.2 使用資訊科技能提升我的自尊	1.十分不同意	2. 不同意	3.一般	4. 同意	5. 十分同意
22.3 使用資訊科技能使我更有自信	1.十分不同意	2. 不同意	3.一般	4. 同意	5. 十分同意
22.4 使用資訊科技使我有正面的思想	1.十分不同意	2. 不同意	3.一般	4. 同意	5. 十分同意
22.5 使用資訊科技使我更積極	1.十分不同意	2. 不同意	3.一般	4. 同意	5. 十分同意
22.6 使用資訊科技能改善我的人際關係	1.十分不同意	2. 不同意	3.一般	4. 同意	5. 十分同意
22.7 使用資訊科技能改善我與家人的關係	1.十分不同意	2. 不同意	3.一般	4. 同意	5. 十分同意
22.8 家人的支持我使用資訊科技	1.十分不同意	2. 不同意	3.一般	4. 同意	5. 十分同意
22.9 朋友支持我使用資訊科技	1.十分不同意	2. 不同意	3.一般	4. 同意	5. 十分同意
22.10 使用資訊科技，使我學習到新技能	1.十分不同意	2. 不同意	3.一般	4. 同意	5. 十分同意

22.11 使用資訊科技，使我得到新知識	1.十分不同意	2. 不同意	3.一般	4. 同意	5. 十分同意
22.12 使用資訊科技時，使我能自我放鬆	1.十分不同意	2. 不同意	3.一般	4. 同意	5. 十分同意
22.13 我很享受使用資訊科技	1.十分不同意	2. 不同意	3.一般	4. 同意	5. 十分同意

23 以下是一些形容你/妳生活質素的句子，請圈出現在最合適的答案

23.1 請問你/妳怎樣評估你的生活質素?

1.十分不滿意 2. 不滿意 3.一般 4. 滿意 5. 十分滿意

23.2 請問你/妳滿意自己現時的健康狀況嗎?

1.十分不滿意 2. 不滿意 3.一般 4. 滿意 5. 十分滿意

23.3 請問你/妳在日常生活中，你感到安全嗎?

1.十分不安全 2. 不安全 3.一般 4. 安全 5. 十分安全

23.4 請問你/妳認爲身處的自然環境健康嗎?

1.十分不健康 2. 不健康 3.一般 4. 健康 5. 十分健康

23.5 請問你/妳有幾滿意自己住所的情況呢?

1.十分不滿意 2. 不滿意 3.一般 4. 滿意 5. 十分滿意

23.6 請問你/妳有足夠的金錢應付需要嗎?

1.十分不足夠 2. 不足夠 3.一般 4. 足夠 5. 十分足夠

23.7 請問你/妳滿意自己的理財能力嗎?

1.十分不滿意 2. 不滿意 3.一般 4. 滿意 5. 十分滿意

23.8 請問你/妳有幾滿意自己和家人的關係呢?

1.十分不滿意 2. 不滿意 3.一般 4. 滿意 5. 十分滿意

23.9 請問你/妳有幾滿意朋友對你的支持呢?

1.十分不滿意 2. 不滿意 3.一般 4. 滿意 5. 十分滿意

23.10 整體而言，你對自己的生活感到幾滿意呢?

1.十分不滿意　2. 不滿意　3.一般　4. 滿意　5. 十分滿意

Part D 個人資料 Personal Information

性別	1.男 2.女
年齡	_____
婚姻狀況	1.單身 2.已婚 3.離婚 4.孤寡 5.分居 6.不願作答
教育程度	1.沒受正規教育 2.小學程度 3.中學程度(中一至中五) 4.預科程度 5.大專程度或以上 6.不願作答
居住狀況	1.獨居 2.與家人同往 3.與親友同住 4.其他:_____ 5.不願作答
就業情況	1.全職工作 2.兼職/半職工作 3.已退休_____(請註明退休前工作) 4.家庭主婦 5. 不願作答
現時每月平均收入	1. $1000 或以下 2. $1001-$1500 3. $1501-$2000 4. $2001-$2500 5. $2501-$3000 6. $3001-$3500 7. $3501-$4000 8. $4001-$4500 9. $4501-$5000 10.$5001 或以上
同往家庭成員人數	_____
家庭每月平均收入	1. $5000 或以下 2. $5001-10000 3. 10001-15000 4. 15001-20000 5. $20001-25000 6. 25001-30000 7. 30001 或以上 8. 不知道

問卷完，多謝

Appendix IV

Questionnaire (English Version)

Information Technology Usage and Quality of Life amongst Older Persons:
A Qualitative and Quantitative Study in Hong Kong

Interviewer:_____ Place of Interview:_____ Computer Class Y/N No:_____

Hello, I am a student from Lingnan University. I am conducting a study about the relationships between information technology usage and quality of life amongst older persons. Thank you for your help, and the information you provided will be highly confidential.

Part A IT Usage

1 How often do you use the following IT products?

1.1 Computer	1.Never	2. Seldom	3.Sometimes	4.Often	5. Always
1.2 Internet	1.Never	2. Seldom	3.Sometimes	4.Often	5. Always
1.3 Mobile Phone	1.Never	2. Seldom	3.Sometimes	4.Often	5. Always

In question 1.1, if your answer is (1. Never), please go to question 15.
From question 1.1 to 1.3, if all answers are (1. Never), please go to question 19.

2 To what extent would you rate your familiarity in using computer?

1. Very Unfamiliar	2. Unfamiliar	3. Average	4. Familiar	5. Very Familiar

3 How long have you been using the computer?
_____ Years/Months (Please fill in an appropriate answer)

4 How many days do you use the computer per week?

0	1	2	3	4	5	6	7

5 How many hours do you use the computer per week?
_____hours (Please fill in an appropriate answer)

6 How many computers do you have at home?(including notebook)

0	1	2	3	4	5	6 or more

7 How many computers do you own? (including notebook)

0 1 2 3 4 5 6 or more

8 Where do you use computer most frequently?

1. Home 2. Community Centre 3. Friends' home 4. Relatives' home 5. Office 6. Others_____

9 What is/are your major purpose(es) of using computer? (Multiple answers are allowed)

1.Using Internet services 2. Playing games 3. Watching videos 4. Watching photos 5. Image processing 6. Working 7. Word processing 8. Listening to music 9. Others_____

10 Can your computer access to the internet?

0. No computer 1. Cannot access the Internet 2. Can access the Internet

In question 10, if the answer is (1. Cannot access the internet), please go to question 15.

11 To what extent would you rate your familiarity in using the Internet?

1. Very Unfamiliar 2. Unfamiliar 3. Average 4. Familiar 5. Very Familiar

12 How long have you been the Internet?

_____ Years/Months (Please fill in an appropriate answer)

13 How many hours do you spend on the Internet per week?

_____hours (Please fill in an appropriate answer)

14 What is/are your major purpose(es) in accessing the Internet? (Multiple answers are allowed)

2. Searching for news 2. Searching for stock information 3. Searching for leisure information 4. Communicating with family members 5. Communicating with friends 6. Communicating with relatives 7. Photos sharing 8. Using e-banking service 9. Using e-shopping service 10. Playing online games 11. Reading magazines/ newspapers online 12. Using e-government service 13. Others_____(Please fill in an appropriate answer)

15 To what extent would you rate your familiarity in using the mobile phones?

1. Very Unfamiliar	2. Unfamiliar	3. Average	4. Familiar	5. Very Familiar

16 How long have you been using the mobile phone?

_____ Years/Months (Please fill in an appropriate answer)

17 How many mobile phones do you own?

0	1	2	3	4	5	6 or more

18 How did you get your mobile phone(s)?

1. Myself 2. Sons/Daughters 3. Spouse 4. Grandsons/Granddaughters 5. Relatives 6. Friends 7. Others_____(Please fill in an appropriate answer)

Part B Intentions of using IT

19 Why do you use information technology? (Multiple answers are allowed)

1. Self-enhancement 2. Entertainment 3. Acquiring new skills 4. Acquiring new information 5. Find it Interesting 6. Popularity 7. Encouragement from family/friends 8. Others:_____ (Please fill in an appropriate answer)

20 To what extent would you rate your agreement with the following statements about the intentions of using IT?

20.1 It is good to use IT	1. Strongly disagree	2. Disagree	3. Average	4. Agree	5. Strongly agree
20.2 It is beneficial to use IT	1. Strongly disagree	2. Disagree	3. Average	4. Agree	5. Strongly agree
20.3 It is worthy to use IT	1. Strongly disagree	2. Disagree	3. Average	4. Agree	5. Strongly agree
20.4 It is useful to use IT	1. Strongly disagree	2. Disagree	3. Average	4. Agree	5. Strongly agree
20.5 It is more efficient by using IT	1. Strongly disagree	2. Disagree	3. Average	4. Agree	5. Strongly agree

20.6 It is easy to use IT	1. Strongly disagree	2. Disagree	3. Average	4. Agree	5. Strongly agree
20.7 It is easy to learn IT	1. Strongly disagree	2. Disagree	3. Average	4. Agree	5. Strongly agree
20.8 It is not difficult to use IT	1. Strongly disagree	2. Disagree	3. Average	4. Agree	5. Strongly agree
20.9 Using IT raises my self-image	1. Strongly disagree	2. Disagree	3. Average	4. Agree	5. Strongly agree
20.10 It is smart to use IT	1. Strongly disagree	2. Disagree	3. Average	4. Agree	5. Strongly agree
20.11 I observe others using IT frequently	1. Strongly disagree	2. Disagree	3. Average	4. Agree	5. Strongly agree
20.12 I observe my family members using IT frequently	1. Strongly disagree	2. Disagree	3. Average	4. Agree	5. Strongly agree
20.13 I can easily observe my family members using IT	1. Strongly disagree	2. Disagree	3. Average	4. Agree	5. Strongly agree
20.14 My friends believe I am able to use IT	1. Strongly disagree	2. Disagree	3. Average	4. Agree	5. Strongly agree
20.15 My family members believe I am able to use IT	1. Strongly disagree	2. Disagree	3. Average	4. Agree	5. Strongly agree

20.16 Many people able to use IT in our society	1. Strongly disagree	2. Disagree	3. Average	4. Agree	5. Strongly agree
20.17 I have confident in using IT	1. Strongly disagree	2. Disagree	3. Average	4. Agree	5. Strongly agree
20.18 I am able to control IT	1. Strongly disagree	2. Disagree	3. Average	4. Agree	5. Strongly agree
20.19 I will continue to use IT	1. Strongly disagree	2. Disagree	3. Average	4. Agree	5. Strongly agree
20.20 I will spend more time in learning IT	1. Strongly disagree	2. Disagree	3. Average	4. Agree	5. Strongly agree

21 What difficulties do you face in using IT?

1. Too complicate 2. Forgetfulness 3. Afraid of causing damages 4. Poor eyesight

5. Difficult to control 6 Unfamiliarity of language. 7. Others:_____ (Please fill in an appropriate answer)

Part C Quality of life

22 To what extent would you rate your agreement with the following statements concerning quality of life?

22.Using IT enhances my quality of life	1. Strongly disagree	2. Disagree	3. Average	4. Agree	5. Strongly agree
22.2 Using IT boosts my self esteem	1. Strongly disagree	2. Disagree	3. Average	4. Agree	5. Strongly agree

22.3 Using IT enhances my confidence	1. Strongly disagree	2. Disagree	3. Average	4. Agree	5. Strongly agree
22.4 Using IT encourages my positive feelings	1. Strongly disagree	2. Disagree	3. Average	4. Agree	5. Strongly agree
22.5 I am more active after using IT	1. Strongly disagree	2. Disagree	3. Average	4. Agree	5. Strongly agree
22.6 Using IT improves my personal relationship	1. Strongly disagree	2. Disagree	3. Average	4. Agree	5. Strongly agree
22.7 Using IT improves my family relationship	1. Strongly disagree	2. Disagree	3. Average	4. Agree	5. Strongly agree
22.8 My family supports me in using IT	1. Strongly disagree	2. Disagree	3. Average	4. Agree	5. Strongly agree
22.9 My friends support me in using IT	1. Strongly disagree	2. Disagree	3. Average	4. Agree	5. Strongly agree
22.10 I acquired new skills through using IT	1. Strongly disagree	2. Disagree	3. Average	4. Agree	5. Strongly agree
22.11 I acquired new knowledge through using IT	1. Strongly disagree	2. Disagree	3. Average	4. Agree	5. Strongly agree

22.12 I can relax after using IT	1. Strongly disagree	2. Disagree	3. Average	4. Agree	5. Strongly agree
22.13 I enjoy using IT	1. Strongly disagree	2. Disagree	3. Average	4. Agree	5. Strongly agree

23 Please circle the most appropriate sentence to describe your recent quality of life

23.1 To what extent would you rate your quality of life?

1. Strongly dissatisfied	2. Dissatisfied	3. Average	4. Satisfied	5. Strongly satisfied

23.2 To what extent would you rate your health?

1. Strongly dissatisfied	2. Dissatisfied	3. Average	4. Satisfied	5. Strongly satisfied

23.3 Do you feel safe in daily lives?

1. Very Unsafe	2. Unsafe	3. Average	4. Safety	5. Very safe

23.4 To what extent would you rate your natural environment?

1. Very unhealthy	2. Unhealthy	3. Average	4. Healthy	5. Very Healthy

23.5 How satisfy are you with your living condition?

1. Strongly dissatisfied	2. Dissatisfied	3. Average	4. Satisfied	5. Strongly satisfied

23.6 Do you have enough money for daily lives?

1.Very not enough	2. Not enough	3.Average	4. Enough	5. Very enough

23.7 To what extent would you rate your satisfaction in your ability in financial management?

1. Strongly dissatisfied	2. Dissatisfied	3. Average	4. Satisfied	5. Strongly satisfied

23.8 Do you satisfy with your family relationship?

1. Strongly dissatisfied	2. Dissatisfied	3. Average	4. Satisfied	5. Strongly satisfied

23.9 Do you satisfy with your friends' supports?

1. Strongly dissatisfied	2. Dissatisfied	3. Average	4. Satisfied	5. Strongly satisfied

23.10 In general, how would you rate your lives?

1. Strongly dissatisfied	2. Dissatisfied	3. Average	4. Satisfied	5. Strongly satisfied

Part D Personal Information

Sex	1.Male 2.Female
Age	_____
Marital status	1.Single 2.Married 3.Divorce 4.Widowed 5.Separated 6.no answer
Level of education	1.No formal education 2.Primary 3.Secondary 4.Matriculation 5.Tertiary or higher 6. No answer
Living condition	1.Living alone 2.Living with family members 3.Living with friends or relatives 4.Others:_____ 5. No answer
Work status	1.Full-time 2.Part-time 3.Retired_____(Please state your job before retirement) 4.Housewife 6. No answer
Monthly income	1. Below $1000 2. $1001-$1500 3. $1501-$2000 4. $2001-$2500 5. $2501-$3000 6. $3001-$3500 7. $3501-$4000 8. $4001-$4500 9. $4501-$5000 10.$5001 or more
No of family members living together	_____
Average family monthly income	2. Below $5000 2. $5001-10000 3. 10001-15000 4. 15001-20000 5. $20001-25000 6. 25001-30000 7. 30001 or more 8. Don't know

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