DIGITAL DIVIDE AMONG ELDERLY WORKERS – A COMPARATIVE STUDY BETWEEN PUBLIC AND PRIVATE SECTORS IN MELAKA

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ABSTRACT

Generally, this study explains the digital divide among older workers of age 50 to 58 years in public and private sectors in the state of Melaka. The main purpose of the study is to reveal and distinguish the factors that contribute to digital divide among older workers of age 50 to 58 years in public and private sectors. According to the Ministry of Energy, Water and Communications digital divide is a reference that is given to the circumstances in which part of the community is not likely to ease of use of information communication technology (ICT) infrastructure caused by factors such as accessibility, capability, ability to use computer and lack of local content. The study focuses on factors that cause digital divide namely demographic factors (socio-economic backgrounds, education level, and geographical location of residential area), accessibility of ICT infrastructure, computer skills, and perception towards ICT. The study is conducted to achieve three objectives: namely to examine the ability to use computer and digital divide among elderly between public and private sectors, to investigate distinction level of digital divide arising among elderly workers in public and private sectors and lastly to identify factors that cause digital divide among the elderly. Population of elderly workers of age 50 to 58 years are stratified into public and private sectors. From each of the sectors, samples with the stated quota, that is, those workers of age between 50 and 58 years old are selected. From the results of the analysis obtained, there is a distinction that indicates emergence of digital divide among elderly between public and private sectors. As such, government should take more effective initiatives to address the digital divide issue among the elderly. Through these initiatives the digital gap among the elderly in public and private sectors can be bridged in helping the elderly to be more independent and competitive to face the challenging old days.

Keywords: Digital divide, ICT, older workers, public and private sectors

INTRODUCTION

Developments in the electronic dissemination of information began in the last twenty years. However, digital divide is a prevailing phenomenon in many countries irrespective of their status as developed or developing countries (Zaitun & Barbara, 2005). There are several factors affecting the digital divide which are economic factors, geography, computer skills and language proficiency level of literacy and the Internet (Norizan, 2008). Malaysia was not spared of the phenomenon of digital divide among the people. There are some people who need ICT and communication and including the elderly workers of public and private sectors. The key to improve social and economic life in the global environment today is through access to information. However, population aging is a phenomenon that is affecting many countries, including Malaysia. In 1999, the world's population over the age of 60 years is estimated around 355 million people while 61.2% were in developing countries. In 2020, the world's older persons will increase to 1,000 million (1 billion) people. This is an increase of 75% compared to 50% for the entire world population. There are approximately 700 million senior citizens in developing countries (Source: Family Health Development Division).

In this era of digital technologies, the concept of digital divide has become more complex. The use of computers and Internet have become more easy and convenient. During its first emergence, the large gap between people who could afford to buy and access computers and Internet and those who could not was due to the high price of computers. However, nowadays, the availability of many community access or telecentres have provided an easy access to computers and Internet for many people. In Malaysia, various Federal and State Government agencies have set up telecentres. Today, there are 2,150 telecentres all over the country and they are equipped with facilities such as computers, Internet, printers, scanners, digital cameras, telephones and even LCD projectors. These telecentres also conduct training on the use of basic software applications and the use of the Internet to get information, communicate and do basic transactions with the government, private and financial institutions.

With this easy access to computers and Internet, the term digital divide is redefined to comprise technology literacy and the total cost of

running a computer. In other words, in order to make computers and Internet accessible, people have to be technically able and financially affordable. In Malaysia, the term digital divide is defined as a condition where a part of society is unable to gain access or use ICT infrastructure due to IT illiteracy or are unable to create value out of the ICT facilities available

Problem Statement

According to Economist Intelligence Unit (EIU), Internet penetration rate in Malaysia is estimated around 61.9%. Most urban areas in Malaysia are connected to the Internet. The percentage of Internet users for urban households is 85% while for rural households is 15%. There are nine groups identified to be marginalised by the digital divide. These are the elderly, women, rural community, small, micro and medium enterprises, youth, children, people with disabilities, indigenous and the poor. Mahendran et.al (2010) revealed that among others, women and older citizens in the rural population use computers less than other groups. Does the elderly include those between 50 and 58 years? For this reason the study is conducted specially to investigate of digital divide among the working elderly aged between 50 and 58 years who are employed in public and private sectors.

Researh Questions

The study will attempt to answer the following research questions:

1. What is the ability to use computers and Internet among the elderly workers in public and private sectors?

2. What is the level of digital divide among elderly workers in public and private sectors?

3. What are the factors affecting digital divide among elderly workers in public and private sectors?

Research Objectives

The purpose of the study is to achieve the following three research objectives:

1. To examine the ability to use computers and Internet among the elderly workers in public and private sectors.

2. To investigate the level of digital divide among the elderly workers in public and private sectors.

3. To determine factors affecting digital divide among elderly workers in public and private sectors.

LITERATURE REVIEW

Ou (2010) explained how communication technologies like instant messaging (IM) enable employees to be empowered. Use of IM enhances the social network in the workplace. The control variables of other Online Communication Tools at work are such as use of email, video conferencing, intranet and knowledge community that can achieve outcome satisfaction, outcome quality and group satisfaction. This enhances the work of an individual as IM can be used for business purposes such as for solving mutual knowledge problems and collaborative activities.

Middelon and Chambers (2010), reveals that demographic factors and situational variables are significantly correlated to the size of digital divide. They highlighted that the access to high speed WIFI has the potential to reduce or eliminate the digital divide. Norizan (2008) highlighted the importance of ICT into four sections:

- Exchange of information (lifelong learning)
- Source of employment
- Entrepreneurship
- Bridging the communication and networking

According to Richard (2006) in her study titled 'Net Benefits (Older People & The Internet)' relates the importance of ICT to the elderly in some parts. The Internet is an integral part of life. Internet benefits the public

in term of communication, managing the sale and purchase of goods and knowledge.

Another study was done on the involvement of older workers in jobs that require the use of ICT. Due to the rapid growth of senior citizen population in the country, it is important to assess their contribution in enhancing the country's economy. The objective of the study was to examine the computer literacy and the digital gap among older workers. The study revealed that approximately 57 percent of respondents who use computers compared to 43 percent who do not. It was further discovered that digital divide existed among workers aged between 55 and 56 years in Klang Valley. The study also found that senior citizens used Internet to get the latest information on current issues, contacting friends and obtain health or medical information.

Besides that, Bo (2003), it is found that the positive impact of ICT has made the elderly live harmoniously without relying on other individuals. There are issues where family support is not sufficient to provide care, especially among working families (Syarifah Norazizan & Nurizan, 2005). With ICT facilities, senior citizens can lead their lives independently. Hence, ICT can improve their health status and facilitate the social network among them.

According to Fox (2004) in her study entitled "Older Americans And The Internet" has found that age factor is one cause of the digital divide. Only 58 percent of Americans aged 50 to 64 years used the Internet. This study also discovered the digital divide in the United States is dependent on ethnicity. For example, in 2003, only 11 percent African American population of senior citizens used the Internet, compared to 22 percent of white elderly population. The percentage of senior citizens using the Internet shows a marked difference according to gender. In 2000, 60 percent of Internet users among the elderly are men, and 40 percent are women. However, these percentages changed to 50 percent of men and 50 percent female in 2004.

Syarifah & Nurizan (2005) describe elderly need to use technology such as banking, look for information, and pay bills. Technology ensures a better quality of life. However, the problems are related to product design

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and the problem of access to very limited skills in the design of products that do not fit the needs of ergonomics intervention (human factors).

Ou (2010) states ICT can help senior citizens find jobs or business opportunities to increase income and the economy. If there is a digital divide, the elderly may expect other people to sustain their lives, especially for those who have no pension. Thus, this will incur high cost for the government to fulfil their needs.

The present study is conducted to examine whether digital divide exists among the elderly workers in public and private sectors in the state of Melaka. It is hoped that the study would be able to help certain agencies bridge the digital divide in society, in particular the elderly.

RESEARCH METHODOLOGY

Subjects and Procedure

The subjects of the study include 130 elderly workers aged 50 to 58 years in public and private sectors in Alor Gajah, Melaka. This group of people is identified as one of the groups that is easily marginalised by the digital divide. The study utilizes stratified quota sampling. Population of elderly workers is stratified which sectors they work in, either public or private sectors. From each of the sectors, samples with the stated quota, that is, those workers of age between 50 and 58 years old are selected. The study used a questionnaire which was primarily designed to tailor the objectives of the study. A total of 130 questionnaires were distributed. A total of 121 questionnaires were returned to the researchers making the response rate approximately 93%. Table 1 depicts the descriptive statistics about the sample.

Measurement

The study compares the level of digital divide among these elderly workers in public and private sectors with respect to demographic factors (gender, age, ethnicity, education, monthly income, and residential area). For each comparison there are two independent variables with two or more

levels and one dependent variable. One of the independent variable, job sector, is fixed with two levels (1 – public sector, 2 – private sector) while the other independent variable is each of the demographic factors.

Table 1: Descriptive Statistics of Samples (n = 121)

Demographic Variables	Frequency	Percent (%)
Gender		
Male	66	54.5
Female	55	45.5
Age		
50	22	18.2
51	20	16.5
52	19	15.7
53	10	8.3
54	14	11.6
55	17	14.0
56	5	4.1
57	9	7.4
58	5	4.1
Marital Status		
Unmarried	6	5.0
Married	113	93.4
Divorced	2	1.6
Ethnicity		
Malay	101	83.5
Chinese	15	12.4
Indians	5	4.1
Education		
Primary school	13	10.7
Sijil Pelajaran Malaysia (SPM)	74	61.2
Sijil Tinggi Pelajaran Malaysia (STPM)	7	5.8
Diploma	19	15.7
Bachelor degree	6	5.0
Master degree	2	1.6

In order to fulfill the analysis, demographic factors such as age, education, and monthly income were recoded into three levels for "age", four levels for "education" and "monthly income". Gender is operationalized in two levels; 1 – Male, 2 – Female. Age of respondents is operationalized by recoding into age group as 1 – 50 up to 53 years old, 2 – 54 up to 56 years old, 3 – 57 up to 58 years old. Ethnic group is measured in three levels as

1 – Malays, 2 – Chinese, 3 – Indians. Highest education level is measured by the respondents' education level and it is recoded as 1 – Primary school, 2 – Sijil Pelajaran Malaysia (SPM), 3 – Pre-university, 4 – University. Socio-economy is measured by the respondents' monthly income and it is operationalized by recoding the variable as 1 – Below RM2000, 2 – RM2000 and below RM4000, 3 – RM4000 and below RM6000**,** 4 – RM6000 and above. As for geographical location, it is measured by the respondents' residential areas either 1 – rural or 2 – urban.

There is no consensus on how to measure digital divide since the technologies of computers and Internet are evolving rapidly and their capabilities are almost boundless (Ali Acilar ; 2011). The most used indicators of the digital divide between countries is the Internet usage. According to Vehovar et al (2006), the term digital divide refers not only to the Internet but also to other important ICTs such as personal computers, cellular phones, wireless telephone etc. This study only focuses on two main ICTs; computers and the Internet. The study measures the digital divide in terms of home personal computers ownership, Internet subscription, accessibility of computers and Internet, computer usage, Internet usage, and computer knowledge and skills.

Home personal computer ownership, Internet subscription, accessibility of computers/Internet are each measured by dichotomous scale (1 – Yes, 2 – No).   These variables are operationalized by recoding the dichotomous scales to dummy scales (0 – Yes, 1 – No). Computer usage and the Internet usage are each measured by the frequency of computer and Internet usage (1 – Seldom, 2 – Sometime, 3 – Frequent) while computer knowledge and skills are measured by 5-point Likert scale (1 – Very poor , 2 – Poor, 3 – Fair, 4 – Good, 5 – Very good).

Analysis of Data

The study used both descriptive and inferential analyses. For research question 1, the ability to use computers and Internet among elderly workers in public and private sectors is determined by examining and comparing the mean differences of ability of using computer software such as Microsoft Word, Microsoft Excel, Microsoft Powerpoint, Microsoft Access, Adobe Photoshop, Internet Browser, e-mail, Media Player, Acrobat Reader, and

Yahoo Messenger between elderly workers in public and private sectors. The independent sample t-test is used to investigate for any significance of abilities as there are two independent groups (public and private sectors).

To address research question 2, the level of digital divide among elderly workers in public and private sectors is determined by analyzing the mean differences of each of digital divide indicators; home personal computer ownership, Internet subscription, accessibility of computer and Internet, home personal computer usage, home Internet usage, and computer knowledge and skills. In this case two independent groups are studied (public and private sectors). Thus, t-statistics is conducted to examine any significance difference between each indicator of digital divide and job sector.

In order to analyze research question 3, that is, to identify factors affecting digital divide among elderly workers in public and private sectors, a two-way ANOVA analysis is conducted. In this case, there are two independent variables with two or more levels and one dependent variable. The first independent variable is the demographic variable (gender, age, ethnicity, education level, income level, and residential area) and the second independent variable is the job sector (public and private sectors). The dependent variable is each indicator used for digital divide.

A two-way ANOVA test is a statistical test used to examine any significant effects of independent variables on a dependent variable. A two-way ANOVA is used as the study desires to compare the effect of multiple levels (two or more levels) of two factors and multiple observations are obtained at each level. The variable of interest is the dependent variable while the two factors are independent variables. The factors are classified into two or more groups or levels. There are three effects to be examined; the main effect for each factor (independent variable) on dependent variable and the interaction effect for the effect of both factors on dependent variable. If a significant main effect is obtained, then a further analysis known as post-hoc analysis is conducted to investigate which pair of independent variables show a significant mean difference. Our main concern here is to study the interaction effect of both independent variables on dependent variable. If the interaction effect is found to be significant, then a further analysis known as simple effect analysis has to be conducted to examine which level of independent variable is significant.

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RESULTS AND DISCUSSIONS

Socio-Economy Status of Samples

As indicated in Table 2, most of the elderly workers or 69.4% resided in urban areas as to 30.6% of them resided in rural areas. Exactly 50.4% of the respondents worked in private sectors while 49.6% of them worked in public sectors. These elderly were employed in various job areas. Most of the elderly workers or 27.3% were employed in services sectors, 26.4% of them in administrative and management, 24% in technical, and 19% in health sectors.

Table 2: Socio-Economy of Respondents (n = 121)

Socio-economic Variables	Frequency	Percent
Residential Area		
Urban	84	69.4
Rural	37	30.6
Job Sector		
Public (Government)	60	49.6
Private	61	50.4
Job Area		
Administrative & Management	32	26.4
Services	33	27.3
Education	1	0.8
Health	23	19.0
Technical	29	24.0
Information Communication Technology (ICT)	3	2.5
Monthly Income		
< RM1500	3	2.5
RM1500 < RM2000	10	8.3
RM2000 < RM3000	52	43.0
RM3000 < RM4000	45	37.2
RM4000 < RM5000	7	5.8
RM5000 < RM6000	0	0.0
RM6000 < RM7000	2	1.7
RM7000 and more	2	1.7
Monthly Expenditure		
< RM1000	11	9.1
RM1000 < RM2000	52	43.0
RM2000 < RM3000	43	35.5
RM3000 and more	15	12.4

Majority of the respondents or 43% earned between RM2000 and less than RM3000 per month and approximately 37% of them have monthly salary between RM3000 and less than RM4000. Most of the respondents or 43% respondents spent between RM1000 and less than RM2000 per month while approximately 36% of them spent between RM2000 and less than RM3000 per month. On average respondents earned approximately RM3031 per month and spent RM2021 per month. It can be concluded that the average difference between monthly income and monthly expenditure is approximately RM3031 – RM2021 = RM1010.

Ability to Use Computers and Internet among Elderly Workers in Public and Private Sectors

In this study, ability to use computers and Internet is defined as being able to use the various computer software and applications such as Microsoft Word, Microsoft Excel, Microsoft Powerpoint, Microsoft Access, Adobe Photoshop, Internet Browser, e-mail, Media Player, Acrobat Reader, and Yahoo Messenger. Ability to use computers and Internet among respondents is summarized in Table 3. Table 3 clearly indicates that there is a high significance in overall mean computer software ability levels among the elderly workers in public and private sectors.

Table 3: Mean Computer Software Ability Level among Elderly Workers in Public and Private Sector

Computer Software Ability Level	Job Sector	n	Mean	SD	t-statistic	df	Sig.
Microsoft Word	Public	60	2.50	1.228	-3.268	119	0.001*
	Private	61	3.18	1.057			
Microsoft Excel	Public	60	2.10	1.145	-4.845	119	0.000*
	Private	61	3.10	1.121			
Microsoft Powerpoint	Public	60	1.98	1.081	-3.662	119	0.000*
	Private	61	2.74	1.182			
Microsoft Access	Public	60	1.65	0.954	-3.339	119	0.001*
	Private	61	2.30	1.160			
Microsoft Photoshop	Public	60	1.52	0.833	-1.186	119	0.072**
	Private	61	1.84	1.083			
Internet Browser	Public	60	1.82	1.033	-2.698	119	0.008*
	Private	61	2.38	1.240			
E-mel	Public	60	2.00	1.074	-4.803	119	0.000*
	Private	61	2.98	1.176			
Media Player	Public	60	1.60	0.785	-2.982	119	0.003*
	Private	61	2.16	1.241			
Acrobat Reader	Public	60	1.60	0.785	-1.642	119	0.103
	Private	61	1.89	1.097			
Yahoo Messenger	Public	60	1.77	0.789	-3.011	119	0.003*
	Private	61	2.31	1.162			
Total	Public	60	1.85	0.850	-3.891	119	0.000*
	Private	61	2.49	0.938			

* Significant at 5% level   ** Significant at 10% level

Elderly workers in private sectors are significantly more able in using computer software than elderly workers in public sectors (t = -3.891 ; p < 0.05). Results show that elderly workers in private sectors are more significantly more able in using Microsoft Word (t = -3.268 ; p < 0.05), Microsoft Excel (t = -4.845 ; p < 0.05), Microsoft Powerpoint (t = -3.662 ; p < 0.05), Microsoft Access (t = -3.339 ; p < 0.05), Internet Browser (t = -2.698 ; p < 0.05), e-mail (t = -4.803 ; p < 0.05), Media Player (t = -2.982 ;

$p < 0.05$), and Yahoo Messenger ($t = -3.011$; $p < 0.05$). However, there are no significant ability differences in using Microsoft Photoshop ($t = -1.186$; $p > 0.05$) and Acrobat Reader ($t = -1.642$; $p > 0.05$) between elderly workers in public and private sectors. Also the ability of using Microsoft Photoshop among elderly workers in private sectors is significantly higher than those elderly workers in public sectors ($t = -1.186$; $p < 0.10$). These results indicate the elderly workers in private sectors are significantly more able in using most of computer software and applications.

Results revealed that the elderly workers who owned home personal computers are more able and skilled (mean = 3.08 ; SD = 0.80) in using computers than those who do not own the appliance (mean = 1.59 ; SD = 0.80). Similar result is revealed for elderly workers who subscribe Internet. They are more skilled (mean = 3.16 ; SD = 0.74) in using computers compared to those who do not subscribe the Internet.

Level of Digital Divide among Elderly Workers in Public and Private Sectors

Results revealed that out of 121 respondents, 104 or approximately 86% respondents owned home personal computers and out of these 104, 96 or 92.3% subscribed the Internet. Computer ownership is higher among elderly workers resided in urban areas (71.2%) than those who resided in rural areas (28.8%). Internet subscription is also higher among elderly workers resided in urban areas (72.9%) than those who lived in rural areas (27.1%). These results give the indication that home personal computer and Internet penetration rates are mostly concentrated in urban areas. Also approximately 88% of the elderly workers who owned home personal computers and about 81% who subscribed the Internet were married. Eleven out of 17 or 64.7% respondents did not own home personal computers because they did not have computer skills and 23.5% say that there is no urgency of owning home personal computers. Also, twelve out of 25 or 48.0% respondents say that they do not subscribe the Internet because there is no urgency to subscribe while 44.0% say that they have no skill in using the Internet. Result revealed that cost factor was not the main reason for not owning computers and not subscribing the Internet. These findings are supported by the average monthly income for elderly workers owning home personal computers (mean = RM3136 ; SD = RM1080) and those

subscribing Internet (mean = RM3192 ; SD = RM1062). Result further indicates the computer owners are among those of younger elderly workers (mean = 52.77 years ; SD = 2.333) and as for Internet subscribers, they also constitute the younger elderly workers (mean = 52.62 years ; SD = 2.323 years). Therefore, it can be concluded that the home personal computers and Internet subscribers among the elderly workers are married, residing in urban areas, younger elderly workers, and with average monthly income of more than RM3000. According to Organization of Economic Co-operation and Development (OECD, 2001), size and type of household are important factors in computer penetration and Internet access. Married couples with children have the highest access of all households, and married couples with children under 18 years are more likely to own home personal computers and subscribe Internet (OECD, 2001).

Result also reveals that both elderly workers in public and private sectors can easily access the computers and the Internet. Approximately 86% or 104 out of 121 respondents say that their residing areas have information communication technology (ICT) infrastructure facilities (Internet, wifi, etc). Out of this, 75 respondents or 72.1% reside in urban areas and 29 respondents or 27.9% reside in rural areas. Out of 121 respondents, 104 or approximately 86% respondents own computers and out of 104 respondents, 96 or approximately 92% have Internet facilities. The results indicate that more than 80% of respondents own both computers and Internet facilities. Approximately 26% of respondents (31 out of 121) find difficulties to access the Internet. Out of those elderly workers that find difficulties in accessing the Internet, 71% of them do subscribe Internet at home. Approximately 24% of the elderly workers that have difficulties in accessing the Internet reside in urban areas while 29.7% reside in rural areas. The major reasons for these difficulties are due to slow networking (38.7%) and due to lack of skills in information seeking (19.4%).

Out of 104 respondents whom responded "yes" to having computers at home, 40 or 38.5% respondents said that they frequently used computers at home, 50 or 48.1% respondents answered they sometime used computers at home, and 14 or 13.5% respondents responded very seldom used computers at home. This means that the usage of computers at home among elderly workers is not frequent. As for 96 respondents who responded "yes" to having Internet facilities at home, 36 or 37.5% respondents said they frequently used Internet at home, 47 or 49% responded sometime used Internet at home, and 13 or 13.5% respondents answered they seldom

used Internet at home. These findings show that only approximately 38% respondents frequently use computers and Internet while at home.

The accompanying Table 4 depicts the purpose of surfing Internet among the respondents. Out of 96 respondents who used Internet at home, almost 89% of them used Internet to seek information and about 56% of them surf Internet for knowledge enhancement. Approximately 41% of respondents used Internet at home to send e-mails and about 41% of them also used Internet to access e-filing for computation of income tax. Other purposes of Internet surfing at home among the respondents are social networking using either skype, facebook, twitter or Yahoo messenger (28.1%), payment of utilities (26%), payment of credit cards (11.5%), entertainment (11.5%), and on-line business (2.1%).

Table 4: Purpose of Surfing Internet At Home

Purpose	Number of Respondents	Percent
Information seeking	85	88.5
Knowledge enhancement	54	56.3
Sending e-mails	39	40.6
e-filing	39	40.6
Skype/Facebook/Twitter/Yahoo Messenger	27	28.1
Utilities payment	25	26.0
Credit cards payment	11	11.5
Entertainment	11	11.5
On-line business	2	2.1
Product advertisement	0	0.0

In terms of computer and Internet skills, elderly workers in private sectors (mean = 3.23 ; SD = 0.783) show significantly more knowledgeable and more skilled (t = -4.561 ; p < 0.05) than those elderly workers in public sectors (mean = 0.250 ; SD = 0.966). This is supported by approximately 56% (53 out of 94) of elderly workers that attend computer training are from private sectors while approximately 70% (19 out of 27) of elderly workers that do not attend any computer training are from public sectors. Most of the respondents (56 out of 121) or 46.3% respondents are fairly skilled in computers and Internet while 30 or 24.8% respondents perceive they are good at computer and Internet. There are also respondents (35 or 28.9%) that perceive their computer knowledge and skills are rather poor.

In order to address the second research question, we examine and compare the level of digital divide among elderly workers in public and private sectors. Table 5 compares level of digital divide among elderly workers in public and private sectors. Result shows that the mean difference in computer usage between elderly workers in public and private sectors is not significant at 5% significant level but it is significant at 10% level (t = -1.755 ; p < 0.10). Internet usage among elderly workers in public and private sectors is found to be not significant (t = -1.098 ; p > 0.05).

Table 5: Level of Digital Divide among Elderly Workers in Public and Private Sectors

Variable	Job Sector	n	Mean	SD	t-statistic	df	Sig.
Home personal computer ownership (0 – Own computer, 1 – Do not own computer)	Public	60	0.20	0.403	1.874	119	0.064**
	Private	61	0.08	0.277			
Internet subscription (0 – Subscribe Internet, 1 – Do not subscribe Internet)	Public	60	0.33	0.475	3.548	119	0.001*
	Private	61	0.08	0.277			
Accessibility of computer/ Internet (0 – Easy to access, 1 – Difficult to access)	Public	60	0.30	0.462	1.090	119	0.278
	Private	61	0.21	0.413			
Computer usage (1 – Seldom, 2 – Sometime, 3 – Frequent)	Public	48	2.13	0.733	-1.755	102	0.082**
	Private	56	2.36	0.616			
Internet usage (1 – Seldom, 2 – Sometime, 3 – Frequent)	Public	40	2.15	0.736	-1.098	94	0.102
	Private	56	2.30	0.630			
Computer	Public	60	2.50	0.966	-4.561	119	0.000*
	Private	61	3.23	0.783			

* Significance at 5% level   ** Significance at 10% level

Table 5 also reveals that Internet subscription is significantly high among elderly workers in private sectors (t = 3.548 ; p < 0.05). Computer knowledge and skills is also found to be highly significant among elderly workers in private sectors (t = -4.561 ; p < 0.05). Home personal computer ownership is high among elderly workers in private sectors (t = 1.874 ; p < 0.10) than those elderly in public sectors.

Factors Affecting Digital Divide among Elderly Workers in Public and Private Sectors

To address the third research question, we investigate and compare the level of digital divide in terms of gender, age, ethnicity, education, monthly income, and residential area among elderly workers in public and private sectors. In this study, the indicators used to measure digital divide are home personal computer ownership, Internet subscription, accessibility of computers and Internet, computer usage, Internet usage, and computer knowledge and skills. The investigation involves three variables at a time. For each investigation, it involves two independent variables and one dependent variable. The first independent variables are gender, age, ethnicity, education, monthly income, and residential area and the second independent variable (job sector) is fixed while the dependent variable is the indicator of digital divide. We investigate any significant interaction effect of each of the first independent variables and job sector on each of digital divide indicators using a two-way ANOVA analysis.

Divide in Home Personal Computers Ownership

In this study, home personal computer ownership is operationalized by recoding the dichotomous scales (1 – Yes, 2 – No) to dummy scales (0 – Own home personal computer, 1 – Do not own home personal computer). Using two-way ANOVA analysis to analyze the effect of gender and job sector, three effects are gathered at a time; i) main effect of gender on home personal computer ownership, ii) main effect of job sector on home personal computer ownership, and iii) interaction effect of gender and job sector on home personal computer ownership. Result indicates there is a strong indication that home personal computer ownership varies between

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males and females elderly workers ($F(1, 117) = 4.289$; $p < 0.05$), home personal computer ownership also varies significantly from one ethnic group to the other ($F(2, 115) = 4.868$; $p < 0.05$), and it also differs significantly on education level ($F(3, 113) = 11.112$; $p < 0.05$).

Specifically, home personal computer ownership seems to be significantly higher (mean difference = -0.124 ; $p < 0.05$) among female elderly workers compared to males. Results also show that computer ownership is significantly higher (mean difference = -0.2343 ; $p < 0.05$) among Malay elderly workers compared to Chinese elderly workers. Computer ownership among university and pre-university holders seem to be significantly higher than those SPM holders and primary schools leavers. There do not appear to be any interaction effect between job sectors and any of demographic variables on home personal computer ownership. This means that the difference in home personal computer ownership for combined effect of each demographic variables and job sector is very small.

Therefore, there is a difference in home personal computer ownership between male and female elderly workers in which home personal computer is higher among female elderly workers. Ethnic group also gives an effect on home personal computer ownership in which ownership among Malay elderly workers is higher compared to Chinese and Indians. There is also a difference in home personal computer ownership between education level of respondents in which computer ownership is higher among pre-university and university holders. However, when job sector is introduced to interact with the variables, results indicate that the digital divide in terms of home personal computers ownership among the elderly workers in public and private sectors almost not exist between gender, age groups, ethnic groups, education levels, income levels, and residential areas.

Divide in Home Internet Subscription

Internet subscription is also operationalized by recoding the dichotomous scales (1 – Yes, 2 – No) to dummy scales (0 – Subscribe Internet, 1 – Do not subscribe Internet). There is a significant influence of Internet subscription between male and female elderly workers ($F(1, 117) = 4.875$; $p < 0.05$). Home Internet subscription is higher among female

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(mean = 0.13 ; SD = 0.34) elderly workers than male workers (mean = 0.27 ; SD = 0.45). Elderly workers in private sectors (mean = 0.08 ; SD = 0.28) have higher home Internet subscription than those elderly workers in public sectors (mean = 0.33 ; SD = 0.48). There is also a significant interaction effect of gender and job sector on home Internet subscription $(F(1, 117) = 4.010 ; p < 0.05)$. The effect of education level on home Internet subscription is also significant $(F(3, 113) = 8.080 ; p < 0.05)$. Home Internet subscription is found to be relatively higher among university and pre-university holders elderly workers. Result also shows that elderly workers who earn RM6000 and more has the highest home Internet subscription as compared to other income groups. Results also indicate that job sector has a significant influence on home Internet subscription $(F(1, 117) = 12.381 ; p < 0.05)$, $F(1, 115 = 4.666 ; p < 0.05)$, and $F(1, 117) = 6.737 ; p < 0.01)$. Therefore, there is a difference in home Internet subscription between male and female elderly workers in which Internet subscription is higher among female elderly workers.

Education level gives a significant effect on home Internet subscription in which subscription among pre-university and university holders elderly workers is the highest. There is a difference in home Internet subscription between income groups of respondents in which Internet subscription is higher among elderly workers with high income. Elderly workers in private sectors are more dominant in subscribing home Internet. When job sector is introduced to interact with the variables, results indicate that the digital divide in terms of home Internet subscription among the elderly workers in public and private sectors shows a significant difference between gender in which female elderly workers in private sectors are shown to have the highest home Internet subscription. However, the interaction effect of job sector and other demographic variables (age groups, ethnic groups, education levels, income levels, and residential areas) are found to be insignificant.

Divide in Internet Accessibility

Internet accessibility is also operationalized by recoding the dichotomous scales (1 – Yes, 2 – No) to dummy scales (0 – Face difficulty in accessing, 1 – Do not face difficulty in accessing). Internet accessibility varies significantly between male and female elderly workers $(F(1, 117) =$

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8.605 ; p < 0.05). Male elderly workers face not much difficulty in accessing the Internet (mean = 0.15 ; SD = 36) as compared to females (mean = 0.38 ; SD = 0.49). The probable reason is that more than 50% of male elderly workers reside in urban areas for which the accessibility of Internet is more easier and faster in urban areas. Age group is found to have a significant effect on Internet accessibility (F(2, 115) = 3.286 ; p < 0.05). Result also reveals that younger elderly workers are much more easily accessible to the Internet than the older elderly workers. The elderly workers of age group 50 to 53 years have easy accessibility to Internet (mean = 0.18 ; SD = 0.39) compared to age group 54 to 56 years (mean = 0.33 ; SD = 0.48) and 57 to 58 years (mean = 0.43 ; SD = 0.51). There is no significant influence of ethnic group on Internet accessibility which means all the ethnic groups can easily access the Internet.

However, there is a significant interaction effect of ethnicity and job sector on Internet accessibility (F(2, 115) = 4.491 ; p < 0.05) which means the influence of ethnicity on Internet accesibility does depend on job sector in which the elderly workers are employed. With a significant interaction effect, it is important to conduct a simple effects analysis. In private sectors, the ethnicity has considerable impact; no difficulty in accessing the Internet among the Indians elderly workers. Simple main effects could be obtained by analyzing the effect of ethnicity on the public sectors or private sectors. Simple main effects analysis showed that the Indians were significantly were more easier to access the Internet than Malays and Chinese employed in private sectors (F(2, 115) = 6.281 ; p < 0.05) but there were no differences between ethnic groups when employed to public sectors (F(2, 115) = 0.535 ; p > 0.05).

The main effect for education level on Internet accessibility is found to be significant (F(3, 113) = 3.339 ; p < 0.05). However, the main effect of job sector on Internet accessibility is not significant (F(1, 113) = 0.830 ; p > 0.05). Result reveals the elderly workers with university education find there is no difficulty in Internet accessibility as compared to those elderly workers with pre-university education (mean = 0.08, SD = 0.29), SPM (mean = 0.32, SD = 0.47), and primary school (mean = 0.31, SD = 0.48). Results also reveal that income group (F(3, 113) = 2.053 ; p > 0.05) and residential area (F(1, 117) = 0.000 ; p > 0.05) insignificantly influence the Internet accessibility. No interaction effects were found between gender,

age group, education level, income level, and residential area each with job sector on Internet accessibility.

Divide in Computer Usage

Result indicates that female elderly workers in public sectors (mean = 2.19, SD = 0.63) slightly more frequently used computers compared to those female elderly workers in private sectors (mean = 2.08, SD = 0.64) while male elderly workers in private sectors (mean = 2.58, SD = 0.50) more frequently used computers than those male elderly workers in public sectors (mean = 2.05, SD = 0.84).

The main effects for gender and job sector are found to be not significant. Therefore, neither gender nor job sector significantly influences the computer usage. Results reveal that the interaction effect between job sectors and gender (job sectors * gender) is significant ($F(1, 103) = 6.334$; $p < 0.05$). This indicates that the influence of gender on frequency of usage of computers does depend on the job sectors of the elderly workers.

With a significant interaction effect between job sector and gender, a further simple effect analysis is conducted. Gender has no influence on computer usage among elderly workers in public sectors. However, in private sectors, gender gives an impact where it can be seen that male elderly workers in private sectors have the highest frequency of computer usage. According to Loke and Foo (2008), computer usage among female member of a household is a constraint as they have to indulge in giving priority of other household chores.

Simple main effects analysis shows that male elderly workers are significantly more frequently use computers than females employed in private sectors ($F(1, 100) = 8.185$; $p < 0.05$) but there are no differences between gender when employed in public sectors ($F(1, 100) = 0.606$; $p > 0.05$). Result also reveals that the main effects for education level ($F(3, 97) = 3.929$; $p < 0.05$) and income level ($F(3, 96) = 2.846$; $p < 0.05$) on computer usage are both significant. Therefore, both education level and income level significantly influence the computer usage. Gender, age group, ethnicity, and residential area do not show any significant influence

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on computer usage. Job sector also does not have any significant influence on computer usage.

Divide in Internet Usage

Two-way ANOVA analysis is again used to analyze the main effect of gender on Internet usage, the main effect of job sectors on Internet usage, and the interaction effect of both job sector and gender (job sectors * gender) on Internet usage. There is no significant difference in Internet usage between male and female elderly workers ($F(1, 92) = 2.336$; $p > 0.05$). Results reveal that the interaction effect between job sector and gender (job sectors * gender) on Internet usage is not significant ($F(1, 92) = 3.756$; $p > 0.05$). The influence of age on Internet usage is also found insignificant ($F(2, 90) = 0.815$; $p > 0.05$).

Result indicates a significant interaction effect between age group and job sector on Internet usage ($F(2, 90) = 3.481$; $p < 0.05$). Simple main effects analysis show that elderly workers of ages 57 up to 58 years in public sectors are significantly more frequent using the Internet ($F(2, 90) = 4.861$; $p < 0.05$) as compared to other age groups. The main effect of education level on Internet usage is highly significant ($F(2, 91) = 5.205$; $p < 0.005$). Result shows that Internet usage is significantly high among elderly workers graduated from universities (mean = 2.63, SD = 0.52) as compared to pre-university holders (mean = 2.44 ; SD = 0.65) and SPM holders (mean = 2.15 ; SD = 0.65). Post hoc analysis shows that there are significant mean differences between university holders and primary school leavers (mean difference = 1.50 ; $p < 0.05$) and between university holders and SPM holders (mean difference = 1.18 ; $p < 0.05$). This result again indicates that education is an important factor in bridging the digital divide among the people.

Income level shows no significant influence on the Internet usage ($F(3, 88) = 1.508$; $p > 0.05$). Geographical location of residential area also shows no significance influence on the Internet usage ($F(1, 92) = 1.146$; $p > 0.05$). However, there is a significant interaction effect residential area and job sector. Results reveal that the Internet usage is significant among the elderly workers in private sectors who reside in urban areas.

Therefore, education level is the only factor that influences the Internet usage among the elderly workers. Results reveal that gender, age group, ethnicity, income level, and residential area do not have significant influences on Internet usage. Combination effects between age group and job sector and between residential area and job sector on Internet sector are found to be significant.

Divide in Computer Knowledge and Skills

Two-way ANOVA analysis is again used to analyze the main effect of gender on computer knowledge and skills, the main effect of job sectors on computer knowledge and skills, and the interaction effect of both gender and job sector (gender * job sector) on computer knowledge and skills. Result indicates that there is no significant difference in computer knowledge and skills between male and female elderly workers $(F(1, 117) = 0.362 ; p > 0.05)$. However, job sector has a significant influence on computer knowledge and skills $(F(1, 117) = 19.562 ; p < 0.05)$ for which elderly workers in private sectors are found to be significantly more knowledgeable and more skilled in computers than those elderly workers in public sectors $(t = -4.561 ; p < 0.05)$. Results also revealed that the interaction effect between gender and job sector (gender * job sector) on computer knowledge and skills is significant $(F(1, 117) = 5.612 ; p < 0.05)$. Simple main effects analysis shows that there is a significant difference in computer knowledge and skills between male and female elderly workers in public sectors $(F(1, 117) = 4.396 ; p < 0.05)$ but not to male and female elderly workers in private sectors.

Result indicates that age has a significant influence on computer knowledge and skills $(F(2, 115) = 4.248 ; p < 0.05)$. Post hoc analysis shows that younger elderly workers of age group 50 to 53 years is significantly more knowledgeable and more skilled compared to elderly workers of age 54 to 56 years (mean difference = 0.53 ; $p < 0.05$) and elderly workers of age 57 to 58 years (mean difference = 0.76 ; $p < 0.05$). Influence of age group and job sector on computer knowledge and skills is found to be insignificant $(F(2, 115) = 1.266 ; p < 0.05)$. Ethnicity is found to have a significant influence on computer knowledge and skills $(F(2, 115) = 3.081 ; p < 0.05)$. Once again job sector is revealed to have a significant influence on computer

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knowledge and skills. However, there is no significant interaction effect of ethnicity and job sector on computer knowledge and skills ($F(2, 115)$ = 0.048 ; $p > 0.05$). Result shows that computer knowledge and skills is significantly high among elderly workers graduated from universities (mean = 3.88, SD = 0.64) as compared to pre-university holders (mean = 3.23 ; SD = 0.77) , SPM holders (mean = 2.88 ; SD = 0.83), and primary school leavers (mean = 1.46, SD = 0.52). Post hoc analysis reveals that there are significant mean differences between university holders and primary school leavers (mean difference = 2.41 ; $p < 0.05$), between university holders and SPM holders (mean difference = 1.00 ; $p < 0.05$), between SPM holders and primary school leavers (mean difference = 1.42 ; $p < 0.05$), and between pre-university holders and primary school leavers (mean difference = 1.77 ; $p < 0.05$). These findings again indicate that education is an important factor in bridging the digital divide among the people.

Income level is also found to have a significant influence on computer knowledge and skills ($F(3, 113)$ = 7.414 ; $p < 0.05$). Post hoc analysis shows that there are significant mean differences between elderly workers earning RM2000 to less than RM4000 per month and those elderly earning less than RM2000 per month (mean difference = 0.99 ; $p < 0.05$), between elderly workers with monthly income RM4000 to less than RM6000 and those elderly with monthly income less than RM2000 (mean difference = 1.51 ; $p < 0.05$), and between elderly workers earning RM6000 and above and those elderly earning less than RM2000 (mean difference = 1.83 ; $p < 0.05$). Result indicates that there is no significant interaction effect between income level and job sector on computer knowledge and skills. As for residential area, result shows that it has no significant influence on computer knowledge and skills ($F(1, 117)$ = 0.873 ; $p > 0.05$). Job sectors in which the elderly workers work have a significant influence on computer knowledge and skills ($F(1, 117)$ = 7.968 ; $p < 0.05$). Simple main effects analysis shows that elderly workers in private sectors and reside in urban areas are significantly more knowledgeable and more skilled in computers than those reside in rural areas ($F(1, 117)$ = 4.536 ; $p < 0.05$).

CONCLUSION AND DISCUSSION

The main objective of this study is to investigate factors that play a role in determining level of digital divide among elderly workers in public and private sectors. In this study, level of digital divide is measured using indicators such as home personal computer ownership, Internet subscription, accessibility of computer and Internet, computer usage, Internet usage, and computer knowledge and skills.

Education level is found to be a significant motivating factor for all the indicators of digital divide among the elderly workers. High literacy rate is an essential factor in narrowing digital gap as it can enhance computer and Internet penetration. Usage of computer and Internet would become very frequent with high literacy rate. A certain level of literacy and specific computer knowledge must be attained in order to operate and utilize the computer and the Internet. Result has revealed that due to lack of computer knowledge and skills most of elderly workers do not own home personal computers and do not subscribe Internet.

Income is not a significant factor in determining home personal computer ownership, however it is a significant motivating factor in determining Internet subscription. In order to subscribe Internet, one must own a computer. This would incur additional cost for the household expenditure. The study reveals that there is no urgency to subscribe the Internet and lack of computer skills are reasons why the elderly workers do not subscribe the Internet at home and not due to cost factor. In fact, the decision to subscribe the Internet at home will depend on whether it can be fully utilized and its function is maximized by the household members. The number of Internet users in the household as well as the level of computer knowledge will determine the decision to subscribe the Internet at home.

Gender is also a factor that determines the level of digital divide among the elderly workers. Results reveal that home personal computer ownership and Internet subscription are higher among female elderly workers. Most of the female elderly workers are housewives and for most of the time they make decision whether or not to purchase the computer and to subscribe the Internet for home utilization. However, male elderly workers can easily access the Internet rather than females since most of the males reside in

urban areas. Differences in the use of computers and the use of Internet based on gender appear rather small.

Age is another factor that contributes to level of digital divide among the elderly workers. The factor has significant effects on Internet accessibility and computer knowledge and skills respectively. The younger elderly workers are found to be easily accessible to Internet as compared to the older elderly workers. This is mainly because most of the younger elderly workers reside in urban areas. Elderly workers in early fifties are found to be more knowledgable and skilled in computers since many of them regularly attended computer training.

Ethnicity is also a contributing factor to level of digital divide. There is a large difference in computer ownership by different ethnic groups of elderly workers. The highest computer ownership is found to be among Malay elderly workers. Ethnicity among elderly workers is also found to influence computer knowledge and skills. The Malay elderly workers are found to be more knowledgable and more skilled in computers. All the indicators of digital divide studied are found to have small difference by the location of residential areas of elderly workers. Eventhough the elderly workers reside in rural areas, in the workplace they always in touch with computers and Internet.

Female elderly workers in private sectors are shown to have the highest home Internet subscription. For public sectors, gender has no influence on computer usage. However, in private sectors, gender gives an impact where it can be seen that male elderly workers in private sectors have the highest frequency of computer usage as males have greater interest in computers and with the working computer environment they are more comfortable in using the computer gadgets. The interaction effect between gender and job sector is seen to have a significant impact on computer knowledge and skills. Male elderly workers in private sectors are more significantly knowledgable and more skilled as they are more often attending computer training. As such their computer knowledge and skills are enhanced since a certain level of computer literacy is needed in using computers.

As seen earlier residential area has no significant influence on any indicator of digital divide. However, when job sector is introduced to interact

with the independent variable on Internet usage and computer knowledge and skills, it shows significant effects. Internet usage among the elderly workers in private sectors and reside in urban areas are found to be high. Easy and fast Internet access in urban residential areas and in their offices. Consequently, the Internet usage among elderly workers in private sectors and reside in urban areas become high. Computer knowledge and skills are seen to be significantly higher among elderly workers in private sectors and most of them are residing in urban areas.

There is a high Internet usage among younger elderly workers in private sectors. This shows that the combined effect of age and job sector infleunce the Internet usage among elderly workers. The combined effect of ethnicity and job sector is also found to influence the Internet accessibility.

As a conclusion, the results of the study indicate there still exist digital gaps among the people especially on the targeted group; the elderly workers of age between 50 years to 58 years. The indicator computer knowledge and skills ranks the first in digital divide dimension. Digital gap occurs because of lack of computer knowledge and skills and as such some of the elderly workers neither own computers nor subscribe Internet. Consequently, the computer and Internet usage at homes are less frequent as they merely use the appliances while at workplace. The second highest gap in digital among elderly workers is in terms of Internet subscription. Many of them do not subscribe the Internet as they are lacking in computer knowledge and skills and they have no urgency to subscribe the appliance. The digital divide still exists among elderly workers as many of them still have difficulties in accessing the Internet especially those residing in rural residential areas. There are still elderly workers who do not own personal computers as they lack computer knowledge and skills and also they have no urgency to purchase the computers. The usage of computers and Internet among this group is also not frequent and as a result widening the digital divide. The digital divide becomes more obvious among elderly workers in public sectors especially in terms of Internet subscription and computer knowledge and skills. Future research should be directed at studying the acceptance level of the elderly people toward computers and Internet. Information obtained from these studies can be used by public policy organizations and non-governmental organizations (NGO) to plan strategies to bridge the digital divide among the elderly people.

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