Examining the Adoption, Use and Diffusion of Tablet and Mobile Devices by Older Adults in Hertfordshire County, UK

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Abstract

Ubiquitous or mobile computing is the new trend of this modern era whereby information can be accessed anytime and anywhere. It is anticipated that this form of computing will be more effective than the Internet because of its capability of combining the integral benefits of wireless Internet and interactivity with its own unique characteristics namely, mobility, portability and flexibility. One of the devices that have made this form of computing a reality is the tablet device. It is also a device identified to make a significant impact in encouraging the use of the Internet and ICT generally among the older population. However, there is limited study on the reasons older adults adopt and use tablet devices. Therefore, this research project aims to ***identify and evaluate the factors that influence the adoption, use and diffusion of tablet devices within the older population (aged 50 and above) in UK.*** For this purpose, a Framework of Tablet Device Adoption (FTDA), which was based mainly on the Decomposed Theory of Planned Behaviour (DTPB) with the inclusion of an extra construct Trust, was developed. In particular, the hypothesised constructs included nine variables namely: Compatibility, Perceived Ease of Use, Perceived Usefulness, Trust, Attitude, Subjective Norm, Perceived Behavioural Control, Intention to Use and Actual Use.

Furthermore, a quantitative approach for data collection was employed to test the FTDA model. The data collection was conducted in three phases including, content validity, pilot phase and the final phase. Data was collated through an online survey, which produced 203 completed responses for the pilot phase and 1,008 completed responses for the final phase. In addition, to validate the result of the quantitative study, qualitative method in the form of telephone interviews was employed.

Result showed that attitude has the strongest effect on the intention to use tablets, while perceived usefulness had the strongest impact on attitude. In addition, the impact of attitude on intention was moderated by age and health status while the impact of perceived behavioural control was moderated by age. Findings also revealed that ailments such as anxiety disorder, vision impairments and learning difficulties impacted on adoption and use.

In conclusion, this study contributes to a growing body of knowledge on older adults' adoption and use of tablet and mobile devices. Specifically, it addresses the gap relating to the adoption, use and diffusion of tablets by older adults in Hertfordshire, UK and identifies significant factors that impact on an older adult's adoption and use of the tablet device. In addition, it also provides information regarding the generational difference existing within the older population of 50 years and over.

Keywords: Adoption, Older adults, Tablet devices, Usage, United Kingdom.

Dedication

I DEDICATE THIS THESIS TO MY BELOVED PARENTS, SURV. CHIKE VALENTINE AND MRS NKECHI JOSEPHINE NWANEKEZIE.

Thank you.

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Table of Content

List of Figures

List of Tables

List of Abbreviations

ICT	Information and Communication Technologies
MCD	Mobile Computing Devices
IS	Information Systems
IT	Information Technologies
HCI	Human-Computer Interaction
ONS	Office for National Statistics
OFCOM	Office for Communications
BBC	British Broadcasting Corporation
UK	United Kingdom
DOI	Diffusion of Innovation
TPB	Theory of Planned Behaviour
DTPB	Decomposed Theory of Planned Behaviour
UTAUT	Unified Theory of Adoption and Use of Technology
COMP	Compatibility
TRU	Trust

ATT	Attitude
PBC	Perceived Behavioural Control
SN	Subjective Norm
PEOU	Perceived Ease of Use
PU	Perceived Usefulness
INT	Intention to Use
ACU	Actual Use
TRA	Theory of Reasoned Action
TAM	Technology Acceptance Model
SEM	Structural Equation Modelling
CB-SEM	Covariance-Based Structural Equation Modelling
PLS-SEM	Partial Least Squares Structural Equation Modelling

Publications

Nwanekezie, U. and Choudrie, J., 2014. "Developing a Model of the Behavioural Intentions of Older Adults Towards Internet Service Providers: A UK Perspective". *UK Academy for Information Systems Conference Proceedings 2014*. 39.

Choudrie, J., Pheeraphuttharangkoon, S. and Ojiako, U., 2017. Smartphones Adoption and Usage by 50+ Adults in the United Kingdom. *Social Inclusion and Usability of ICT-Enabled Services*, p.328.

Chapter 1: Introduction to the Study

1.0 Introduction to chapter

In this chapter, an introduction to the research will be provided to give an insight into the motivating factors for the study. In addition, the study aim, objectives and research questions will also be presented and discussed in this chapter. Furthermore, the research scope, research approach as well as the contributions of the research to the academic field, industry and policymakers will also be discussed. Finally, an overview of the whole study report will be provided.

1.1 Research background

Information and Communication Technologies (ICT) have gradually been introduced into essential activities of our daily life (Damant et al., 2017). To provide readers with a better understanding, ICT is defined as the application of digitized elements for communication and representation (Barnes, 2002; Lyytinen and Rose, 2003). It can also be described as an umbrella term for mobile devices, broadband, Internet, desktop computers and generally any communication gadget or application (Kleine and Unwin, 2009; Selwyn, 2004). Moreover, ICT plays a major role in the exponential growth and development of political, social and economic aspect of many nations (Choudrie et al., 2013). Initially, it was mainly used as a tool for processing information and recording transactions, however in recent times, it has become a means for achieving majority of our daily activities (Mansell, 1999). It was this observation that generated the need for this research.

Currently, the adoption and use of ICT is a growing research topic because it helps access the successful diffusion of ICT in the society (Wang et al., 2013). Despite the capabilities, effectiveness and benefits of ICT, it has also contributed to the creation of the digital divide and social exclusion (Selwyn, 2004). Social exclusion is defined as a situation whereby a person who is part of a society does not partake in the general activities meant for citizens due to several reasons (Zheng and Walsham, 2008). In this case, it is the inequality preventing certain group of individuals from participating in the Electronic society (e-society). Meanwhile, digital divide is the term used to describe the inequality existing among people with physical access to digital technologies and those with limited or no access to digital technologies (Agarwal et al., 2009; Goldfarb and Prince, 2008; Niehaves and Plattfaut, 2014). This digital divide has led to the entire population not realising the benefits of ICT.

Consequently, age has been found to be a significant element of the digital divide (Gao et al., 2015). In particular, the older population of many nations are one of the groups negatively affected by the digital divide (Olphert and Damodaran, 2013). Furthermore, the United Kingdom (UK) is one of the Countries currently experiencing the digital divide. Specifically, the Office for National Statistics (ONS) found that about 4.8 million adults in UK had never used the Internet as at the year 2017 (ONS, 2017a). In addition, in a report published by Age UK (2018), nearly 3.8 million people aged 65+ are non-users of the Internet while 59% of those aged 75+ are also non-users. According to Arnott et al. (2004), the factors limiting older adults' participation in the e-society includes age-related physical and psychological issues as well as lack of experience. Moreover, most of the older population were born in an era when technology was absent or limited therefore, making it more difficult for these individuals to adopt and use ICT (Boontarig et al., 2012).

Furthermore, many nations are currently undergoing an aging population and at the same time ICT is infiltrating daily activities (Niehaves and Plattfaut, 2014). This situation emphasizes the need for older adults to be digitally included in the e-society as nowadays; most of daily activities are online. Moreover, Morris and Venkatesh (2000); Czaja and Lee, (2007) suggested that the future of the economy is dependent on the older population because sooner or later, this group will dominate the workforce given the aging population issue. In concurrence, Land (2017) suggested that the older population not only adds a huge amount of resources to the economy, this group also adds value to the wider society through the provision of care to family, friends and others. In addition, ICT is beneficial to this group of society because it is an intervention tactics for preventing certain health risk namely, depression, loneliness and social isolation (Delello and McWhorter, 2017; Cotton et al., 2014). Hence, this further highlights the importance of older adults to society and subsequently the need for this group to be involved in the e-society through the use of ICT.

Furthermore, with the emergence of ICT, several novel technologies have been created (Chiou, 2004). In particular, ubiquitous computing in the form of mobile computing devices (MCD) is one of the recent novel technologies of ICT and this technology has been trending in recent years (Intille, 2004; Godwin-Jones, 2008). This trend is obvious in the increased adoption of MCD by several individuals and organisations for meeting up with the evolving demands of modern society (Kim and Garrison, 2008). For the purpose of this research, mobile computing devices are handheld devices that combines portability, more communication options and mobility with computing features (Hong et al., 2006; Kim and Garrison, 2008; López-Nicolás et al., 2008; Ventola, 2014). Over the years, MCD have expanded to include smartphones and tablet devices, which have yielded new capabilities in communication and information gathering (Ventola, 2014). For instance, Song et al. (2013) identified that the use of search engines by individuals gradually moved from desktop to mobile devices.

In this research, the tablet device has been selected as an example for MCD considering that this particular device has become commonplace in modern society especially UK (BBC, 2014). The tablet device or computer is a rapidly growing novel representation for mobile computing (Barnard et al., 2013). In recent years, the tablet computers have become core-computing devices due to its portability, mobility, computing power and usability (Hur et al, 2014). For the purpose of this research, tablet devices are devices that are compact, flat, lightweight, have large screen and offer wireless connectivity (Burford and Park, 2014; Garfield, 2005). These devices are sometimes viewed as mini mobile computers or large mobile phones because they combine the features of a computer and mobile phone thereby offering the best of both worlds (Leung, 2015).

The Company Apple first brought these tablet devices to light when it introduced the iPad in 2010 (Henderson and Yeow, 2012). Since then, several other brands including Amazon

Kindle, Samsung Galaxy tab and Microsoft surface among others have been released (Hur et al., 2014; Ventola, 2014). Furthermore, due to the capabilities and market expansion of these devices, its adoption rate has increased over the years therefore making mobile devices even more common (Burford and Park, 2014). For instance, in the UK, statistics reported by the Office for Communications (OFCOM) in 2014 showed that approximately 44% of individuals living in households now own a tablet computer as opposed to the 24% observed in the previous years (OFCOM, 2014). In the same report, it was also observed that 28% of individuals over the age of 55 own a tablet. Furthermore, Furness (2017) reported in the Telegraph stating that there is an increase in the number of older adults using tablets and signing up to social media platforms such as Facebook. Similarly, Pew Internet statistics recorded an increment of tablet ownership from 3% to 10% between May 2010 and August 2010 in the United States (Müller et al., 2012). Thus, to summarise, the popularity of the tablet has led to it being used in various areas of society including the educational, social and medical sectors.

Consequently, the British Broadcasting Corporation (BBC) in 2014 reported that the presence of tablet devices has changed the way older adults use the Internet (BBC, 2014). Specifically, the tablet device has increased the number of those aged 65 years and over going online by 12% between the year 2012 and 2013 (BBC, 2014). However, despite this increment, older adults still spend less time online in comparison to their younger counterpart (OFCOM, 2014).

Moreover, as previously mentioned, studies regarding ICT's adoption, usage and diffusion rate has shown an age-related diversity in adoption and usage. However, it is pertinent that all age group especially the older population embrace ICT (Choudrie et al., 2013). This is because while ICT is spreading to all parts of society, the population of many nations including UK is ageing (ONS, 2017b). This is evident in the statistics data that showed that in UK, the proportion of those aged 65 and over increased from 14.2% to 18% between the years 1976 to 2016 (ONS, 2017b). Meanwhile the proportion of those aged 15 and under decreased from 24.5% to 18.9% between 1976 and 2016. Therefore, this confirms that UK's population is ageing and it is estimated that the proportion of older people in the Country will continue to increase to almost a fourth of the general population by 2046 (ONS, 2017b). This ageing of population has been associated with various factors including mortality rate, fertility and lifestyles (Massimi et al., 2007). Notably, the ageing of society has been attributed to the application of numerous novel technologies in the healthcare sectors for providing better health services, which has led to a better quality of life (Massimi et al., 2007). Furthermore, this change in the population has also led to older adults staying longer in the workforce thus, highlighting their importance to society. The older population are also classified as wealth holders and accumulators which implies that the future of the economy is dependent on older adults, as this group are currently likely to be stakeholders in major industries in the society (Lusardi and Mitchell, 2007; Börsch-Supan, 1992). Consequently, it has been predicted that this ageing society is likely to continue over the next decades, which further suggests that special attention should be paid to the older generation (ONS, 2017b).

Moreover, Selwyn (2004); Tsai et al. (2017) suggested that ICT offer various benefits to individuals especially older adults. In the light of this, the digital inclusion of older adults can be beneficial to UK's society given that its population is ageing. This is because technologies are currently useful tools for most of everyday activities and for older adults, it can provide benefits such as independence and connectedness, which can improve the quality of life for older adults (Mitzner et al., 2010; Wood et al., 2005).

Furthermore, older adults are usually unaware of the existence and usefulness of current and various types of ICT (Boontarig et al., 2012). This is due to the rapid rate at which IT has expanded since its inception (Wu et al., 2015). One of such recently developed ICT is the tablet computer. Moreover, previous studies on tablet computers have concentrated on its adoption and effectiveness in fields like education and medicine (Henderson and Yeow, 2012; Sclafani et al., 2013). However, despite the rapid improvement and market growth of tablets in recent society, there is limited research on individuals' behavioural intentions towards adopting and using the tablet device especially from the perspective of older individuals. Furthermore, as previously mentioned, the evolution of technology and the ageing of nations are currently occurring simultaneously. Therefore, there is the responsibility of ensuring that suitable ICT devices are developed for the older generation in order to encourage this group to join the e-society. This study thus seeks to identify factors that promotes or hinders older adults' participation in online activities and determines whether or not tablet devices can help with this issue. As a result, it is necessary to examine the factors influencing the adoption, use and diffusion of tablet devices, especially from the older adults' perspectives.

1.2 Research aim and objectives

Having identified the research gap in the adoption rate of tablet devices within the older population and also putting into consideration the presence of an ageing population, this study aims:

- ***To identify and evaluate the factors that influences the adoption, use and diffusion of tablet devices within the older population (aged 50 and above) in UK.***

Older adults, elderly, and older population are some of the terms used in this research. To clarify, the term 'older population or older adults or elderly' in this study is used to describe individuals aged 50 years old and over. This definition was used based on medical literature, which suggest that age-related decline in health are commonly from 50 years and over (Cotton et al., 2014). Additionally, this classification was also adapted from an evolving and trending theme of research studies examining social inclusion and the adoption and use of the Internet from the views of individuals aged 50 years and over (Friemal, 2016; Cotten et al., 2012; Olphert et al., 2005; Pan and Jordan-Marsh, 2010).

Moreover, there are many other terms that have be applied when referring to this group of population including the pre-seniors, baby boomers or the young-old, the old-old and oldest-old or very-old (Hanson, 2009; Lee and Bowes, 2016; OFCOM, 2017). Explaining further, the pre-seniors refer to those aged 50-64 years, the young-old refers to those aged 65-74 years, the old-old refers to those aged 75-84 years and the oldest-old refers to the 85+ years (Lee and Bowes, 2016). Based on this, this research acknowledges that this variation in describing this demographic group may show significant difference among each group in terms of adopting and using tablet devices as well as impairment levels. As a result, this study employed this system of categorization with the intention of providing an insight to the similarities and differences among different segment in relation to the adoption and use of tablet devices. It should also be noted that by including the pre-seniors age group in the research sample, this study gives a more comprehensive view of the older population.

Furthermore, to achieve the above study aim, the following objectives were generated:

1.2.1 Objectives

- To critically review most recent and relevant literature until the completion of the research project in order to gather additional facts on the subject for better evaluation and understanding
- To combine two theories including the decomposed theory of planned behaviour (DTPB) and Trust theory in order to develop a framework that will enable academics and practitioners in understanding the factors that affect adoption and usage of tablet devices.
- To conduct a survey research, which will undergo different stages of validation including pre-testing, content validation, pilot testing and construct validation.
- To evaluate and discuss the findings in order to form suitable conclusions, identify limitations and recommend future directions for the study

Moreover, to guide the research, the following research questions were generated:

1.2.2 Research questions

Based on the above-mentioned objectives, the research questions are as follows:

1. Is there an age difference in the adoption and use of tablet devices?

2. What are the factors enabling or hindering the adoption and usage of tablet devices within the older population of UK (i.e. why do they want or not want to use these devices)?
3. For tablet devices adopters, how are these tablet devices mainly used?
4. In terms of age, is there a significant difference in the factors affecting the adoption and use of tablet devices? And why?

1.3 Research scope

The relevance of this study is grounded in the need to mitigate and if possible eradicate the digital divide most especially given that society is aging globally and technology is gradually taking over daily activities (Niehaves and Plattfaut, 2014). Therefore, the research basically involves the assessment of the pattern of adoption, usage and diffusion of tablet devices within the older population. The reason behind selecting the older population is because this group are widely recognised in literature as one of the marginal groups of society being negatively affected by the digital divide (Choudrie et al., 2013). Additionally, this group has also been highlighted as an important group of society especially considering the ageing of populations. In view of this, a socio-technological approach is applied which means, the study examined the technological effects of ICT on the social aspects of society. In other words, no technical invention will be produced during the course of this research. Additionally, data was collected from UK residents specifically from individuals living in Hertfordshire County. The justification for selecting this research site is to ensure the feasibility of the study as well as achieve a deep understanding of the identified research problem. Moreover, the site selection was also because Hertfordshire County is the second most populated area in UK. Therefore, the findings from this research will only offer a snapshot of UK's older populations' behaviour towards adopting and using ICT. In addition, it should be noted that ICT is an umbrella term for a wide range of technological artefacts from the Internet to mobile devices (Kleine and Unwin, 2009). Thus, in order to put this in context, tablet devices have been selected as a representative of ICT in this study. This is because, tablet devices are currently trending in the UK (BBC, 2014; OFCOM, 2014) and it appears to have been developed with older adults in mind. Subsequently, there is evidence showing that the use of this device has increased the number of older adults going online hence, highlighting its potential and making it suitable for the study.

1.4 Research proposed contributions

Since the introduction of ICT, numerous studies have examined its adoption, usage and diffusion pattern by the general population. However, studies specific to older adults in UK are limited. In terms of the tablet device, studies addressing the adoption, usage and diffusion pattern of this device specifically targeting older adults are rare. Therefore, this study aims to provide novel findings that will be useful to academia, policy makers and the IT industry. The contributions to these respective bodies are as follows:

1.4.1 Academia:

Currently, there is limited research on the adoption, use and diffusion of tablet devices specifically within the older population of UK. Considering this, the research focused on this marginal group in UK, in order to address this gap. Therefore, the study will likely add a unique feature to academia by providing significant information regarding the adoption, use and diffusion concept of ICT generally and then, specifically from older adults' perspective with regards to tablet devices. In addition, these findings will specifically be examined from the perspective of a country where the adoption rate of tablet devices is apparently striving (BBC, 2014). This will be achieved by using some concepts of trust and acceptance theories for developing the research conceptual framework. This will subsequently provide an in-depth understanding of the identified issues. Furthermore, the study will statistically validate existing constructs, which unarguably will assist in providing a clearer picture on why older adults in UK are adopting or rejecting the use of tablet devices.

1.4.2 Policymakers:

As mentioned earlier in this report, the evolution of ICT and the ageing of population are currently occurring simultaneously and these events have been projected to continue and increase in future years. Meanwhile, although there is currently a reduction in the digital divide, it still appears to be an issue in the UK (Friemel, 2016; ONS, 2017a). This has resulted in several debates being carried out among policymakers with the intention of achieving successful diffusion of ICT into the society especially for governmental purposes. Thus, studies like this one could assist in the provision of useful information that if applied, could help in developing strategies that will see to the successful diffusion of ICT in UK.

1.4.3 Industry:

ICT continues to expand with novel devices being developed almost annually. Considering this, the Information Technology (IT) industry continues to seek a breakthrough that will see to the successful diffusion of technology amongst all members of the society. Although for this to happen, every market segment needs to be considered and included. However, the existence of the digital divide continues to be a stumbling block for the industry (Warschauer, 2004). Thus, this study will be useful to the industry because information gathered in the course of the study can provide valuable findings, which can be applied in developing relevant ICT product and services for individual market segment especially the older population. This in turn might help bridge the gap created by the presence of the digital divide.

1.5 Research approach

During the course of this study, the research approach applied includes a critical review and examination of relevant literature, deduction, a survey questionnaire and also statistical analysis.

Firstly, to undertake any research, it is important to critically review literature relating to the subject matter. The reason for this is to enable the researcher to identify the gap in research in order to be able to narrow the scope of the study as well as determine a suitable research approach (Jugenheimer et al., 2014). Having conducted a review of literature, it was concluded that a positivist approach is suitable for this research. This is because the measurement of people’s behaviour is commonly viewed from a positivist perspective (Golafshani, 2003; Drost, 2011). Consequently, a survey method was identified as a suitable method for this research. This is because this method is usually useful in offering an in-depth understanding of respondents’ viewpoints especially when studying human behaviour. Additionally, Rea and Parker (2012), highlighted that surveys mostly gather three kinds of information. This includes descriptive, attitudinal and behavioural information. It is intended that the study will provide an understanding of the motivations and circumstances surrounding the adoption and usage of tablet devices by older adults. Therefore, an online survey questionnaire was developed for gathering data for this research. This questionnaire was distributed both online and in paper form in order to provide a more concrete and valuable information as well as reduce bias.

Furthermore, the study was focused on quantifying older people’s behaviour when adopting and using tablets devices. Based on this, the research can be categorized as a behavioural research thus, confirming the suitability of selecting the positivist paradigm. Additionally, the quantification of human behaviour requires that the measurement items used must be reliable and valid (Drost, 2011). Therefore, validity and reliability of the measurement instruments used in the survey questionnaire was conducted. This was also to ensure rigour, consistency and accuracy. For validity testing, content validity and construct validity were conducted by pretesting and pilot testing the questionnaire (Mohamad et al., 2015). While reliability of the measurement instruments used for the study was calculated using analysis such as Cronbach Alpha. Furthermore, to assess the credibility of result gathered from the quantitative study, qualitative method was used to evaluate the findings.

1.6 Overview of thesis structure

The thesis is structured into seven chapters. Details of the content of each chapter have been provided in table 1.

Table 1: Outline of thesis

Chapters	Content
1	**Introduction:** This chapter provides the general background of the research and provides justification on the choice of the research subject. Additionally, the chapter provides in this order the introduction and brief background of the research, aim and objectives of this research, research questions, research scope, research contributions, a brief description of the research methodology applied to this research and finally, the summary of the chapter.
2	**Literature review:** This chapter reviews various literature relevant to the research. This includes studies on older adults, tablet devices, technology adoption and digital divide. Furthermore, based on the review of the above-mentioned studies, an assessment of previous models, theories and constructs were also reviewed. This aided the selection of constructs and development of a suitable research conceptual framework and hypothesis.
3	**Research methodology:** This chapter begins with the provision of details regarding the methodology applied to the research. It also includes a brief description of site selection, reasoning behind selected data collection and analytic methods as well as the method applied in distributing the research survey.
4	**Pilot findings & analysis:** This chapter provides details of the content validity and pilot phase. This includes a general description of a pilot as well as the reason it was relevant to this particular study. Findings and analysis gathered from the pilot phase are also provided in this chapter.
5	**Final phase findings & analysis:** In this chapter, details of final findings are provided. This will also include the identified strength and weaknesses of pilot studies and how it was overcome during this phase.
6	**Evaluation and Discussion:** This chapter will evaluate the findings derived from the quantitative study using qualitative methods. It also discusses the research findings from both the pilot study and main study by assessing it with information gathered from the review of literature conducted in chapter 2.
7	**Conclusion/Recommendation:** In this chapter, a relevant conclusion will be provided based on the results obtained from the findings. This chapter will also provide details on the implications for academia, policy makers and industry basing the discussion of the gathered results. In addition, the limitation or gap of the research will be identified and discussed. Finally, some recommendations will be provided in order to proffer directions for future studies on the issue.

1.7 Summary of chapter

There are two societal trends, which are occurring simultaneously and thus, making this research relevant. These trends include a) the ageing of population and b) the presence of ICT in major parts of society. Therefore, in this chapter, the research being undertaken was introduced and the research gap, which gave rise to the research problem or aim, was identified. Specifically, it was noted that there is a gap in research with regards to studies addressing the adoption, use and diffusion of tablet devices by older adults. Therefore, identifying this research gap led to the research problem, which is focused on identifying and evaluating the factors that affect older adults' adoption, use and diffusion of tablet devices.

Identifying the factors that affect older adults' adoption and use of ICT is important for devising means that will ensure the older population are digitally included (Choudrie et al., 2013). This is because digitally including older people will ensure these individuals remain independent and socially included notwithstanding their failing health. In addition, digitally including older adults could potentially lead to an improved quality of life among these individuals as well as an improvement in the economy. However, given that ICT is a broad term for any digital element including MCD; thus, the tablet device was selected as an example for MCD. This was to ensure that this research work had a perspective as well as will fill the research gap identified.

Furthermore, to achieve the research aim, the objectives and four research questions were also developed and discussed in this chapter. Moreover, the research scope, which provided an insight to the level of generalisation that can be deduced from the study, was also discussed. For example, from section 1.3, it can be identified that the research study is carried out in Hertfordshire County, UK. Finally, the research approach and outline of the thesis was also provided in this chapter. These aspects provided an insight of methods used as well as an overview of the content of the thesis respectively.

Having introduced the research, the next chapter provides and discusses relevant literature associated with the subject matter.

Chapter 2: Literature Review

2.0 Introduction to chapter

To provide a valid contribution to academia, industry and policy makers a literature review was conducted in this chapter. The search for the literature was carried out using keywords such as older adults, usability of ICT, tablet devices, mobile technology and digital divide. From the review, a research gap was identified, which led to the aim of this study.

Furthermore, this chapter provides an overview of impairment issues associated with ageing, and how these issues affect technology use among older adults. Overall, the available literature relevant to the current study is presented and discussed in this chapter. Moreover, a number of theories previously applied in studies similar to this current research will be discussed. These identified theories formed the basis of the selection of a suitable model or conceptual framework for this study, which are discussed in detail in this chapter. In addition, the research hypotheses to be tested will also be presented and discussed. Finally, the overall summary of the chapter is provided.

2.1 Adoption and diffusion of ICT

An innovation is the development and application of new ideas, products, processes and or new services (Baregheh et al., 2009). Based on this, mobile technologies in the form of tablet devices, which are the devices considered for this study, are classed as innovations. When considering innovation, it is often tightly linked to change and most individuals are often resistant to change (Ćirić and Raković, 2010). As a result, it is usually difficult to get people to adopt innovations even when there are obvious benefits that could potentially be gained from such innovations (Rogers, 2010). Therefore, for any innovation to be adopted successfully, it is fundamental to communicate such ideas and its advantages to the prospective users until it is eventually accepted (Kotter and Schlesinger, 2008). Considering this, diffusion of innovation plays the role of disseminating information about an innovative idea, process, service and or product (Di Benedetto, 2015). Diffusion is the process of communicating an innovation via various channels to individuals of a social system within a period of time (Rogers, 2010). Moreover, diffusion of innovation is dependent on several factors and processes, but researchers have identified four significant factors and processes in the diffusion of technological innovations (Rogers, 2003; Michailidis et al., 2011). These factors include innovation, communication channel, time and the social system. To further explain this, Raus et al. (2009) suggested that the diffusion life circle usually begins from the innovation phase because it is this phase that contains all the decision-making and the activities where the need or problems of each market segment are identified. Following this innovation phase, the end product of the innovation is then disseminated through a communication channel over time to the relevant consumers. Based on this, the phase being addressed in this study is the dissemination phase. Figure 1 shows the diffusion life cycle as suggested by Raus et al. (2009).

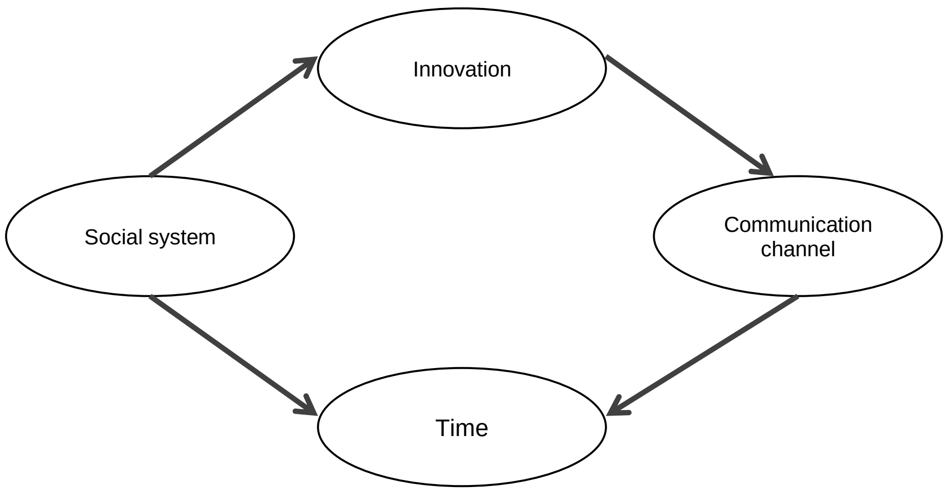

Figure 1: The diffusion life cycle

Source: Raus et al. (2009)

As new ICT innovations are developed, the adoption pattern and utilisation of these innovations differ among organisations, individuals and countries (Dewan and Riggins, 2005). In turn, this leads to a difference in the level of access (Dewan and Riggins, 2005).

Furthermore, the decision of individuals to either adopt or not to adopt innovations is dependent on their perception of the innovation (Rogers, 2010). For instance, despite the numerous benefits associated with the use of ICT, it is clear from available literature that the adoption of ICT products is more common among the younger generation than among the older generation (OFCOM, 2016). Applying Rogers (2010) explanation, this means that ICT appears to be more desirable to younger adults than the older ones.

In the last decade, the recent popularity and rapid penetration rate of mobile technology is a clear indicator of mobile technology diffusion. For example, a previous study conducted by Li (2014) showed that mobile technology in the form of tablet devices and smartphones are the top two digital gadgets in Taiwan. In particular, tablet devices are steadily gaining a market share because of its flexibility, portability and wireless connectivity features (Burford and Park, 2014).

Moreover, the adoption and use of ICT has become a growing interest to both academics and policy makers (Choudrie et al., 2013). Studies on ICT's adoption, use and diffusion pattern are often conducted in an organisational or user context (Dewan and Riggins, 2005). In organisational context, most organisations currently rely on the use of technology for work related activities. It is therefore important to understand how the implementation of ICT will affect the efficiency and effectiveness of organisations (Peansupap and Walker, 2005). Subsequently, everyday activities such as socialising, governmental interactions and health related activities are commonly conducted online nowadays. Thus, understanding the impact of ICT on a user level is also necessary (Choudrie et al., 2010). This study therefore addresses the adoption and use of ICT from users' perspective, in particular, older adults. Furthermore, an ICT adoption cycle has also been developed to understand the diffusion process and this adoption cycle contains three variables namely: innovation, access and usage (Dewan and Riggins, 2005). Considering the continuous development of novel ICT innovations, this cycle is a recurring one since for every newly developed ICT, the processes of access and usage starts anew (Dewan and Riggins, 2005). Figure 2 illustrates the ICT adoption cycle.

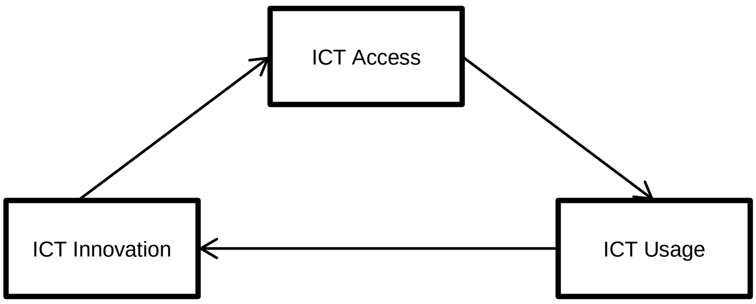

Figure 2: ICT adoption cycle

Source: Dewan and Riggins (2005)

2.2 Ageing and ICT

Ageing is an inevitable change that people usually undergo in life and it is commonly associated with several physical, psychological and social challenges (Al-showarah, 2015). Some of these challenges include vision and hearing impairments, cognitive decline, social isolation and loneliness (Yusif et al., 2016; Coelho and Duarte, 2016). Usually, these changes significantly impact on older adults' quality of life.

According to Delello and McWhorter (2017), it has been confirmed that the human brain is malleable rather than fixed as was previously believed. The brain is therefore capable of adjusting and responding to new information. Moreover, based on the model of human information processing developed by Atkinson and Shiffrin (1968), there are three key stages of memory and these include sensory, short-term or working and long-term memory. According to this model, individuals usually receive information through input channels such as auditory or visual channels when interacting with ICT (Downton, 1991). This information is then processed in the brain and stored in either the sensory memory or the working or long-term memory. Furthermore, response to this information received then occurs via output channels such as motor control (Downton, 1991). Figure 3 shows the model of human information processing.

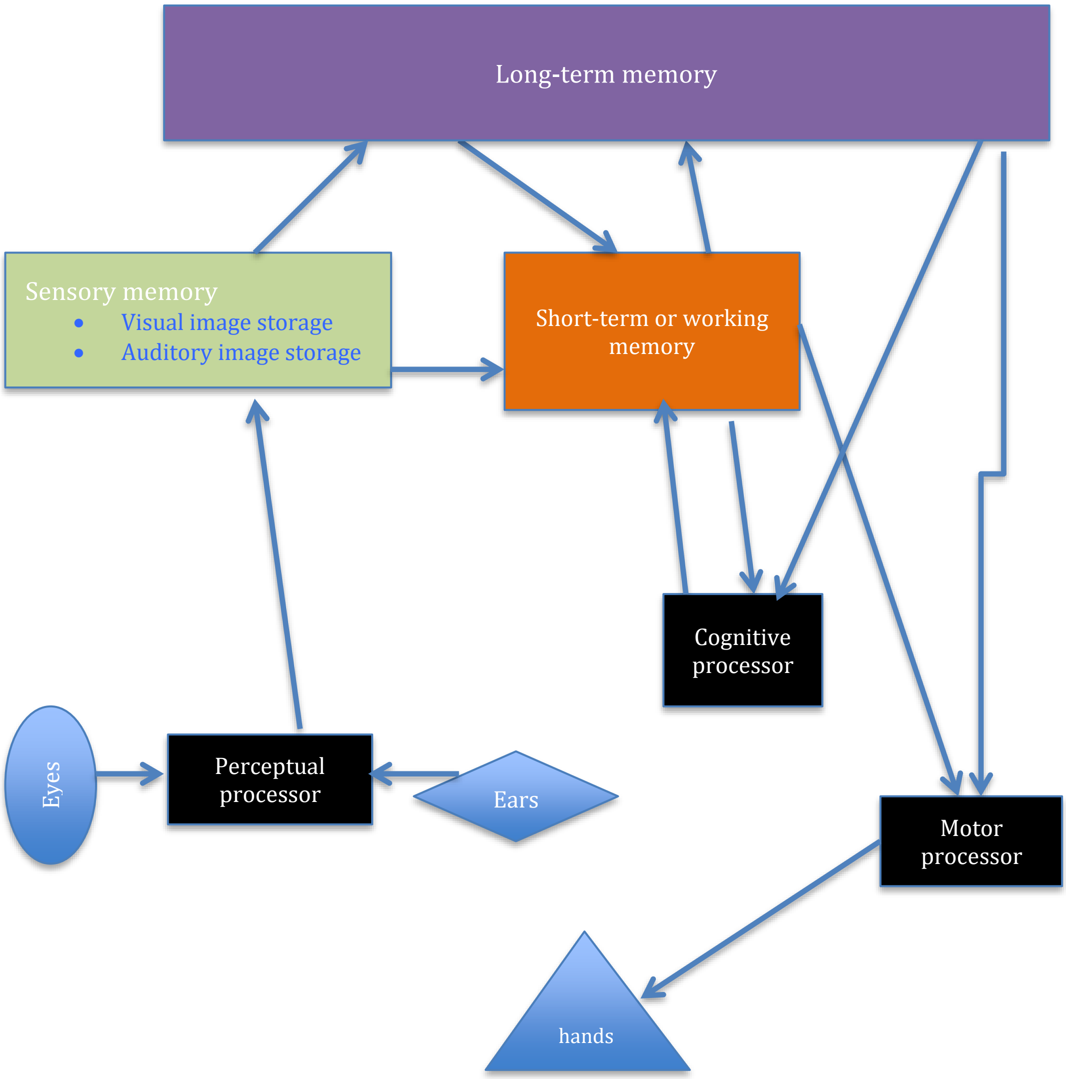

Figure 3: Model of human information processing

Source: Downton (1991)

Figure 3 shows the normal steps an individual undergoes in processing information. However, for older adults, this may not be the case due to the impairments in perception, sensation, cognitive abilities and motor movement, all of which are commonly associated with ageing (Chen, 2013). In particular, an older adult's performance on working memory task usually deteriorates with age (Becker, 2004). For instance, an older adult who previously had the knowledge and ability to perform certain computer tasks could forget how to perform these tasks due to a working memory decline (Arnott et al., 2004).

Consequently, in human-computer interaction (HCI), the input channels in individuals have a fundamental role to play in ensuring the effective or not so effective usability of technology (Downton, 1991). For instance, to a large extent, vision limitation affects technology utilisation especially when the font size on the visual display is small (Phiriyapokanon, 2011). Concurring with this, researchers have suggested that health issues are moderating factors that enhance the effect of age on technology usage (Heart and Kalderon, 2013). A further study found that there are two major factors hindering the effective use of ICT by older adults. These include age-related physical, psychological and social barriers and lack of experience with modern technologies (Arnott et al., 2004).

Furthermore, Stößel and Blessing (2010); Boontarig et al. (2012) found that adoption and utilisation of ICT are more difficult for older adults because most of these adults were born in an era when ICT were either uncommon or absent. Therefore, these difficulties in adopting and using ICT are further enhanced for older adults, especially when it involves exponentially evolving technology such as smartphones or tablets which otherwise should be a source of advantage for improving their quality of life (Al-showarah, 2015).

Most of the times, older adults prefer to sustain their independence for as long as is possible (Selwyn, 2003; Selwyn et al., 2003). However, the above-mentioned age-related deficiencies among other factors can challenge the achievement of this independence desired by older adults.

Devices such as tablet computers might be a solution for some of these challenges because these devices provide convenient and prompt access to several benefits (Tsai et al., 2015). These benefits include sustaining connections with family and friends as well as using the current healthcare systems. This will in turn reduce loneliness and isolation normally experienced by older adults (Chen and Schulz, 2016). In general, despite the numerous benefits which older adults stand to gain from the use of ICT, they still belong to the group of population that are least likely to adopt and use the Internet (Tsai et al., 2015).

Currently, there is a global aging of population and this is evident from a study by Coelho and Duarte (2016), which reported that in 2009, the number of older adults in the world exceeded 700 million. This number continues to increase and it has been projected that the proportion of people in the world aged 60 years and over will reach two billion by 2050 (United Nations, 2010; Chen and Schulz, 2016). Specifically, in UK, the percentage of those aged 60 and over increased by 6.6% between 2011 and mid-2015 (OFCOM, 2016). It has been predicted that this trend will continue such that by the year 2033, 23% of UK's population will be aged 65 and above while 18% will belong to the 16 years and under group (ONS, 2009).

Consequently, the reason many societies are ageing is as a result of the increase in life expectancy and a decrease in fertility rate, which means that there are currently more elderly people in the population than in the past centuries (Cramm et al., 2013; Tinker, 2014). It is also suggested that an improvement in the healthcare system has contributed to the ageing of several populations (Massimi et al., 2007). Subsequently, a major part of this improved healthcare system, which offers more efficient and effective services, is due to ICT (Heart and Kalderon, 2013).

Consequently, while populations are ageing, there is continuous growth in ICT, with different novel technologies being developed (Niehaves and Plattfaut, 2014). Meanwhile, ICT have been found to be of maximum benefits to the elderly (Selwyn, 2003). In agreement, Delello and McWhorter (2017) described ICT as a means for reducing certain health risks. Furthermore, Chen and Schulz (2016) suggested that ICT plays a role in combatting social isolation among older people by helping them to gain social connectedness and support. Narkwilai et al. (2015) also found that the use of social networking keeps elderly people in touch with loved ones, provides information, grants them freedom and support for a better quality of life. Furthermore, Cotton et al. (2014) suggested that ICT could assist in reducing the feelings of depression, stress and loneliness in older adults. The above-mentioned points therefore emphasises on the need for all group of society especially older adults, to embrace digital technology. This is because sooner or later, it could be an inevitable requirement for everyday activities to function.

Some studies such as that of Czaja and Lee (2007) and Mitzner et al. (2010) have suggested that majority of the older population are not technophobic and often display competence in the use of technology. However, Neves et al. (2013) categorised the reasons for non-usage among this group into three groups, which include attitudinal, functional and physical reasons. According to Neves et al. (2013), a) attitudinal has to do with the older individual's lack of interest in ICT or perception in terms of usefulness; b) functional is linked to the lack of access to the Internet/computer or lack of skill in using it; while, c) physical refers to the health-related physical issues that are associated with aging. Meanwhile, Czaja and Lee (2007) stated that principal reasons for non-use or adoption of technology from the older adults' perspective are mostly attitudinal. In concurrence, Magsamen-Conrad et al. (2015) stated that aging and technology adoption are mostly studied in relation to individual's attitudes towards technology and its uses. It was also suggested that the link between age and attitudes towards technology is most often significantly negative (Wagner et al., 2010). In other words, the older an individual gets, the higher their negative attitude towards technology. Moreover, Gascon et al. (2015) argues that age does not necessarily have a direct impact on the perception and evaluation of new technologies; instead, the social context that the technology is introduced into along with past experience with the technology plays a vital role. In their study, it is also suggested that more suitable ways to introduce and train older people to use ICT be discovered, with the older adults' emotions being taken into consideration (Gascon et al., 2015). This almost agrees with the concept that the attitude and trust of individuals towards ICT significantly impacts on adoption and use (Al-Somali et al., 2009).

2.3 Importance of older adults to society

The older population is one group of society that is presently attracting huge debate with regards to their health and wellbeing along with what they can benefit from ICT (Choudrie et al., 2013). With the ageing of nations, this group of population are of immense importance to the society and the economy at large. This is because most organisations now use ICT for various work-related activities, and the older population are becoming the fastest growing proportion of the workforce (Wagner et al., 2010). Moreover, older adults contribute on a macro level to the workforce financially, socially and in years of experience (Land, 2017). For instance, in the UK, statistics showed that in 2010, the over 65s made an average net contribution of £40 billion pounds to the country through the provision of both formal and informal care and volunteering as well as taxes and expenditures (Fenton and Draper, 2014). Consequently, this value is projected to increase such that by 2030 the net contribution of the over 65s will rise to approximately £77 billion (WRVS, 2010). Concurring, Land (2017) suggested that this group of society coupled with their significant contribution to the economy, also contribute to the wider society through the provision of care to family and friends especially their grandchildren. For instance, it was found that in England, there were approximately 5.3 million informal carers of which one in every five of this group was aged 65 and over (Land, 2017). In accordance with this, a report by Age UK (2018) indicated that in the UK, 45.4% of people who provide care for family, friends or other individuals, are aged 65 years and above. Moreover, in the same report by Age UK (2018), the estimated net contribution made by those aged 80+ through the provision of informal care in England alone is valued at £5.9 billion.

Overall, the importance of older adults to society cannot be overemphasised, and thus these individuals need to feel included, valuable and part of society. This therefore, further emphasises the importance of ensuring that the older population engage in the current ICT adoption and usage trend. This will in turn ensure healthy and successful ageing in these adults (Chong et al., 2006).

Further literature on older adults and ICT are presented in appendix 1.

2.4 Tablet devices

In the past, desktops and laptop computers were the only available means of accessing the Internet (Burford and Park, 2014). However, in this modern era, ubiquitous and mobile computing is the new demand (Voumvakis, 2014). In addition, mobile and ubiquitous computing enables faster and easier access to the Internet. Currently, mobile devices have advanced such that individuals are capable of choosing particular people to communicate and interact with (Park, 2013). It is also possible for individuals to select the number of people they can communicate and interact with at the same time (Park, 2013). Furthermore, it provides an avenue for individuals to carry out private conversations in public places without feeling exposed (Leung, 2015).

Consequently, tablet devices are one of the technological gadgets that have made this form of computing a reality (Voumvakis, 2014). It combines the features of a computer and a mobile phone to form a unique device (Burford and Park, 2014). A tablet is described as a mini mobile computer that is lightweight, flat, and compact and also has a large screen (Hur et al., 2014). These devices potentially offer numerous benefits some of which include continuous connectivity, as well as the provision of a means for multitasking (Park, 2013). In addition, due to its mobility and portability attributes, individuals are able to use this device notwithstanding the time or location (Leung, 2015). A tablet device also promotes the use of the Internet via applications (Hur et al., 2014). According to Park (2013), tablet devices possess some similarities with smartphones however there are significant differences between these two devices. These differences, some of which include the screen size and the social perception of usage therefore makes the two devices complementary to each other (Leung, 2015). For instance, in terms of social perception of usage, smartphones are perceived as a personal device that should not be used in a formal social gathering such as meetings or classrooms. However, in comparison to this, the social perception for using tablet device is that it is appropriate for use in formal gatherings in almost the same way as laptops and desktops (Park, 2013). In concurrence with this point of view, Lee et al. (2012) found that tablet devices are less personal devices than the smartphones given that a tablet device can be co-owned and used by multiple individuals. However, smartphones on the other hand are more private considering that most times, these smartphones are used by one individual (Lee et al., 2012). Moreover, considering that tablet devices can fit in with any physical and social setting, it can be said that it takes full advantage of its mobility, which makes it a unique device (Park, 2013).

2.4.1 History of the tablet device

Although, this device has been in existence in a variety of forms since the sixties, however more recently, it became a trend in mobile computing (Halme, 2011). Whilst the tablet device was formally introduced in the year 1989 (Warkentin et al., 2004), it however started gaining its popularity in the year 2010 after the introduction of the Apple's iPad, which happens to be the most commonly used tablet device (Henderson and Yeow, 2012; Griffey, 2012). Furthermore, the popularity of the iPad was emphasised in a study by Henderson and Yeow (2012), which suggested that 15 million iPads were sold in the first few months of its unveiling to society.

Originally, the tablet device was intended as a supplement to desktop and laptop computers (OFCOM, 2016). However, in recent times, this device has begun to replace the desktops and laptops (Griffey, 2012). Evidence of this is presented in a report by OFCOM (2016), where it was suggested that most individuals are currently moving from laptops and desktops towards smartphones and tablets. Statistics also presented by this OFCOM (2016) report also showed evidence of a decrease in the number of people accessing the Internet via laptop/desktop computer. Specifically, in their statistics, this reduction was from 81% in 2014 to 71% in 2015. Meanwhile, there was a 4% and 6% increase in the percentage of people accessing the Internet via smartphones and tablet devices (OFCOM, 2016). This finding confirms the selection of the tablet device for further investigation.

2.4.2 Tablet and mobile device adoption studies

Considering that tablet devices are a form of MCD, studies on mobile devices /technologies were reviewed before limiting the scope to tablet devices. In the light of this, the following demonstrates the progression of the studies on the adoption of mobile devices in general.

Generally, since the inception of mobile technology, studies have been carried out to address the adoption of mobile devices in various sectors. One of such studies includes a quantitative study that examined the adoption of mobile devices in the gaming world (Ha et al., 2007). Specifically, Ha et al. (2007) used an extension of Technology, Acceptance Model (TAM) proposed by Davis et al. (1989) to assess the factors that influence potential users' adoption of Mobile Broadband Wireless Access (MBWA) games. The study also analysed the moderating impact of age, gender and prior experience on the adoption of MBWA games. Findings of the study indicated that age is a fundamental moderator of game adoption. In addition, it was also found that perceived enjoyment is a key factor, however; usefulness is not a significant determinant for attitude. See figure 4 for the research model used by Ha et al., (2007) in their study.

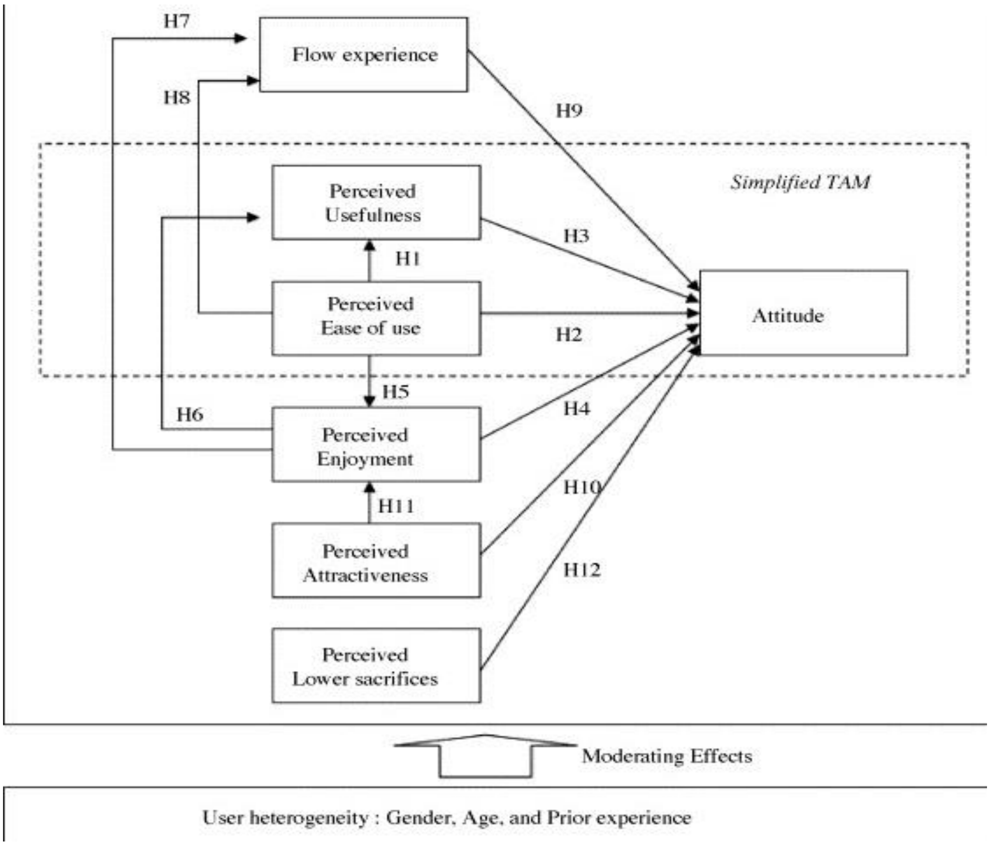

Figure 4: Research model of Ha et al. (2007)

Source: Ha et al. (2007)

Figure 4 illustrates the research model used in the study of Ha et al. (2007) to assess the adoption of MBWA games. From the figure, it can be observed that the TAM model was extended to include the following constructs: flow experience, perceived enjoyment, perceived attractiveness and perceived lower sacrifices. The model was further modified to include moderating factors such as gender, age and prior experience.

Furthermore, some studies addressing the adoption of mobile devices in a financial environment have also been conducted. For instance, a qualitative study was carried out to explore the factors that influence consumer adoption of mobile payments, which are carried out using a mobile device (Mallat, 2007). The study was grounded on Rogers' diffusion of innovation theory. Findings from this study showed that complexity, perceived risk and perceived incompatibility are inhibiting factors for mobile payment adoption. It also indicated that relative advantage was determined by enhanced availability of mobile technology, perceived independence of time and place and the ability to avoid queues.

Another study considered the benefits of mobile devices to individuals with certain disabilities. Specifically, the study applied a qualitative method to explore how individuals with visual and motor impairments select, adopt and use mobile devices (Kane et al., 2009). Findings from this study revealed that perceived privacy, compatibility and cost are factors that influence the adoption and use of the mobile device among people with disabilities.

Furthermore, studies addressing the use of mobile devices for entertainment have also emerged. For instance, Jung et al. (2009) assessed the impact of media content and cognitive concentration or flow experience on users' adoption of mobile television (TV). This study modified the TAM model by including hedonic attributes to their research model (see figure 5). Result from this study indicated that media content has a significant impact on cognitive concentration.

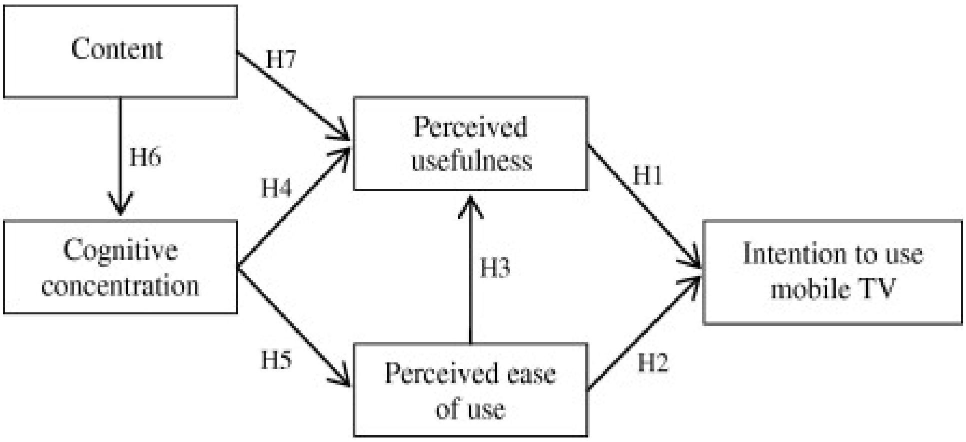

Figure 5: Research model used in the study of Jung et al. (2009)

Source: Jung et al. (2009)

Figure 5 shows the research model used in the study of Jung et al. (2009) to assess the adoption of mobile TV. From the figure, it can be observed that the TAM model was modified to include two hedonic attributes: content and cognitive concentration while the attitude construct was removed.

Moreover, the presence of mobile devices has also designed a new mode of service delivery in the form of mobile services. As a result, studies addressing the adoption of mobile devices for delivering services have also emerged. One of such studies includes the work of Islam et al. (2011), where the adoption of mobile commerce (M-commerce) service among employed mobile phone users in Bangladesh was investigated. The study used constructs such as awareness and knowledge, convenience, cost and pricing, security, rich and fast information and usefulness as determinants of M-commerce service adoption. Self-efficacy was also used as a moderating factor in the study (Islam et al., 2011). In addition, the study used a survey method to examine factors that influence the adoption of M-commerce in two major cities in Bangladesh: Dhaka and Chittagong. Result indicated that security and privacy is a significant determinant of M-commerce service adoption. On the other hand, perceived usefulness was found insignificant in determining the adoption of M-commerce services.

Furthermore, in 2011, an empirical study investigating the use of mobile technology to conduct mobile commerce and financial services also emerged. This study combined attributes from Roger's diffusion of innovation theory with attributes from knowledge-based trust to assess mobile banking adoption (Lin, 2011). Using a survey and employing SEM analysis, result showed that perceived relative advantage, ease of use, compatibility, competence and integrity have significant impact on attitude towards adopting mobile banking. Result also indicated that attitude has a significant influence on behavioural intention to adopt mobile banking (Lin, 2011). See figure 6 for the research model used in the study of Lin (2011).

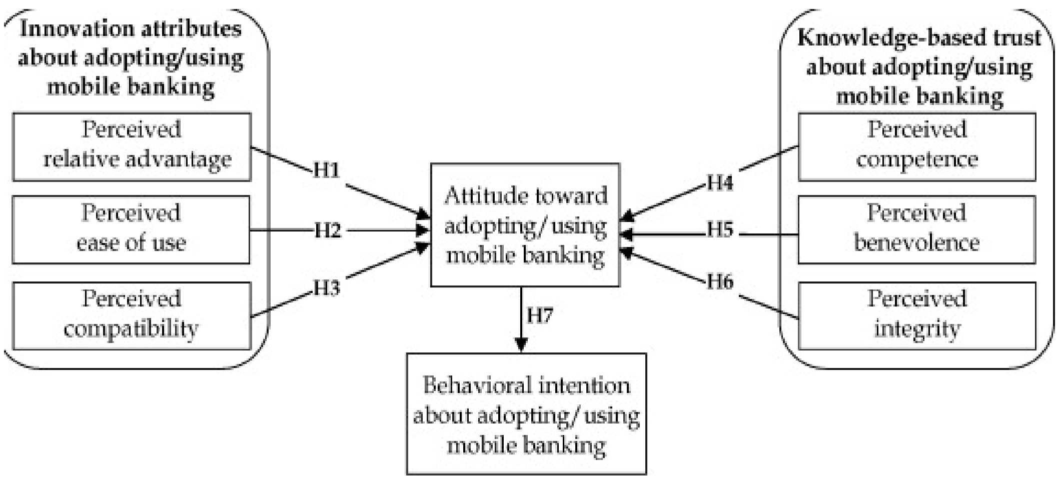

Figure 6: Research model used in the study of Lin (2011)

Source: Lin (2011)

From figure 6, it can be observed that the attributes adopted from Roger's diffusion of innovation theory include perceived relative advantage, perceived ease of use and perceived compatibility. On the other hand, the attributes adopted from knowledge-based trust theory include perceived competence, perceived benevolence and perceived integrity. In addition, from figure 6, it can be observed that Lin (2011) hypothesised that the innovation attributes and the attributes from knowledge-based trust, have an influence on attitude towards the adoption of mobile banking. Subsequently, attitude has an effect on the behavioural intention to adopt mobile banking.

Given the literature review regarding mobile devices generally, the following review now demonstrates the progression of the topic on tablet device adoption.

As mentioned in section 2.4.1, the tablet device was developed since 1989 however, it started trending in the year 2010. With its presence in society, some tablet adoption studies have emerged with the application of adoption theories to some of these studies. Furthermore, these studies have emerged in different fields to gain an insight on the factors that play a role in the adoption of the tablet device. For instance, Moran et al. (2010) conducted a study regarding the implementation of the tablet device into an educational sector. Specifically, Moran et al. (2010) applied a modified Unified Theory of Acceptance and Use of Technology (UTAUT) to examine the implementation of tablet device in a higher education institution. Findings from this study showed that performance expectancy, self-efficacy effort expectancy and attitude were significant predictors of behaviour intention. However, social influence and anxiety were not significant in predicting behaviour intention (Moran et al., 2010). Figure 7 shows the model used in the study carried out by Moran et al. (2010).

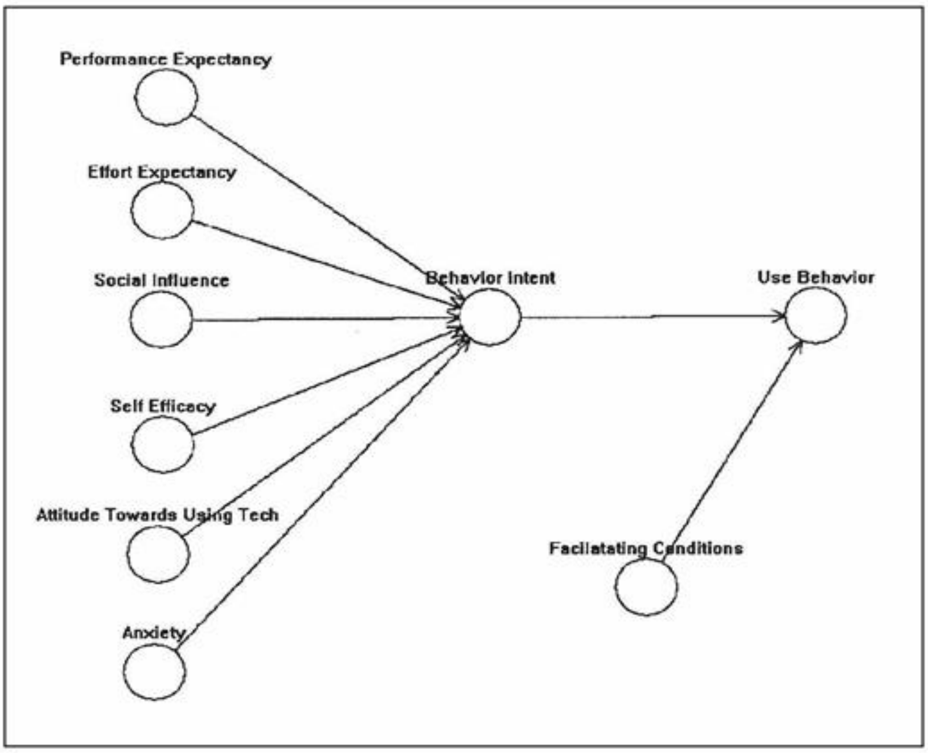

Figure 7: Modified UTAUT model

Source: Moran et al. (2010)

From figure 7, it can be observed that Moran et al. (2010) modified the UTAUT model by including two constructs: attitude towards using tech and anxiety. However, the moderating factors in the original UTAUT model were excluded from their model.

Furthermore, a qualitative study, which was grounded on Rogers' innovation theory, was also carried out to investigate tablet adoption and implementation in academic libraries (Scale, 2013). To achieve this, online discussion conducted via blogs and tweets was used to gather data for the study. Result revealed that libraries and librarians adopt and use tablets to deliver services because these devices can provide wireless access to e-resources better than smartphones or e-readers (Scale, 2013).

Moreover, some studies assessing the adoption of tablet device from the consumer's perspective have also been carried out. For example, Hur et al. (2014) conducted a study in South Korea to explore the factors that influence a consumer's intention to use a tablet device. This study applied a modified TAM model and analysed the data gathered using partial least squares (PLS) analysis. Result indicated that perceived usefulness and enjoyment have a positive impact on attitude while; social influence and attitude have a positive impact on intention to use tablets (Hur et al., 2014). Figure 8 presents the model used in the study of Hur et al. (2014).

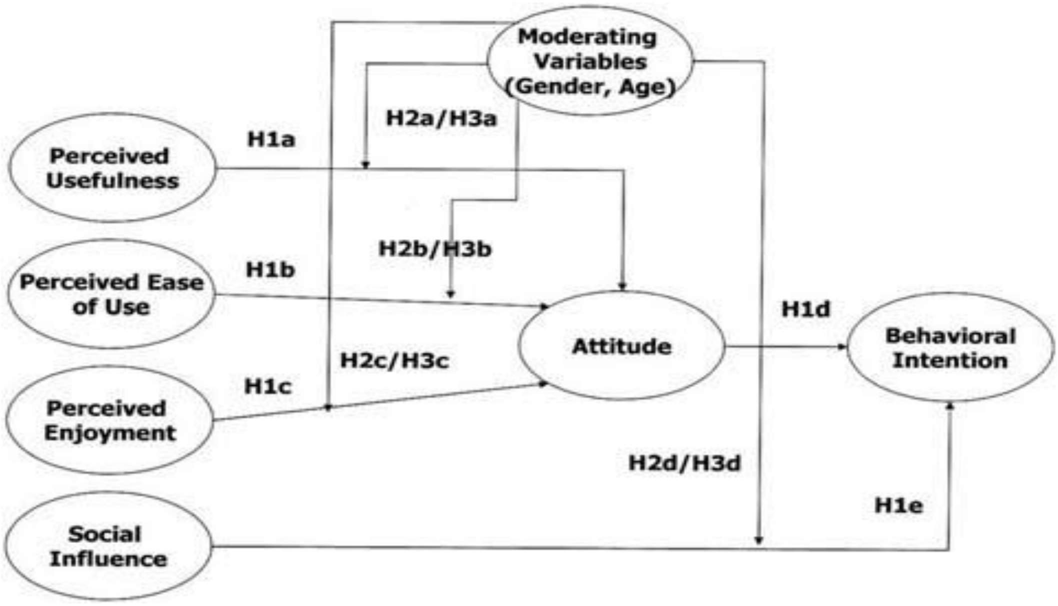

Figure 8: Model used in the study of Hur et al. (2014)

Source: Hur et al. (2014)

From figure 8, it can be observed that Hur et al. (2014) extended the TAM model by including two independent constructs and some moderating factors. In particular, perceived enjoyment was included as a predictor of attitude while; social influence was used as a predictor of behavioural intention. Subsequently, the moderating factors introduced to the modified TAM model include gender and age.

Furthermore, another study conducted in 2014 applied Roger’s diffusion of innovation model to assess the adoption of tablet devices, netbooks and smartphones in Taiwan (Li, 2014). Using multiple regression analysis, findings from this study revealed that education, relative advantage, ease of use and ownership of entertainment technologies collectively impacted positively on the intention to adopt tablet devices. On the other hand, age and television viewing (i.e. people who watched more television) have a negative impact on the intention to use tablet devices (Li, 2014).

Meanwhile, studies assessing the generational difference in tablet adoption also emerged. One of such studies is that of Magsamen-Conrad et al. (2015) who also employed the UTAUT model to predict multigenerational tablet adoption practices. Findings from this study indicated that performance expectancy and social influence were not significant in determining tablet use intention. On the other hand, effort expectancy and facilitating conditions were significant predictors of tablet use intention (Magsamen-Conrad et al., 2015).

Moreover, studies also emerged addressing the adoption of tablet devices in healthcare sector. One of such studies includes that of Ducey and Coovert (2016) where a modified technology, acceptance theory (see figure 9) was used to examine tablet adoption among physicians. The data gathered, which was analysed using SEM revealed that perceived ease of use, perceived usefulness, subjective norm, compatibility and reliability jointly impacts on the intention behaviour of the paediatricians.

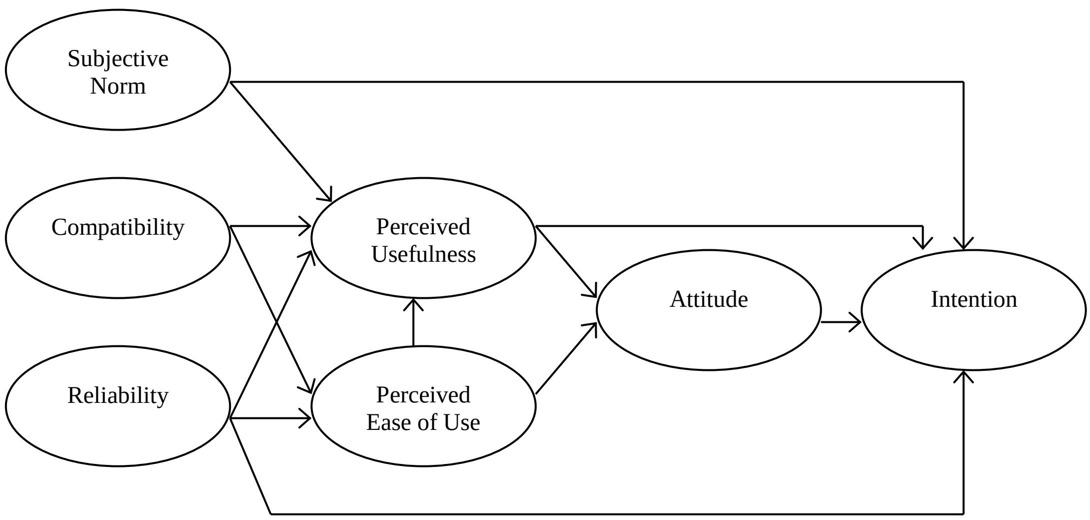

Figure 9: Modified TAM model

Source: Ducey and Coovert (2016)

Figure 9 presents the research model used by Ducey and Coovert (2016) in their assessment of tablet adoption by physicians. From figure 9, it can be observed that Ducey and Coovert (2016) modified the TAM model by including three external variables: subjective norm, compatibility and reliability. These variables were categorised to represent an organisational perspective (subjective norm) and device perspective (compatibility and reliability).

In addition, some studies from the field of marketing have also assessed the use of the tablet device in delivering service. For instance, Kim (2016) conducted a research using age and gender as moderators to investigating whether a customer's perceptions of hotel tablet apps impacts on the customer's behaviour intention. This study also used an extended TAM model, which was tested using confirmatory factor analysis (CFA) and SEM. Findings from this study indicated that perceived usefulness, perceived credibility and subjective norm positively influences customers' behaviour intention. It also revealed that there was significant gender and age related differences in the preferences for particular hotel tablet app functions (Kim, 2016).

Considering this review of mobile and tablet adoption studies, it can be observed that over the years, tablet and mobile device adoption research has been conducted in various fields and has also been addressed from different perspectives. Specifically, it can also be deduced that the tablet device plays a significant role in education, healthcare and marketing sectors. These identified studies have also applied various adoption theories and methods in an attempt to understand mobile and tablet adoption patterns. Thus, this information will help in the selection of relevant constructs for this study, which in turn will help in the development of the study's conceptual framework.

Furthermore, considering that older adults are the population of interest, the next section reviews literature on older adults and tablet devices.

2.4.3 Older adults and tablet devices

Currently, the rate of the adoption and usage of the tablet device especially among older adults has increased over time (Furness, 2017). For instance, in the UK, statistics show that in 2014, approximately 44% of individuals living in households owned a tablet as opposed to the 24% observed in the previous years (OFCOM, 2014). Moreover, as at 2015, approximately 54% of UK households had a tablet device (OFCOM, 2015). Additionally, the percentage of 65-74 years old going online with a tablet device in the UK, increased by 9% between the years 2013 to 2015 (OFCOM, 2016). Pew Internet also recorded a 7% increase of tablet ownership in the United States (US) between May 2010 and August 2010.

Moreover, in the UK, it was found that the increased usage of tablet devices has significantly influenced the number of citizen in particular older adults going online (Reynolds, 2014). For instance, according to a report by Digital Strategy Consulting (2013), 21% of 70-79 years old own a tablet while, 14% of 80+ years old that use the Internet have tablets too.

Furthermore, with the presence of mobile and tablet devices, studies have been carried out to understand how older adults adopt and use these devices. One of such studies is the work of Deng et al. (2014) who used quantitative method to assess the adoption and use of mobile health services among the middle-aged and older adults. To achieve this, an extension of the theory of planned behaviour (TPB) model was applied and this was analysed using SEM. Result showed that perceived value, attitude, perceived behavioural control, technology anxiety and self-actualization need significantly affected the behaviour intention of the older users towards adopting mobile health services. Meanwhile, for the middle-aged users, perceived value, attitude, perceived behavioural control and resistance to change impacted on the behaviour intention of the middle-aged users. Figure 10 presents the model used by Deng et al (2014) to assess the adoption and use of mobile health services.

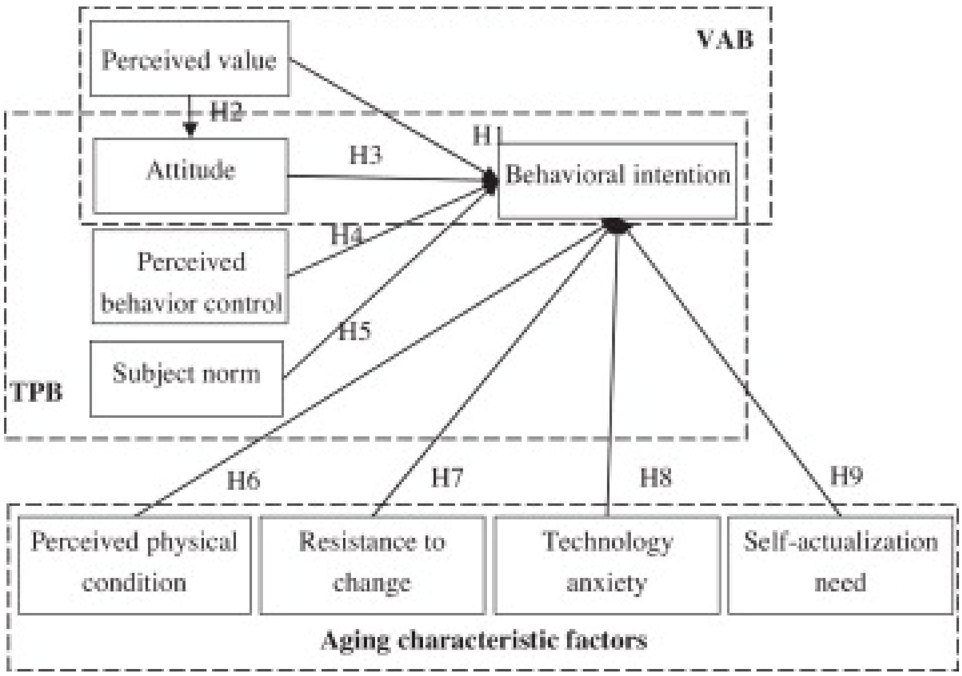

Figure 10: Modified TPB model

Source: Deng et al. (2014)

Figure 10 shows the modified TPB model, which Deng et al (2014) employed in assessing the adoption and use of mobile health services by middle-aged and older users. From the figure, it can be observed that the TPB model was extended to include perceived value, perceived physical condition, resistance to change, technology anxiety and self-actualization need.

Similarly, a study by Hoque and Sorwar (2017) assessed the adoption of mobile health (mHealth) by the elderly. In the study, an extended UTAUT model and structural equation modelling was used to investigate the factors that influence the adoption of mHealth among older adults. Results from their study found that performance expectancy, effort expectancy, social influence, technology anxiety and resistance to change had a significant influence on behavioural intention to adopt mHealth. However, facilitating conditions was not significant in determining the behavioural intention of the elderly in relation to using mHealth services. Figure 11 shows the extended UTAUT model used in the work of Hoque and Sorwar (2017).

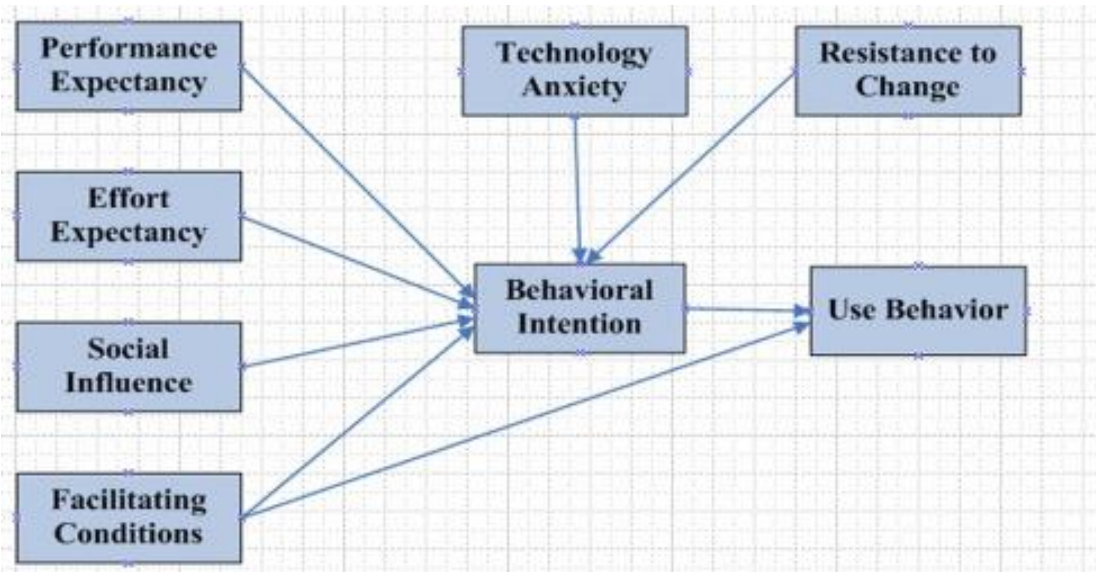

Figure 11: Extended UTAUT model

Source: Hoque and Sorwar (2017).

Figure 11 shows the model applied by Hoque and Sorwar (2017) to understand the factors that influence the adoption of mHealth services by the elderly. From the figure, it can be observed that Hoque and Sorwar (2017) modified the original UTAUT model by including two variables: technology anxiety and resistance to change.

Furthermore, some studies have addressed the adoption of tablet devices by older adults. Some of these studies including the work of Barnard et al. (2013) and Tsai et al. (2015) employed qualitative methods to explore the factors that influence older adults use of the tablet device. From these studies, the factors that influence the adoption of tablet devices among the older adults include the size of the device, its touch-screen feature as well as the screen size, which was especially useful for those with visual limitations (Barnard et al., 2013; Tsai et al., 2015). It was also found that factors such as seeing others using the tablet device combined with the recommendation of a significant member to use the device played a fundamental role in encouraging an older adult to adopt a tablet (Tsai et al., 2015).

Furthermore, for older adults, the tablet device offers a range of benefits including ensuring that these adults maintain their independence (Wilkowska and Ziefle, 2009). In particular, a study by Wilkowska and Ziefle (2009) found that mobile devices such as tablets are highly beneficial to older adults because these devices can serve as health monitoring tools, memory aids and for personal data management. Furthermore, the tablet device also provides calendaring and reminder attributes that could assist an older adult’s prospective memory especially in terms of medication adherence (Roque and Boots, 2016). This device also could help an older adult keep track of their health status through the provision of applications that support activities such as healthy eating and exercises (Jayroe and Wolfram, 2012). Specifically, Jayroe and Wolfram (2012) found that for older adults, tablet devices are potentially effective, enjoyable and efficient means of accessing the Internet. However, the usability of tablets in searching for information is quite challenging for these older individuals (Jayroe and Wolfram, 2012).

Furthermore, one of the factors inhibiting older adults from gaining from ICT in general is the lack of technology proficiency or self-efficacy (Roque and Boots, 2016). However, Tsai et al. (2015) who employed a qualitative method to assess older adults’ adoption of tablets found that the ease of use feature in a tablet helped resolve the challenge of lacking technology proficiency.

Moreover, Park (2013) suggested that smartphones and tablet devices with Internet connectivity provide various methods of communication, some of which include video calling and face-timing. This enables users to create a sense of being in the same space within the same proximity. The use of these methods of communication on these devices somewhat merges the physical world with the digitized world (Park, 2013). Furthermore, several older adults live alone and therefore, tablets could be significantly beneficial to these individuals because it could potentially provide a sense of connected presence. Subsequently, this would assist in combatting the issue of loneliness (Evans and Minocha, 2013).

Moreover, tablet devices make information readily accessible hence, making it possible for individuals to use the device in various ways (Evans and Minocha, 2013). For instance, a study conducted by Oh et al. (2011) compared the usage of the tablet device with the usage of e-readers and smartphones. The study identified that the tablet device was significantly used for watching TV. On the other hand, it was observed that the e-reader was mainly used when individuals were in bed and the smartphone was used when individuals were with friends (Oh et al., 2011). Furthermore, it was found that the tablet device was more commonly used in meetings and classroom environments (Oh et al., 2011). Additionally, Müller et al. (2012) in their study discovered that most people who own a tablet device mainly used it during weekends, particularly at home. Müller et al. (2012) also found that the most common activities carried out with a tablet include checking emails, social networking, playing games and checking up information. These findings are similar to the findings of a Nielsen report, which revealed that social networking, checking emails, and watching TV/videos were the three major activities carried out when using the tablet device (Nielsen, 2011).

Moreover, Leung (2015) suggested that tablets were created with the intention of overcoming the disadvantages associated with the laptop and desktop computers. These disadvantages include the bulky nature of these devices as well as the requirement of a somewhat large surface for the user to be able to work with these devices. In other words, the laptop and desktop computers are not mobile products as opposed to the tablet device thus, making tablets a more practical device for users (Leung, 2015; Burford and Park, 2014). Concurring with this, a study found that many older adults prefer the tablet device to desktop computers because it is less constrained and overwhelming than the desktop computer (Tsai et al., 2015). Also, in their study, many of the older adults did not lack self-efficacy in using a tablet device unlike when they used a desktop computer (Tsai et al., 2015). In addition, Park (2013) found that individuals appreciated the tablet device because it fills the gap between laptops and mobile phones, therefore making it the best of both worlds.

Furthermore, a study suggested that although there is evidence of growth in the adoption and use of ICT especially in the form of tablet devices among older adults, its adoption still remains limited among this group of population especially in comparison to the younger generation (Barnard et al., 2013). In contrast, Zickuhr (2011) reported that although people aged 75 years old and above are less likely than the younger generation to adopt the tablet device however, there is no significant difference in the pattern of adoption of the tablet device between the older and the younger generation.

2.4.4 Tablet devices in delivering ICT services

Mobile technology (m-technology) offers several possibilities for the effective diffusion of ICT in the society (Barnes, 2002). According to Jarvenpaa and Lang (2005), m-technology aids the distribution of mobile information and service to mobile device consumers and thus, it is recommended as an answer to the digital divide. In addition, in a study conducted by Taylor and Todd (1995), it was suggested that the use of ICT is not just limited to the hardware and software elements. It also includes services and the service providers that support the use of ICT. Considering this, tablet devices are one of the tools used for delivering mobile technology services (m-services) such as mobile commerce (m-commerce), mobile learning (m-learning) and mobile government (m-government) (Shaikh and Karjaluoto, 2015; Mengistu et al., 2009). Due to the recent evolvement and ubiquitous nature of the tablet device, many organisations now embrace it as a useful tool for delivering services to their consumers (Mengistu et al., 2009; Pitt et al., 2011). This has been made possible because tablet devices are now equipped with different applications which provide access to a wide range of services. In other words, tablet devices are interrelated to service provision (Pitt et al., 2011).

M-services include support services such as electronic data interchange, payment transfers, data storage and backups, consulting and web-based tax filing (Hsu and Chiu, 2004). For instance, m-commerce is an innovative method for conducting services via an online channel whereby customers interact with the service provider through mobile devices (Luo et al., 2010). Examples of services delivered through m-commerce include mobile banking (m-banking), mobile shopping (m-shopping) and mobile healthcare (m-healthcare) services and a wide range of other services. M-commerce offers a great deal of potential, due to its abilities to proffer anytime and anywhere services (Li and Yeh, 2010). For instance, Luo et al. (2010) suggested that m-banking presents individuals and decision makers with access to multiple banks, accounts and financial services. On the other hand, m-government is defined as the provision of government services to citizens whereby citizens interact with government through mobile devices (Mengistu et al., 2009). As a result, m-government has increased the efficiency and capabilities of government because this form of service delivery inherently offers greater flexibility and mobility of services (Mengistu et al., 2009). Overall, m-service offers a vast range of benefit to older adults including enabling independent living as well as provides relevant health information for an improved quality of life (Heart and Kalderon, 2013). For instance, m-health is a means of providing older adults healthcare support through mobile devices, which in turn will help prevent certain health risk and encourage personal wellness (Heart and Kalderon, 2013).

Furthermore, in most m-service studies, trust is a dominating factor for assessing adoption and use of m-services (Li and Yeh, 2010; Pavlou and Fygenson, 2006). Based on these arguments, the study intends to use models tested in m-commerce and m-government contexts such as trust, as a guide for identifying the theories suitable for the research.

More details on literature regarding older adults and tablet devices are provided in appendix 2.

2.5 Digital divide

Presently, most activities and practices are enabled by ICT through a variation of information, computation and communication services (Selwyn, 2003). Moreover, Friemel (2016) suggested that in many developed countries, the diffusion of technology has reached a level between 80% and 90%. However, one of the negative consequences of the presence of ICT in the society is the digital divide (Warschauer, 2004). The infiltration of ICT into major parts of society such as economic, political, cultural and private life along with the discrepancy in its use has given rise to variations among individuals, social groups and nations (Friemel, 2016). For readers, the disparity or inequalities existing among those who have access to digital technology and those who do not is defined as the digital divide (van Dijk and Hacker, 2003). Moreover, van Dijk and Hacker (2003) described access as a term ranging from possessing a computer (material access), being interested in technology (mental access) to having the knowledge and opportunity to use the technology (skill and usage access). Similarly, Norris (2001) summarised the digital divide as any and every inequality associated with and existing in the Internet community. There are several reasons causing the inequalities in access to ICT, which include age, gender, income, ethnicity, education and experience (Choudrie et al., 2010; Zickuhr and Smith, 2012). In addition, negative outcomes associated with the digital divide have been discussed in relation to health and wellbeing, political information and participation, social inclusion and support (Selwyn, 2003; Warschauer, 2004; Friemel, 2016; Livingstone and Helsper, 2007).

Furthermore, the digital divide has also been described as a multifaceted and dynamic phenomenon and as a result it is difficult to clarify the pattern and strategies for dealing with this social drawback (van Dijk and Hacker, 2003). This issue has created a vast controversy among, academics, government and industry. With the intention of ensuring social inclusion and equality in the distribution of resources, several studies have emphasised on the need to bridge the gap created by the digital divide (Livingstone and Helsper, 2007; Choudrie et al., 2010; van Dijk and Hacker, 2003). Moreover, in literature, the interpretation of the digital divide has varied. For instance, some studies have linked it to demography in terms of income whereby ICT uptake has grown fastest among the affluent members of society (Gilleard and Higgs, 2008). On the other hand, Norris (2001) suggested that there are three distinct forms of the digital divide and these include:

- **Global divide:** This is related to the difference in Internet access existing between developing and developed nations.
- **Social divide:** This is related to the uneven distribution of ICT opportunities among individuals within nations.
- **Democratic divide:** This refers to the disparity existing between those who do and those who do not use the array of digital resources to engage and partake in the general activities of society.

Furthermore, Tsai et al. (2015) suggested that there are two classifications of the digital divide namely:

- First level digital divide which refers to the disparity in technology access
- Second level digital divide which is linked to the disparity in people’s online skills, usage and abilities (van Dijk, 2006).

Explaining further, Friemel (2016) suggested that the first level digital divide addresses the difference in physical access to ICT while beyond this physical access gap, the skills and literacy in relation to use represents the second level digital divide. Concurring, van Dijk (2006); Tsai et al. (2015) also suggested that the focus with regards to the digital divide is now on the actual use of ICT in terms of skills and literacy.

Furthermore, public opinion and policy usually assume that the basic means for combatting the first level digital divide is simply through the provision of physical access to technology

(Choudrie et al., 2010; van Dijk and Hacker, 2003). For instance, Choudrie et al. (2006) found that one of the strategies developed by the UK government to bridge the digital divide was the provision of free Internet access and other facilities in order to prevent the exclusion of individuals who cannot afford to use technology and its devices. Consequently, this implies that once everyone goes online, the digital gap diminishes thus, assuming that people use technology for the same purpose and gain the same benefits from the information society (Helbig et al., 2009). However, in literature, there is a mix of opinions regarding the first and second digital divide and whether it has diminished or not. For example, studies such as that of Madden et al. (2013) have suggested that the first level digital divide is currently on the verge of being eradicated. Meanwhile, Tsai et al. (2015) suggests that bridging the second level digital divide will not only ensure the engagement of older adults with the information society, it will also improve their wellbeing. However, Friemal (2016) found that the first level digital divide still exists when comparing generations.

Moreover, the digital divide has also been studied in terms of the age-related difference in the adoption and usage of ICT (Gilleard and Higgs, 2008). For instance, some studies have compared the digital divide between the young adults and older adults with regards to the difference in technology adoption and use (Pfeil et al., 2009; Helbig et al., 2009; Selwyn et al., 2003). In assessing these differences, adoption is mostly measured based on the individual's use or non-use of the Internet while, usage is measured based on the frequency of Internet use (van Dijk and Hacker, 2003; Friemel, 2016). Findings from these studies have revealed that the older adults are often on the negative side of the digital divide in comparison to their younger counterpart (Pfeil et al., 2009; Selwyn et al., 2003). Moreover, Warschauer (2004) suggested that the digital divide existing between the young generation and the older generation continues to grow and thus warrants special attention.

2.5.1 Older adults and the digital divide

As previously mentioned, not all groups are gaining from the benefits of ICT (Warschauer, 2004). In particular, the digital divide is said to be predominant among the older group of society (Pfeil et al., 2009). For instance, in UK, there are approximately 3.8 million people aged 65+ who have never used the Internet (Age UK, 2018). This shows that while the rest of the population increasingly use technology to conduct daily task, lack of use of these technologies are excluding these older adults from benefitting from both public and private services such as shopping, accessing government information and accessing care services (Delello and McWhorter, 2017).

Some of the reasons attributed to the lack of engagement among the older population include the difficulties encountered in embracing the changes that these technologies have brought to society especially considering most of these adults were not raised with technology (Damant et al., 2017). Furthermore, Arnott et al. (2004) reckons that some health issues prevent older adults from using technology, which has led to their exclusion from the e-society. Concurring, Choudrie et al. (2010) suggested that in developing most technological applications and features, older adults were not put into consideration in terms of how user friendly these applications were designed to be. Therefore, these identified issues have affected ICT adoption pattern among this group. For example, in terms of health issues, it may be difficult for an older user to read an online article depending on the size of the print and status of their eyesight (Selwyn, 2003). Furthermore, Delello and McWhorter (2017) revealed that the factors hindering older peoples' use of ICT include cost, lack of experience, unsuitable technology design, lack of awareness, attitude, self-efficacy and lack of interest. Gilleard and Higgs (2008) also stated that one of the reasons older adults are negatively associated with the digital divide might be due to the reluctance by some of them to acknowledge the usefulness of ICT.

Moreover, some studies have revealed that the first level digital divide is gradually becoming history or is improving especially among the older population (Madden et al., 2013; Friemal, 2016). This is evident in the finding that there is an increased adoption of novel technologies such as smartphones, tablet devices and mobile Internet among these older adults (OFCOM, 2015). Regardless of this, there is the suggestion that there still exists a divide among the older population (Niehaves and Plattfaut, 2014). This divide among the older generation is termed the ‘grey divide’ (Friemel, 2016). The grey divide is described as the difference in the pattern of adoption and use of technology existing among the older generation (Friemel, 2016). For instance, findings relating to the grey divide revealed that although a great number of older adults do not engage with technology, however, there are many others such as the pre-seniors who are resourceful and proficient in their use of ICT (Damant et al., 2017). Furthermore, there is also a significant difference in the pattern of usage of ICT within the older generation. For instance, Damant et al. (2017) found that the ‘younger’ older people who were classified in their work as those aged 65-74 years use the Internet, used tablet devices and mobile phones more than the over 75s. One of the reasons for this difference is that the ‘younger’ older people had the opportunity to be exposed to ICT as part of their jobs and this in turn influenced their attitude towards technologies (Damant et al., 2017). However, the over 75s did not have the opportunity to experience ICT in the workplace because they must have retired before ICT became mainstream, thus, impacting on their attitude and abilities to use new technologies (Damant et al., 2017).

Furthermore, some studies suggest that public policy strategies can help to close the digital divide over time through the provision of equal opportunities for all citizens to benefit from new information technologies (Mossberger et al., 2006; Choudrie et al., 2010; van Dijk and Hacker, 2003). However, some others argue that government policy intervention is not important in closing the digital divide but instead recommends market forces as a potential remedy to eventually closing the gap (DiMaggio and Hargittai, 2001; Damant et al., 2017). More literature on the digital divide and older adults are provided in appendix 3.

Having provided a general overview of the main aspects surrounding this research study, the next section offers an explanation and understanding of the theoretical foundations of this research.

2.6 Theoretical framework

In Information Systems (IS) literature, several studies using various theories have been conducted in an attempt to investigate technology adoption and usage within public and private sectors. Theories used in these studies include, Theory of Reasoned Action (TRA) (Azjen and Fishbein, 1980), Technology Acceptance Model (TAM) (Davis, 1989; Davis et al., 1989), Theory of Planned Behaviour (TPB) (Azjen, 1991), Decomposed Theory of Planned Behaviour (DTPB) (Taylor and Todd, 1995), Diffusion of Innovation theory (DOI) (Rogers, 1995) and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003). Furthermore, all these studies have identified factors that influence an individual's behaviour towards adopting and using ICT. Since this study is focused on examining the adoption and use of ICT from older people's perspective, the following sections provide an extensive review of these technology acceptance theories. The reasoning behind the selection of the model used for this research is also identified and presented.

2.6.1 Theory of reasoned action

The Theory of Reasoned Action (TRA) proposed by Azjen and Fishbein, (1980), is a well-established model commonly used for determining behavioural intentions and actual behaviour. It is a theory that is intuitive, practical and insightful in explaining behaviour (Yousafzai et al., 2010). According to TRA, individuals' behavioural intentions are usually influenced by the belief that carrying out a particular activity will lead to a specific result. In other words, the greater a person's intention is towards a particular behaviour, the higher the chances that the person will perform that behaviour (Madden et al., 1992). Additionally, the theory suggests that behavioural intention is a direct determinant of behaviour such that the individual's belief towards the activity usually affects their behaviour towards that activity. According to Madden et al. (1992), the determinants of beliefs in the theory are divided into two categories:

- **Behavioural belief:** This factor has been noted to have an effect on an individual's attitude towards performing the behaviour
- **Normative belief:** On the other hand, this factor is said to impact on an individual's subjective norm about performing the behaviour.

Furthermore, TRA assumes that behaviour is affected by intention, which in turn is influenced by attitude towards the behaviour and normative opinion regarding the behaviour (Montano and Kasprzyk, 2015). However, because several extraneous factors affect a person's intention, TRA further posits that the link between intention and behaviour depends on two criteria (a) The level of intention must relate to the behavioural benchmark in action, context and time; and (b) the intention does not change before the behaviour is performed (Yousafzai et al., 2010).

Subsequently, TRA suggests that the identified behaviour is under the total control of the person performing the behaviour. However, this does not always apply in all cases and therefore, it is difficult to use TRA to predict behaviour in such cases (Madden et al., 1992; Yousafzai et al., 2010). Additionally, TRA model is a general model that bases behaviour on beliefs, however, it does not pinpoint the beliefs that are significant for a particular behaviour therefore making it susceptible to subjectivity. Figure 12 shows the model of the theory of reasoned action.

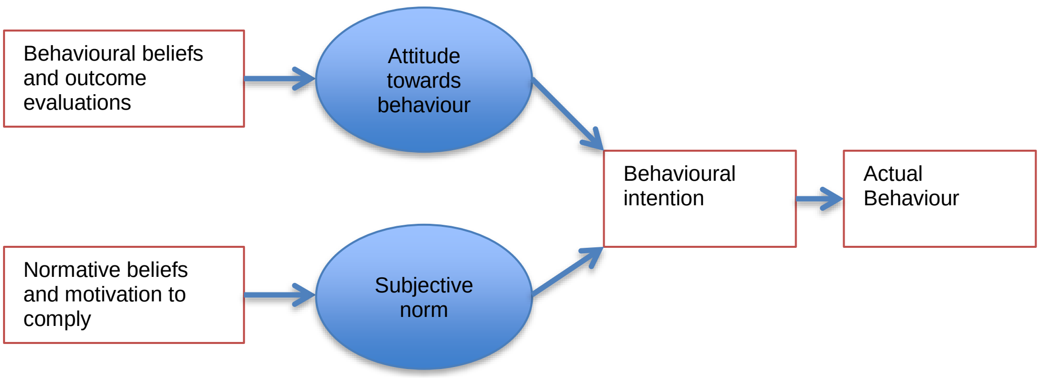

Figure 12: Theory of reasoned action

Source: Yousafzai et al. (2010)

2.6.2 Theory of planned behaviour

The Theory of Planned Behaviour (TPB) (Ajzen, 1991) is a revision of the theory of reasoned action. This model TPB was developed with the intention to improve upon the limitations identified in the TRA. For instance, TRA assumes that an individual must have control over the behaviour thus making it ineffective for predicting behaviours whereby the individual has no control. In contrast, TPB takes into account situations where there are significant barriers to performing a given behaviour (Mathieson, 1991). Based on this, TPB posits that in addition to the attitude and subjective norm factors in TRA, a third factor, perceived behavioural control (PBC) should be included in the model to account for factors that may influence intentions and behaviours but are not under the individual's control (Montano and Kasprzyk, 2015). In other words, TPB posits that perceived behavioural control is a predictor of behavioural intentions and actual behaviour (Ajzen, 1991). Additionally, the inclusion of perceived control to the TRA was based on the realisation that an individual's behavioural action is driven by motivational factors and ability (Montano and Kasprzyk, 2015). This means that in terms of the performance of a given behaviour, the more access a person has to resources and opportunities, the more their perceived behavioural control (Madden et al., 1992). Furthermore, TPB posits that a person's behaviour is usually driven by three factors namely:

a) The behavioural beliefs and the evaluation of the outcome with regards to performing the behaviour.
b) The normative beliefs and the motivation to comply to what they think is expected; and
c) The control beliefs, which have to do with what, the individual possesses in terms of resources and opportunities.

Although TPB attempts to tackle the limitations of TRA, it however has its own limitations. According to Pavlou and Fygenson (2006), TPB like TRA does not explicitly specify the factors that might impact on or predict behaviour. Moreover, it views beliefs as scenario specific and theoretically cannot be generalised. For instance, for all new behaviour, one must identify the significant beliefs for the individual behaviour that are specific to the situation or context in question (Pavlou and Fygenson, 2006). Furthermore, by not indicating the explicit factors that might predict behaviour, this makes the model open to further expansion, which in turn may lead to the creation of biases (Yousafzai et al., 2010). Figure 13 illustrates the model of the theory of planned behaviour.

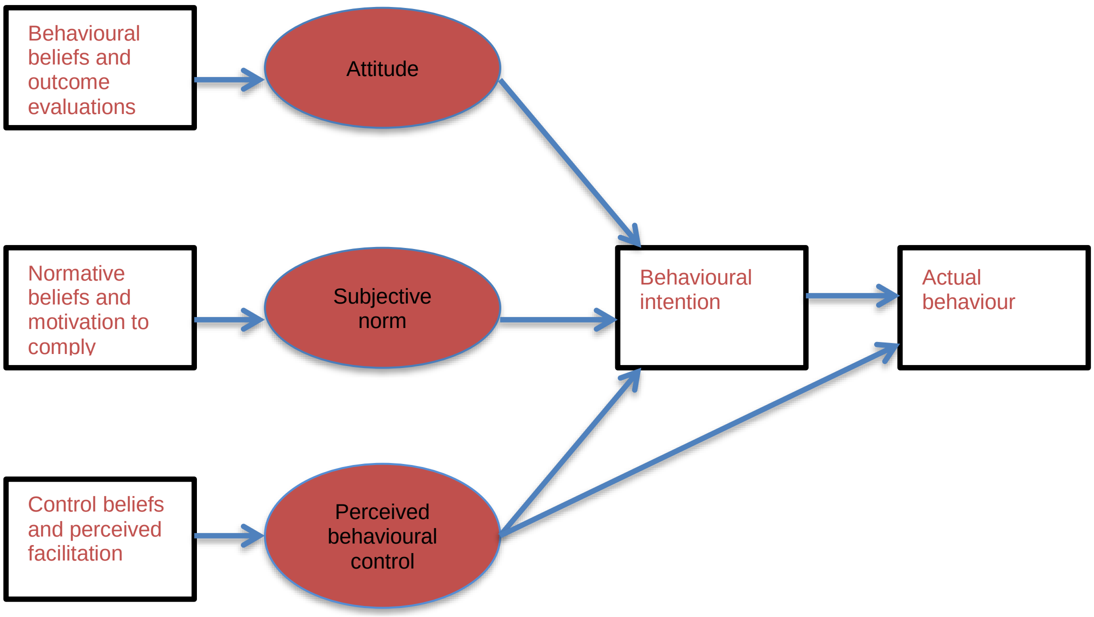

Figure 13: Theory of planned behaviour

Source: Madden et al. (1992); Mathieson (1991)

2.6.3 Technology acceptance model

Technology acceptance model (TAM) was originally introduced by Davis (1989) as an adaptation of Azjen and Fishbein's (1980) theory of reasoned action (TRA). This model is a widely used model for understanding the acceptance and usage of information systems. According to Gupta et al. (2008), TAM was explicitly created with the intention of explaining the factors of computer acceptance as well as for explaining usage behaviour. Although this model was derived from TRA, which is a broadly studied model that proposes that belief influences attitude, which directly influences intentions, and then this in turn leads to performing a behaviour (Lu et al., 2003). However, in contrast, TAM proposes that the intention to use a system is dependent on two internal beliefs namely, perceived ease of use and perceived usefulness (Vijayasarathy, 2004; Gupta et al., 2008). Furthermore, these two beliefs are assumed to impact on a person's attitude towards using the system. Thus, affects a user's intention to use, and in turn, affects the actual use of the system (Gupta et al., 2008). Moreover, TAM has emerged as one of the most prominent models in technology acceptance research and has provided a significant contribution to the field (Malhotra and Galletta, 1999). However, one of the shortcomings of TAM is that the impact of social influence on adoption and usage behaviour are not taken into account. According to Yousafzai et al., (2010), social influence may be significant in capturing variances that cannot be explained by the other variables in TAM. Additionally, the set of variables introduced in TAM may be more suited to explaining the adoption and use of technology within organisations, especially those organisations where the use of technology is either unavoidable or compulsory (Vijayasarathy, 2004), therefore limiting its application in another context. Furthermore, the model suggests that its salient beliefs variables are mediators of the effect of external variables, however, it does not specify what external variables are important and thus, making TAM somewhat incomplete (Porter and Donthu, 2006). Figure 14 presents the original version of the TAM model.

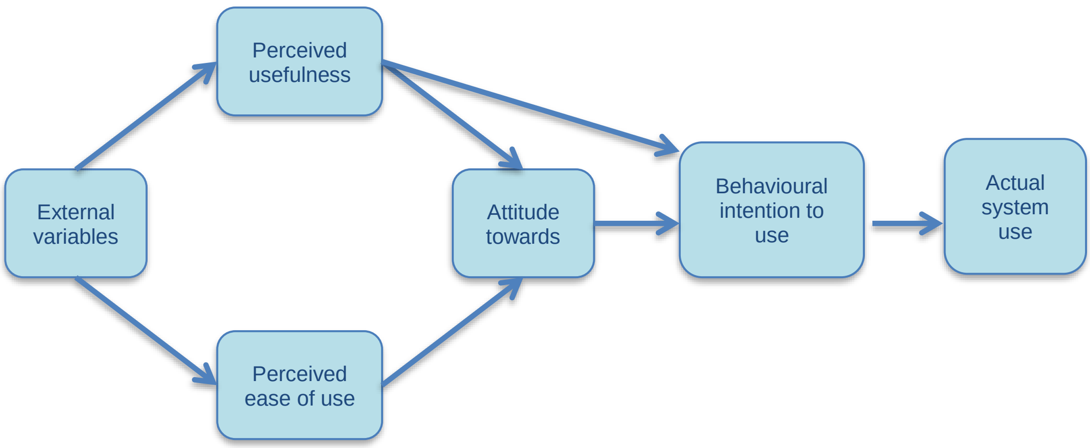

Figure 14: TAM model based on Davis et al. (1989)

2.6.4 Diffusion of innovation theory

Diffusion of Innovation theory (DOI), proposed by Rogers (1995), is another well-established theory for studying ICT innovations. It has also offered an understanding with regards to adoption, implementation and diffusion of novel ICT innovations (Prescott, 1995). According to Kirs and Bagchi (2012), DOI attempts to provide an understanding with respect to why, how and at what rate novel ICT spread. Furthermore, Peslak et al. (2010) described DOI as a theory of communication and adoption of new ideas and technologies. According to Rogers (1995), an innovation is "an idea, practice or object that is perceived as new by an individual or another unit of adoption". Considering this, DOI proposes that individuals usually make decisions to adopt or not adopt an innovation based on what they belief about the innovation (Lee et al., 2011). Subsequently, DOI posits that there are five significant variables that may influence the adoption and usage behaviour of individuals towards ICT. These attributes include:

a. **Relative advantage:** This is defined as the level to which an innovation is measured as being better than the idea it superseded. This variable has been found to be a strong predictor of ICT adoption.
b. **Complexity:** This refers to the level of perception of adopters with regards to understanding the innovation and its ease of use.
c. **Compatibility:** This is the level of perception to which an innovation is considered to be compliant with the existing values and practice of the adopter.
d. **Triability:** This refers to the level to which a new technology can be experimented on a limited basis; and
e. **Observability:** This aspect describes the level to which the outcomes of the innovations can be discerned by the potential adopters.

The variables of DOI were confirmed to be significantly useful in the prediction of individual's adoption intentions (Carter and Bélanger, 2005). Furthermore, DOI proposes that socio-demographic elements such as age, income and education are significantly connected to innovativeness and as such may be used to determine the adoption rate of the innovation (Rogers, 1995). In other words, this theory is well suited for studies aimed at examining forms of innovations and their impact on different groups of society. This current study intends to look at tablet devices and its impact on older adults, which implies that the research is more focused on an already existing device and not a new product. Hence, only a few of the DOI constructs were identified as suitable for this study. In addition, it was observed that most studies adapted the constructs of DOI as a complementary aspect for their model. Therefore, based on this, this study used compatibility for measuring attitude in the research framework.

2.6.5 Unified theory of acceptance and use of technology

The Unified Theory of Acceptance and Use of Technology (UTAUT) was proposed by Venkatesh et al. (2003) in an attempt to understand and predict human behaviour when it comes to adopting and using technology. Venkatesh et al. (2003) integrated variables from eight prominent technology acceptance models to form the UTAUT. These eight models include TRA, TAM, TPB, the motivational model, a model combining TAM and TPB, a model of personal computer utilisation, DOI and the social cognitive theory. UTAUT is a more comprehensive way for evaluating the possibility of technology success and understanding the determinants of acceptance to proactively designed management interventions (Lu et al., 2005).

Moreover, UTAUT hypothesises four main constructs, which include performance expectancy, effort expectancy, and social influence and facilitating conditions as determinants of behaviour intention and/or actual behaviour (Anderson et al., 2006). These relationships were moderated by age, gender, voluntariness of use and experience (AbuShanab and Pearson, 2007). Furthermore, the UTAUT model has been widely used by different scholars since its inception. For instance, Anderson et al. (2006) applied the model in a study that investigated the adoption of tablet PCs in the business faculty of a university.

In the study, it was observed that the model was useful in determining user adoption behaviour. In addition, Magsamen-Conrad et al. (2015) applied UTAUT to the examination of the multigenerational tablet adoption practice and results of the study indicated that only facilitating conditions and effort expectancy were significant in predicting tablet use intention. Furthermore, Negahban and Chung (2014) suggested that the model takes into account the effect of internal and external motivation on adoption and use behaviour. However, studies have suggested that the model was created mainly for examining behavioural intention to use technology in an organisational context (Venkatesh et al., 2012; Niehaves and Plattfaut, 2014). Since this current study is based more on users' context, the model was identified as unsuitable for the research. Figure 15 shows the UTAUT model as proposed by Venkatesh et al., (2003).

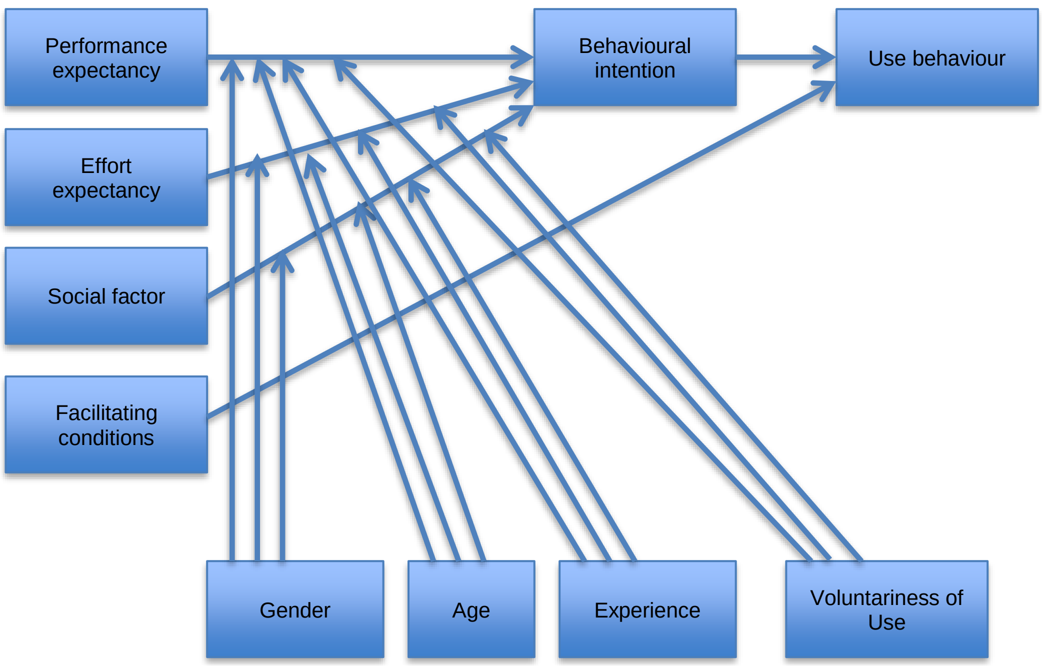

Figure 15: UTAUT model

Source: Venkatesh et al. (2003)

2.6.6 Decomposed theory of planned behaviour

The Decomposed Theory of Planned Behaviour (DTPB) proposed by Taylor and Todd (1995) is an extension of TPB. It views Attitude (ATT), Subjective Norms (SN) and Perceived Behavioural Control (PBC) as direct predictors of behavioural intentions, which in turn leads to one's actual behaviour (Ajzen, 1991). DTPB can also be viewed as a fusion of TPB, TAM and DOI (Taylor and Todd, 1995). DTPB extended the variables ATT, SN and PBC by decomposing each variable into belief-based measures (Sadaf et al., 2012). For instance, ATT was split into attitudinal beliefs such as compatibility, perceived usefulness and ease of use, while SN was decomposed into normative beliefs namely, peer influence or primary influence and superior's influence or secondary influence. On the other hand, PBC was divided into control beliefs such as facilitating conditions and self-efficacy. According to Taylor and Todd (1995), decomposing TPB variables into belief structures made DTPB a better explanatory power and also offers a more precise understanding of behaviour than the original TPB.

DTPB is also one of the well-established models for determining behaviour intentions in information technology studies. It offers a clearer understanding on how a user's attitude, subjective norm and perceived behavioural control can affect his or her intention or lack thereof, to adopt and use ICT (Pavlou and Fygenson, 2006; Sadaf et al., 2012). According to Taylor and Todd (1995), DTPB is especially useful if the study is looking for a more comprehensive view of intentions. Considering that this study is focused on identifying the drivers of tablet device adoption and usage by older adults, the DTPB model was identified as suitable for the study because its constructs are related to the motivational factors that determine adoption and usage behaviour intentions (Pavlou and Fygenson, 2006). Therefore, DTPB served as the foundation for the conceptual framework of this study. Furthermore, in using DTPB as a foundation for the research model, the aim is to offer a more comprehensive as well as high predictive validity in terms of older adults and tablet device adoption and use.

Although DTPB is suitable for determining individual's behaviour intention, it however, does not take into account the influence of apprehension and uncertainty on adoption and use behaviour (Pavlou and Fygenson, 2006). Therefore, to tackle this limitation, DTPB was modified to include a trust model in this research work. Figure 16 presents the decomposed theory of planned behaviour model.

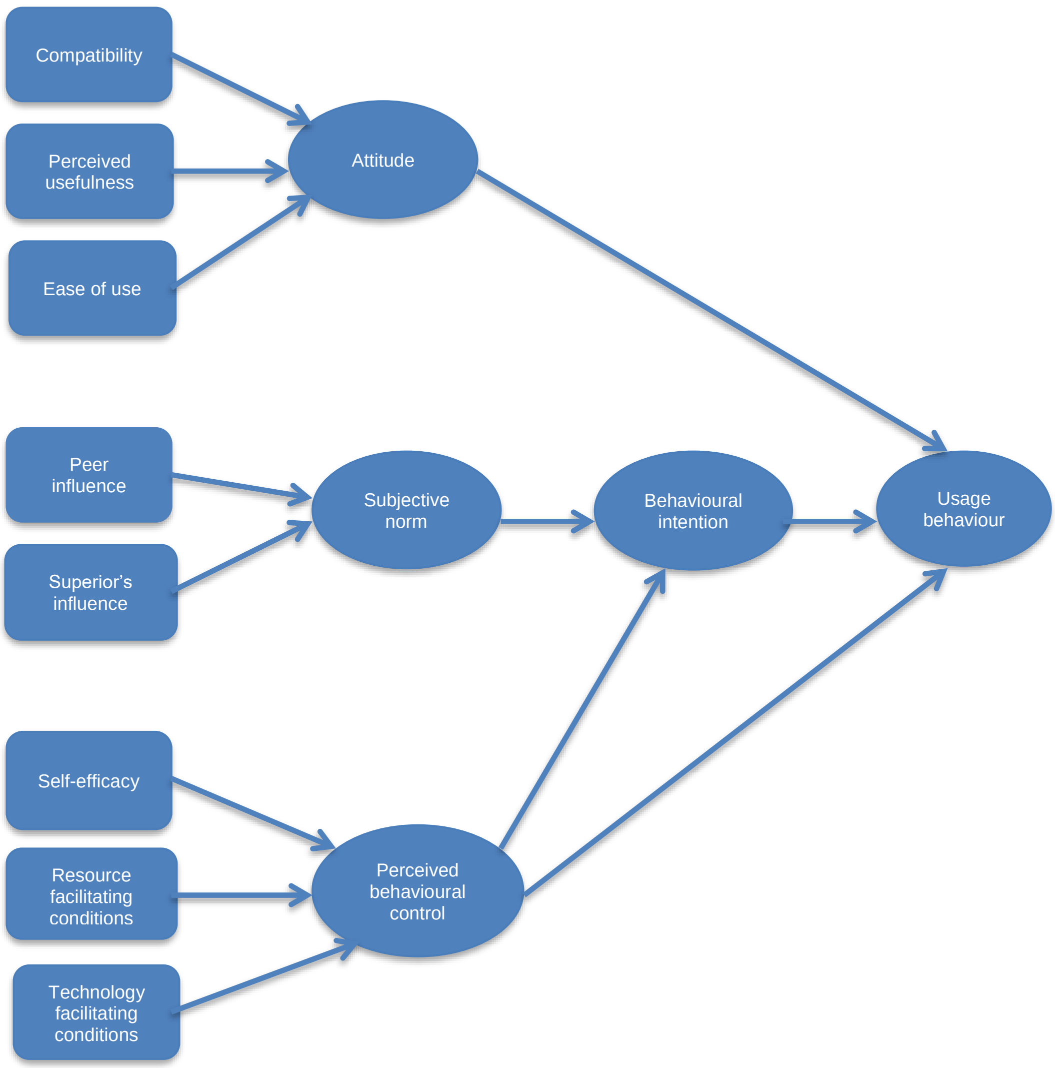

Figure 16: DTPB model

Source: Taylor and Todd (1995)

2.6.7 Trust

Trust is a critical feature wherever uncertainty, interdependence, risks and apprehension is present (Horst et al., 2007). According to Dwyer et al. (2007), it is a fundamental requirement for any online interaction to be successful. Considering that trust is a complex and multifaceted subject, there is no universally scholarly accepted definition for trust (Horst et al., 2007). However, this study defines trust as a psychological state involving the willingness of an individual to be vulnerable to the actions of another individual or group of individuals with the belief that the other(s) will perform a particular action that is beneficial to the trustor (Kirs and Bagchi, 2012).

Moreover, introducing a new innovation may offer both benefits as well as uncertainties to the user, and thus users may want to weigh the uncertainties and benefits of using such innovation prior to deciding whether to adopt or not adopt it (Bélanger and Carter, 2008; Kim et al., 2008). Therefore, it is the individual’s perception of trust in the innovation that will determine the decision to adopt or not adopt (Kirs and Bagchi, 2012). Mobile technology being a relatively new innovation is surrounded with uncertainties, therefore making trust an important construct for examining its adoption processes. Moreover, one of the major reasons attributed to the low rate of ICT purchase, adoption and usage among the older adults, is the issue of trust (Coughlin et al., 2007; Chakraborty et al., 2013). For instance, Vroman et al. (2015) found that majority of older adults who did not use ICT attributed this to feeling anxious with technology. In concurrence, Heinz (2013) found that the primary barriers to ICT adoption especially among older adults were related to the negative attitudes that arose from fear and anxiety. Additionally, Hsiao (2003) found that fear towards new technology is one of the significant challenges of ICT adoption. Meanwhile, a study by Siau and Shen (2003) found that the trust of mobile technology plays a major role in user’s adoption of mobile commerce. Overall, the inclusion of trust in a model takes into account the influence of apprehension on adoption of ICT artefacts (Park and Yang, 2006).

Furthermore, trust is a reoccurring variable that is significantly related to users’ attitude as well as behaviour intentions (Koenig-Lewis et al., 2010). According to Gefen et al. (2003); Koenig-Lewis et al. (2010), trust is a fundamental prerequisite to the decisions of individuals when adopting technologies. In addition, previous studies Kim et al. (2009); Pavlou, (2003);

Wu and Chen (2005); Shin (2010) discovered that trust impacts on an individual's attitude to purchase ICT.

It was based on the above arguments that trust was considered as a useful construct for this current study and therefore it was included in the research model.

Further literature demonstrating the application of the above-mentioned theories and conclusions drawn from the findings are presented in appendix 4.

Having identified relevant constructs for the research model from previous theories, the following discusses the research conceptual framework and the development of the research hypotheses.

2.7 Research conceptual framework and hypotheses

Having identified and selected the constructs suitable for the research, a conceptual framework was developed to guide the study towards understanding how older adults adopt and use tablet devices. This conceptual framework was termed the framework for tablet device adoption (FTDA) and it is presented in figure 17.

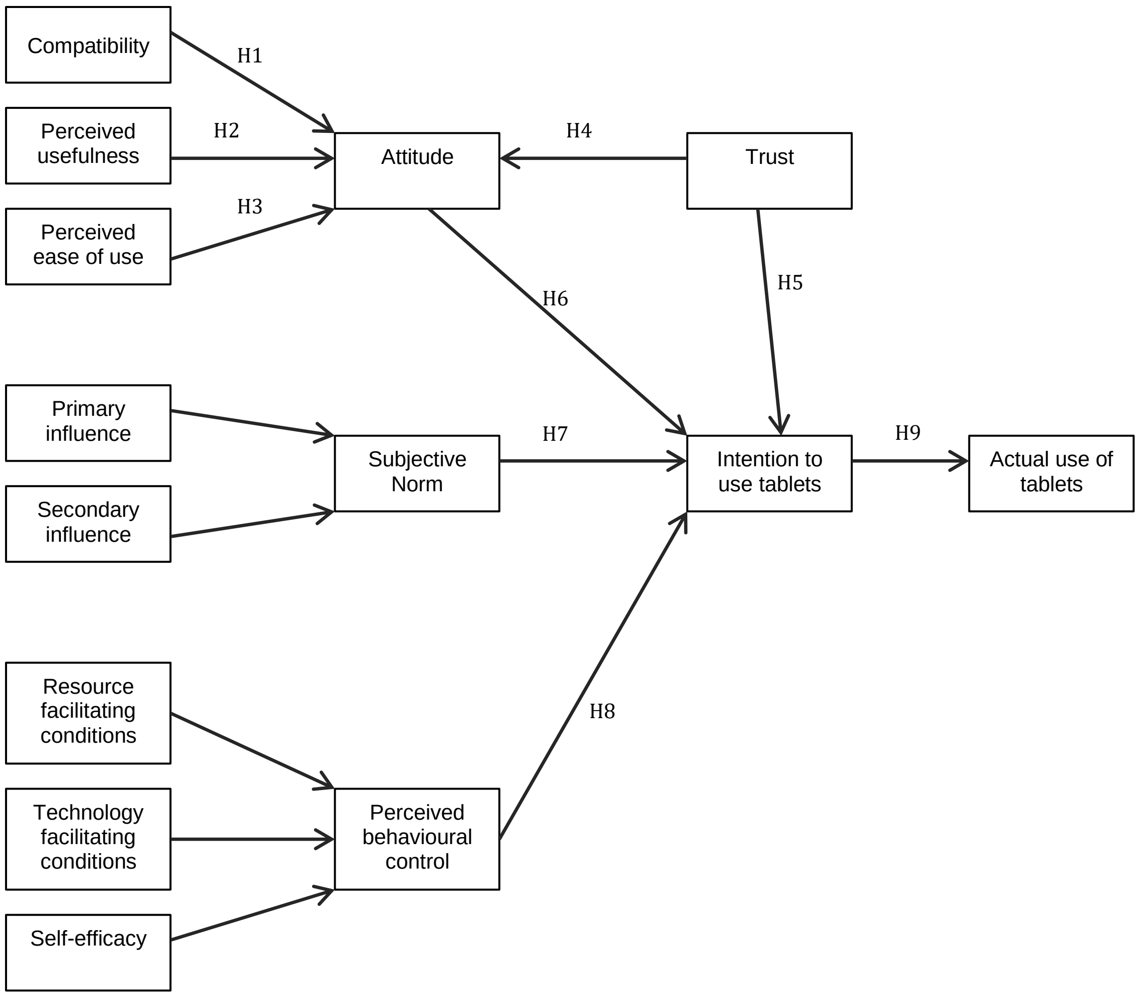

Figure 17: The framework for tablet device adoption (FTDA)

[Compiled by the researcher]

Figure 17 is provided to demonstrate the conceptual relationship between the selected constructs. From figure 17, it can be observed that the hypotheses generated for this study is also stated on the conceptual framework diagram. Subsequently, each of the constructs selected for the study along with the relevant hypothesis associated with it is discussed in details below.

Compatibility (COMP): According to Rogers (1995), compatibility is the extent to which an innovation conforms to an individual’s existing values, past experiences and needs. In order to adopt and use a new technology, potential adopters have to change and learn new behaviours (Sheng, 2012). Therefore, potential adopters usually require the new technology to be compatible with their existing lifestyle or cultural norm otherwise; this will result in a slower adoption rate (Sheng, 2012; Koenig-Lewis et al., 2010). A few studies have highlighted the significance of compatibility in determining attitude and intention to adopt ICT (Shaikh and Karjaluoto, 2015; Koenig-Lewis et al., 2010). However, consistent with the rationale and application in DTPB, the compatibility construct will be allocated to the attitude variable and will be measured with two items, which are presented in table 10. To address the compatibility construct, the following hypothesis (H1) was created.

H1: Compatibility has a significant effect on an individual's attitude towards adopting and using a tablet device.

Perceived usefulness (PU): This construct is originally from TAM and it refers to the extent to which using technology will increase productivity and aid in the achievement of a desired goal (Lu et al., 2005; Koenig-Lewis et al., 2010). Several studies have shown that perceived usefulness is a significant factor that drives intention to use as well as aids the formation of attitude (Taylor and Todd, 1995; Horst et al., 2007; Shaikh and Karjaluotu, 2015). For this current study, perceived usefulness will be an antecedent of attitude and will be measured with three items, also presented in table 10. In relation to perceived usefulness, the following hypothesis (H2) was generated.

H2: Perceived usefulness will significantly influence an individual's attitude towards adopting and using a tablet device.

Perceived ease of use (PEOU): The usability of ICT is an important factor considered by users especially older adults during the process of adoption decision-making (Coughlin et al., 2007). For clarification purposes, usability is defined as the ease with which a technological artefact is learnable and usable (Nielsen, 2003; Dubey and Rana, 2010). According to Davis et al. (1989); Lu et al. (2005), the ease or difficulty which consumers experience with using technology is the focal point that determines the success or failure of the technology. For this reason, the perceived ease of use of the tablet device is an important aspect to examine in this study. Similar to perceived usefulness, the perceived ease use construct is also originally from TAM and it refers to a user's perception of how much effort is required to use a technology (Davis et al., 1989). In other words, the less the physical and mental efforts perceived in using technology, the greater the prospects of adopting the technology (Lu et al., 2005). Some studies have tested the construct as a direct influence on intention to use (Venkatesh and Davis, 2000), some as an influence on attitude (Taylor and Todd, 1995) while some others have postulated that it has an influence on perceived usefulness (Davis et al., 1989). For this current study, the perceived ease of use construct will determine the attitude towards using tablet devices and thus, will be measured with three items, which are provided in table 10. To address this construct, the following hypothesis (H3) was developed.

H3: Perceived ease of use will significantly influence an individual's attitude towards adopting and using a tablet device.

Trust (TRU): As previously mentioned, trust is a fundamental factor wherever apprehension, risk and uncertainty are concerned (Horst et al., 2007). According to Koenig-Lewis et al. (2010), trust is interlinked with risk in the sense that the need for trust only arises when one is trying to overcome anxieties that are related to perceived risk. In this case, it will be related to the belief that technology in the form of tablet devices will be safe to use as well as the belief that it will do what it is expected to do. Previous studies have also revealed that trust is a key factor for assessing ICT adoption and use pattern especially among the older population (Vroman et al., 2015; Heinz, 2013; Shin, 2010). Considering this, the trust construct will be used as an antecedent of attitude towards using and the intention to use a tablet device. This was measured using four items, all presented in table 10. Based on the above, the following hypotheses (H4 and H5) were generated.

H4: An individual's perception of trust significantly affects his/her attitude towards adopting and using a tablet device.

H5: An individual's perception of trust significantly affects his/her intention to adopt and use a tablet device.

Attitude (ATT): The attitude construct is classified as an emotional factor and has been identified as a key predictor of a person's behavioural intention towards ICT adoption and usage (Taylor and Todd, 1995). Attitude is defined as an individual's response towards a concept or performing certain behaviour (Chau and Hu, 2001). It is a person's salient belief regarding the consequences of carrying out an action (Ajzen, 2002). According to Löckenhoff & Carstensen (2007), the emotional factors associated with individuals, as well as their specific goals impact significantly on their decisions. In addition, in terms of age and technology adoption, attitude has been identified as a key determinant of behaviour (Hawley-Hague et al., 2014; Neves et al., 2013). In this current study, attitude is used as a determinant of the intention to use tablets and is measured with three items all of which are provided in table 10. Based on this, the following hypothesis (H6) was created.

H6: An individual's attitude towards using a tablet device directly influences his/her intention to adopt and use the device.

Subjective norm (SN): Subjective norm posits that a person's behaviour is based on the influence of important people in their life (Taylor and Todd, 1995). In other words, if a person perceives that most people who are important to them think they should act in a particular way, then, they are motivated to comply (Venkatesh and Davis, 2000). Moreover, the rationale behind subjective norm is that the adoption of ICT is generally associated with uncertainties. In dealing with these uncertainties, potential adopters often look for information from either a primary source such as family or a secondary such as media prior to making a decision (Taylor and Todd, 1995; Venkatesh and Davis, 2000). Originally from TRA, SN is included as an antecedent of behavioural intention to use. Studies that have examined subjective norm as a determinant of intention have generated contrasting results. For instance, Chau and Hu (2001) found it insignificant in determining behavioural intention while, Greenslade and White (2005) found it significant in determining the behavioural intention of older adults. This study however will assess SN as a determinant of intention to use and it is measured with three items, which are presented in table 10. Based on this, the following hypothesis (H7) was developed.

H7: Subjective norm has a significant effect on an individual's intention to adopt and use a tablet device.

Perceived behavioural control (PBC): This construct refers to the level of one's perception with regards to the access to resources and opportunities required for performing a specific behaviour (Ajzen, 1991). The rationale behind this construct is that a person's behaviour is often dependent on how much resources as well as confidence the person has at their disposal to perform the required action (Taylor and Todd, 1995). Moreover, it is the belief that certain control factors may facilitate or hinder the performance of an action. In this study, this construct is used as a determinant of the intention to use and is measured with three items, which are provided in table 10. Considering this, the hypothesis (H8) shown below was generated to address this construct.

H8: Perceived behavioural control has a direct effect on an individual's intention to adopt and use a tablet device.

Intention to use tablet device (INT): According to Ajzen (1991); Taylor and Todd (1995), the combination of attitude, subjective norm and perceived behavioural control results in the formation of behavioural intention. In other words, the intention to perform any action is often dependent on these three factors (Ajzen, 2002). However, because adopting technology poses several uncertainties, it is necessary to consider trust along with ATT, SN and PBC. Therefore, in this study, the behaviour intention or intention to use tablet device is dependent on attitude, subjective norm, perceived behavioural control and trust. This construct was measured using three items, all provided in table 10. Furthermore, an individual's need to carrying out their intentions given the opportunity often results in the actual behaviour

(Ajzen, 2002). In other words, behaviour intention is the direct antecedent of actual behaviour. In this study, actual use (AC) was measured using five measurement items, which are presented in table 24. Considering the above discussion on intention and actual use, the following hypothesis (H9) was created.

H9: An individual's intention behaviour towards a tablet determines their actual use of the tablet

Furthermore, considering that the research is focused on older adult's behaviour in terms of adopting and using tablet devices, it is important to consider the age factor in this study. Therefore, consistent with UTAUT, this study will use age as a moderator. This study will also assess whether age has a direct effect on the adoption and use of tablet devices. In addition, considering that aging is also often associated with health issues (Heart and Kalderon, 2013), this study will also examine whether health status has a direct influence on the adoption and use of tablet devices. In addition, health status will also be used as a moderator. Furthermore, gender and education will also be used as moderators for the study. This is because, these two variables have been found to be essential demographic factors that often impact on adoption and use behaviour (Hur et al., 2014).

2.8 Summary of chapter

This chapter reviewed relevant literature relating to mobile/tablet devices and older adults. Initially, to complete this chapter, a general review of literature was undertaken using search engines such as Google scholar and Web of Science among others. During this process, more information regarding studies on adoption, use and diffusion of technology were discovered, in particular with reference to tablet devices. For instance, the review of literature suggested that tablet devices could potentially improve the use of the Internet because of its inherent features. However, it was noted that studies on the adoption, use and diffusion of these tablet device were limited. Furthermore, studies specifically relating to the adoption and use of tablet devices among older adults were found to be even more limited. This led to the identification of a research gap and in turn led to the generation of this research's problem or aim, which is provided in section 1.2. Moreover, considering that the research problem is focused on older adults, studies on the digital divide and ageing were also reviewed.

Consequently, to tackle the research problem, theories investigating technology adoption and usage were also reviewed (see section 2.6). From the review of these theories, it was observed that theories such as TAM had been used excessively, which suggested that a diverse perspective was needed for this study. As a result, the diverse perspective included in this study is trust as well as the consideration of age, gender, education and health status as moderating factors. Thus, this then finally led to the formation of the conceptual framework, definition of constructs and the development of the hypotheses for this study.

Furthermore, to verify and validate the conceptual framework developed in section 2.7 as well as the hypotheses; a research methodology is required. Therefore, the next chapter provides detailed discussion on the research methodology applied in this study.

Chapter 3: Research Methodology

3.0 Introduction to chapter

In chapter 2, a critical review of literature was conducted and theories often used in adoption and use of IS studies were identified. This aided in the selection of suitable constructs for developing the conceptual framework or model of this study. However, to put these theories in practice as well as answer the research questions, it is essential to identify a suitable research method and this will subsequently aid in testing the hypotheses of the study. Considering this, the discussion on research methodology in this chapter is guided by the research 'onion', which was proposed by Saunders et al. (2009). Saunders et al. (2009) suggests that the research 'onion' provides researchers with a step-by-step guide on the research processes. Figure 18 provides a visual representation of the research 'onion'.

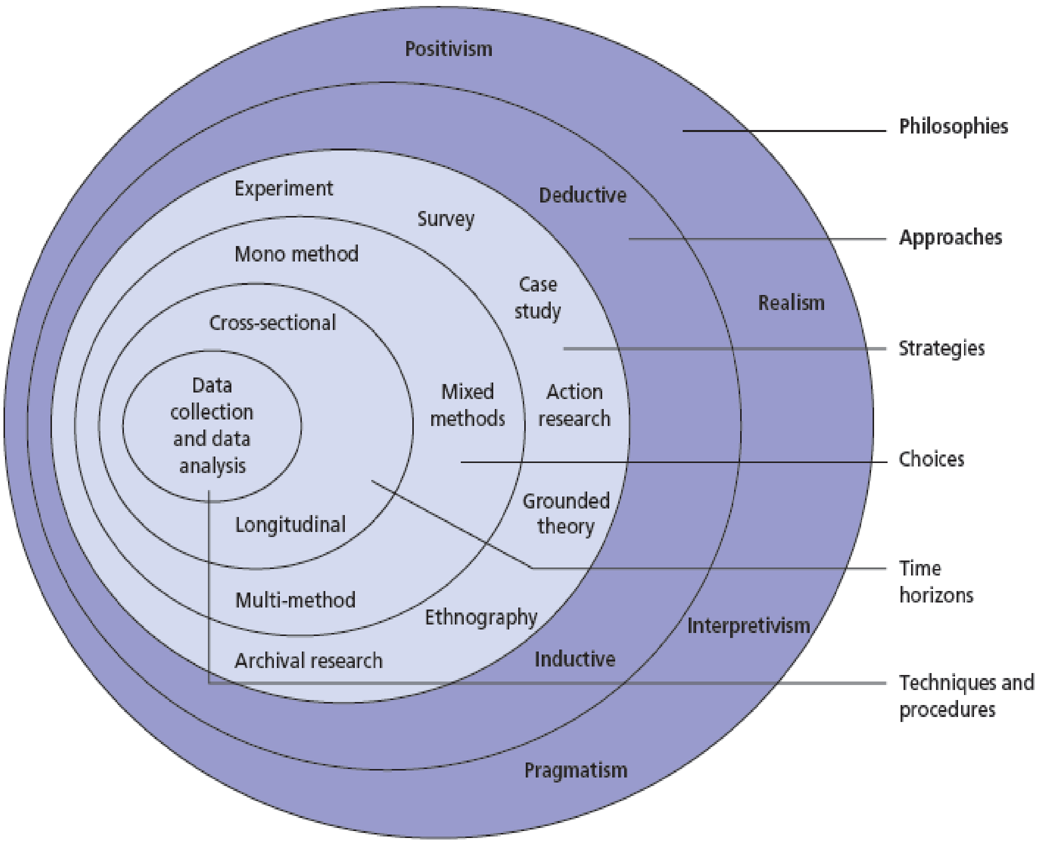

Figure 18: Research 'onion'

Source: Saunders et al. (2009)

From Figure 10, it can be observed that there are six processes or layers that should be considered when attempting to answer the research question(s) in a study. These processes include philosophies, approaches, strategies, choices, time horizon and techniques and procedures. Saunders et al. (2009) suggests that it is important for researchers to consider the first five layers because these aspects help to inform the central point of the research ‘onion’, which is the data collection and analysis procedures. In view of this, this chapter will start off with providing information regarding a research and research methodology in general terms. It will also discuss existing paradigms, how these paradigms link to epistemology, ontology and methodology and subsequently, the paradigm that applies to this study will be determined. In addition, this chapter will discuss the different methods employed in research projects for data collection and will identify the one used in this study. Discussion on the research site will also be provided. Furthermore, the technique used for the analysis of the research data will be discussed. Overall, the research processes considered suitable for the study is provided in this chapter.

3.1 Research and methodology

A definition of research is necessary at this stage to provide a better understanding of this current research. In line with this, a research is a systematic examination aimed towards describing, predicting or understanding a phenomenon (Mackenzie and Knipe, 2006). Furthermore, one of the fundamental requirements of a research work is to critically review literature relating to the research context (Kothari, 2004). This critical review of available literature helps the researcher to identify research gaps in order to be able to narrow down the study scope as well as determine a suitable research approach (Jugenheimer et al., 2014). Considering this, a critical review of literature related to this current study was conducted. Data for the review of literature was gathered using search engines and databases including Google Scholar, Science Direct, PsycINFO, Scopus, Wiley Online Library, Web of Science and AIS Electronic Library. In addition, keywords such as ‘adoption of ICT’, ‘ICT and health aspects', 'tablet devices', 'digital divide', 'older adults and mobile technologies', 'older adults' and 'usability of ICT' were employed in the search for the literature used.

Furthermore, there are several approaches involved in research including identifying the research problem, identifying the philosophical assumptions connected to the research and identifying the suitable methods (Myers, 2013). Holden and Lynch (2004) specifically stated that employing a philosophical approach in research usually helps the researcher to combine methodology, philosophy and the research problem.

Moreover, in order to achieve a successful research project, it is appropriate to identify and apply a suitable research methodology (Saunders et al., 2009). A research methodology involves identifying the processes and systems used to acquire knowledge or to understand a phenomenon (Krauss, 2005). It deals with the overall principles of producing new knowledge (McGregor and Murnane, 2010). Furthermore, methodology is defined as the principle of organising certain activities, which in this case is the research activity (Novikov and Novikov, 2013). According to Kothari (2004), there is usually a mix up between research methodology and research method, however, there is a clear difference between these two concepts. For instance, research method on one hand, is the method or technique used to collate and handle data and this is usually determined by the methodology applied (McGregor and Murnane, 2010). This method or technique can be either quantitative, qualitative or a mix of both quantitative and qualitative (Bernard, 2017). While, on the other hand, the scope of research methodology includes the research method, the logic and philosophy driving the selection of the methods for the research study (Kothari, 2004).

3.2 Paradigms

Most research studies are commonly based on certain philosophical assumptions about the nature of society and science (Myers, 2013). Subsequently, these philosophical assumptions also known as paradigms are based on the epistemologies of the subject matter and provide bases for critical arguments generated in a research (Holden and Lynch, 2004; Myers, 2013). Moreover, Healy and Perry (2000) described a paradigm as an overall conceptual framework within which researchers carry out investigations. In addition, it is a set of practices and concepts that constitute what a researcher believes about reality (McGregor and Murnane, 2010). There are four common paradigms namely, positivism, critical theory, realism and constructivism.

i) **Positivism:** A scientific method that assumes that objective explanations of reality can be provided.

ii) **Critical theory:** This assumes that reality is virtual and is formed based on gender, ethnicity, culture, economic and social values.

iii) **Realism:** This concept is an objective paradigm that believes that there is a 'real' world but its reality is yet to be perfectly understood because of the complexities surrounding it.

iv) **Constructivism:** This is an experimentally based method that assumes that reality can be constructed depending on the perspective of the individual viewing it.

All the above-mentioned paradigms contain three elements including epistemology, ontology and methodology. Moreover, Krauss (2005); Punch (2013) further stated that epistemology is closely interrelated with ontology and methodology. According to these researchers, ontology is the philosophy of reality; epistemology is the link between the reality and the researcher while methodology is the process used to acquire knowledge of the reality (Krauss, 2005; Punch, 2013). Furthermore, epistemology is a word derived from a Greek word epistêmê, which means knowledge or how we come to know (Krauss, 2005). It deals with the philosophical principles applied in a research project (Bernard, 2017; Healy and Perry, 2000). In addition, based on the arguments above, the positivist approach was identified as suitable and as a result it was adopted for the purpose of this research. Considering this, positivism is discussed in more details below.

3.2.1 Positivism

According to Krauss (2005), positivism is defined as an investigation intended to explain or determine a phenomenon by searching for regularities or causal relationships. It is a deductive approach that assumes that knowledge can be acquired by collecting data through objective measures, analysing the data quantitatively and testing theory (Punch, 2013). All these are conducted in order to establish a truth (Pheeraphuttharangkoon, 2015). Subsequently, the positivist approach is linked with quantitative method and as such employs the use of surveys as well as involves the verification of theory and hypothesis using deductive reasoning (Healy and Perry, 2000; McGregor and Murnane, 2010). It is usually based on a previously fixed relationship with regards to a phenomenon and is assessed using structured instruments (Pheeraphuttharangkoon, 2015). Moreover, the positivist considers internal validity, external validity, construct validity and reliability as fundamental elements for quality achievement (Healy and Perry, 2000). Considering this, this current research applied a positivist approach in the sense that it involved the use of surveys and theory verification to determine the factors that influence older adults' adoption and use of tablet devices.

3.3 Research method

Research methods usually employed in research can either be qualitative, quantitative or a mixture of both methods (Bernard, 2017). There have been several debates between quantitative and qualitative researchers for years with each believing that theirs is a more appropriate method for research (Punch, 2013). However, both quantitative and qualitative methods hold significant positions in the research field. Each of these methods has its own uniqueness and is fundamental for achieving a successful research study (Kothari, 2004). However, its effective application depends on what is being studied and the sort of information required (Punch, 2013). In addition, there are differences between both methods in terms of ontology, epistemology and methodology, which can be complementary for a mixed method research (Arghode, 2012; Bernard, 2017). The following provides further detailed discussion regarding the three methods.

3.3.1 Quantitative method

A quantitative method is a scientific method that seeks to explain or understand the cause of a phenomenon using objective measures and quantitative analysis (Arghode, 2012). Its aim is usually to numerically quantify responses and apply the result in explaining the phenomenon, which can be used for the generalisation of similar cases (Sale et al., 2002). Furthermore, it attempts to confirm or disprove a hypothesis or set of hypotheses based on the responses of participants (Kothari, 2004).

Moreover, quantitative methods are based on the positivist paradigm and its ontological view is that there is only one truth and it is independent of human perception (McGregor and Murnane, 2010). Epistemologically, quantitative methods assume that the researcher and the subject being researched are independent of each other, which means that the researcher cannot influence the subject or be influenced by it (Sale et al., 2002). Furthermore, researchers who use this method usually employ techniques such as randomisation, surveys or oral questionnaires with close-ended questions in determining the causal relationship between variables as well as testing hypothetical generalisations (Golafshani, 2003; Sale et al., 2002). It also involves the use of a large sample size for making generalisation and this is analysed using various statistical tools such as SPSS, SMARTPLS, STATA, R and E-views (Pheeraphuttharangkoon, 2015).

3.3.2 Qualitative method

Qualitative methods unlike quantitative assumes that there are several ways of explaining a phenomenon aside from using scientific methods (McGregor and Murnane, 2010). This method bases its understanding of a phenomenon on the perception of participants' understanding of that phenomenon. In other words, focus is often on the participants' perception of "meaning" rather than the actual meaning (Punch, 2013). Subsequently, qualitative method seeks to describe, interpret and decode the views of participants with the aim of explaining the phenomenon (Arghode, 2012). According to Punch (2013), it is also a method commonly used for generating theory.

Furthermore, qualitative is rooted in the constructivist paradigm and its ontological view is that there are several explanations for an occurrence based on a participant's construction of reality (Sale et al., 2002). In terms of epistemology, this method suggests that the researcher's mind and reality are interlinked and as such cannot be independent. In other words, the researcher explores the participant's views in generating knowledge and providing theoretical explanation about the inquiry (Punch, 2013; Golafshani, 2003). Researchers who use this method usually employ techniques such as interviews, observations and documents (Golafshani, 2003) to gain in-depth understanding of the phenomenon (Yin, 2017). Qualitative method usually involves the use of a small sample size, because the main focus is on information gathering, seeking patterns and also putting experiences into words and narratives (McGregor and Murnane, 2010).

3.3.3 Mixed method

As the name implies, mixed method refers to the combination of both quantitative and qualitative methods in a single study (Palinkas et al., 2015). According to Johnson and Turner (2003), it is a type of triangulation process, which involves applying data collection, and/or analytic methods that have both qualitative and quantitative components in a study. The popularity of this method has increased over the years. There are several reasons qualitative and quantitative methods can be combined in a study (Sale et al., 2002). Firstly, both qualitative and quantitative methods involve understanding and explaining a research question (Taylor, 2005). Additionally, Sale et al. (2002) highlighted in their work that both methods apply the same inferential rules and logic. Moreover, it is suggested that using a mixed method increases the analytic power of a study. This is because such studies benefit from the advantages of each individual method whilst reducing the limitations of using each method on its own (Creswell and Clark, 2007). This combined method also increases the credibility and validity of a study as well as increase the confidence in the study's results (Bryman, 2006).

Although mixed method possesses numerous benefits, Johnson and Turner (2003) suggest that there is still confusion associated with how and when these methods should be combined. Moreover, O'Byrne (2007); Johnson and Turner (2003) stated that as with all methods, this method also has its disadvantages. These are further highlighted in table 2.

Table 2: Advantages and disadvantages of mixed method

S/N	Advantages	Disadvantages
1	It offers a more credible and valid result	It may require team work because it can be quite difficult for a single researcher to achieve
2	It is useful for collecting a large data and thus gives more information for generalization and interpretation	It may not be applicable to all studies and will require the researcher knowing when it can be applied
3	It takes advantage of each method's strengths in order to minimise their limitations	It requires the researcher to possess basic knowledge of both quantitative and qualitative methods to ensure the avoidance of information bias
4	It applies visual representations, numerical justifications and transcribes experiences in words when discussing findings	It can be very expensive and time consuming
5	It supports integration during the data interpretation process	The researcher is required to have a knowledge of methodological triangulation in order to mix the methods appropriately

Considering the above descriptions in sections 3.3.1, 3.3.2 and 3.3.3, the main method employed in this study is the quantitative method. However, an aspect of qualitative method was introduced for evaluating the result of the quantitative findings. Further details on the utilisation of these methods are demonstrated in chapters 4, 5 and 6.

3.4 Sampling in research

According to Etikan et al. (2016), a sample is defined as the proportion or representative part of a population. Meanwhile, sampling refers to the method or technique applied in selecting a sample for the purpose of generalising about the entire population (Emerson, 2015). As noted by Saunders et al. (2009), it is usually unrealistic and challenging to examine the entire population, therefore, a more realistic approach will be to conduct the study using a sample of the population being studied. For instance, this study is aimed at examining residents of UK but for feasibility purposes, Hertfordshire County was selected to represent the whole population. Furthermore, the selection of a sampling method for a study often depends on the subject of interest (Acharya, 2013). There are two fundamental methods of sampling namely, probability and non-probability sampling. Further details on these sampling methods are provided below.

3.4.1 Probability sampling

This method refers to a type of sampling that is selected by chance with each of the members of the targeted population having a known or an equal likelihood of being selected (Bradley, 1999). This sampling method is the most utilised method for making generalisable inference about the target population from the outcome of a study (O’Byrne, 2007; Saunders et al., 2009). Furthermore, to draw inference from a sample in relation to its population, it is essential to set out an acceptable probability for confirming the hypothesis (Cramer, 2003). For instance, if the probability of finding a relationship between a sample and its population is set as $p \leq 0.05$, the relationship is said to be significant if the hypothesis tested results in a value that is $p \leq 0.05$ otherwise, it is insignificant (Cramer, 2003). Some probability sampling techniques include simple random sampling, stratified sampling, systematic sampling and cluster sampling. Table 3 provides more details on the above probability sampling techniques.

Table 3: Probability sampling techniques

S/N	Probability sampling technique	Description
1.	Simple random sample	It involves the collection of data using the lottery method, random number table or generating a list of random numbers on a computer. In this case, a sampling frame is needed and the researcher is required to have minimal knowledge of the target population. However, this method is not cost effective and tends to have large sampling error in comparison with stratified sampling.
2.	Stratified sampling	This is a variant of random sampling that involves splitting the target population into sub-groups (strata) with the same characteristics such as age, gender, ethnicity and other characteristics. Participants are then randomly selected from each stratum. This ensures a representation of all groups of the population and then, estimation and comparison can be made. However, precise information with regards to the proportion of each stratum is needed and it can be expensive to prepare stratified lists.
3.	Systematic sampling	It involves selecting a participant randomly from the target population and the other participants are then selected periodically (i.e. every k^{th} item is selected based on the initial number picked). It is not as expensive as a simple random sampling, however not all participants have the chance of being selected.
4.	Cluster sampling	Cluster sampling involves dividing the target population into clusters such as geographic areas, districts and other clusters. Clusters to be used for the study are then randomly or systematically selected. This method requires that all members of the selected clusters be used for the sample. However, similar to systematic sampling, some of the subjects in the population will have zero chance of being chosen.

3.4.2 Non-probability sampling

Non-probability sampling refers to a case where the probability of selecting a member of the target population is either unknown or members of the target population do not have equal chances of being selected (Acharya, 2013). This sampling method requires the intervention of the researcher such that the researcher determines the sampling units based on the criteria of the study (Teddlie and Yu, 2007). Some form of non-probability sampling techniques include convenience sampling, purposive sampling, quota sampling and snowball sampling

(Bradley, 1999). Table 4 describes the forms of non-probability sampling techniques in more details.

Table 4: Non-probability sampling techniques

S/N	Non-probability sampling technique	Description
1.	Convenience sampling	It is a form of self-selection method that is based on the convenience of the researcher such that participants are chosen based on accessibility and willingness. The rationale behind using this technique is that the researcher is dealing with an almost finite population and cannot include every subject of the population. Although it is a cost effective and time saving technique, however, generalisation of the results gathered cannot go beyond the sample.
2.	Purposive or purposeful sampling	It is also known as judgement sampling and involves selecting participants based on a particular reason in relation to the study. It is more concerned with selecting subjects with specific characteristics that will be most productive to the study. The aim of this method is to achieve representativeness or comparability.
3.	Quota sampling	This form of sampling involves selecting specific characteristics of a population to the extent of a set quota or inclusion criteria in order to ensure representativeness. It is a form of convenience sampling in that participants are selected on a 'first come first served' bases until the inclusion criteria is met. However, it tends to have a selection bias.
4.	Snowball sampling	This is a type of purposive sampling that involves the principle of gradual selection where initial subjects are used to recruit potential subjects for the study.

Based on the descriptions in table 4, this research employed a mix of sampling techniques. However, the main technique used was the purposive sampling and snowball method for the main study and pilot study respectively. This is because the study required participants who are 50 years and over in UK specifically Hertfordshire County. To ensure a sample that is representative of the population being studied, Hertfordshire towns with high concentration of the targeted group were identified. Subsequently, within the identified towns, more focus was laid on the streets with high population of these individuals. Further details of these sampling techniques are discussed in chapters 4 and 5.

Furthermore, this research was carried out in three phases namely, content validation phase, pilot test phase and the final study phase. In line with Thabane et al. (2010), the first two phase of the research was carried out to ensure the achievement of rigor as well as the reliability and validity of the final study. In addition, the intention of employing these first two phases was to increase the probability of achieving a successful final study (Golafshani, 2003). Meanwhile, the final or main study provided the bases for the conclusions made in the study with regards to older adults' adoption and use of tablet devices. Further details regarding these phases are provided in chapter 4 and 5.

3.5 Research site

As previously mentioned, the population being investigated is UK's population, which means that data was collected from UK residents only. However, for feasibility purposes, the sample site selected for this research is the Hertfordshire County of UK. Furthermore, there are six counties in the eastern part of England, one of which is the Hertfordshire County (Age UK, 2015). This County is also one of the major counties in UK and it consists of 10 districts (Herts Insight, 2017). In addition, it is rated as the second most populated area in England with an estimated population of approximately 1.2 million people as at 2016 (Herts Insights, 2017). Furthermore, figures obtained from the Office for National Statistics (ONS) showed that in 2016, there were approximately 414,400 adults aged 50 years and above living in the County (ONS, 2017c). This number represents about 35% of the total population living in Hertfordshire (ONS, 2017c). This data was one of the major factors that formed the basis for the selection of the County as the study site. Moreover, in a report done by Regeneris Consulting (2011), Hertfordshire County was classed as one of UK's largest economic contributors with a Gross Value Added (GVA) of £24,000 per head, which is above the national average of £21,100. The age structure of Hertfordshire population aged 50+ years is provided in table 5.

Table 5: Age structure of Hertfordshire population aged 50+

Age Group (years)	Count	Percentage (%)
50-59	158500	38.25
60-69	116700	28.16
70-79	81000	19.55
80-89	47300	11.41
90+	10900	2.63
Total	414400	100

Furthermore, according to Hertfordshire forward (2008), the assessment of life expectancy in the County is estimated as falling above the UK's national average. Specifically, a report by Home Instead Senior Care (HISC) revealed that the percentage of adults aged 65 and over living in Hertfordshire increased to 19.73%, which is 1.73% above the national average (HISC, 2018). This is attributed to the provision of a safe and high quality environment that has led to the residents enjoying a high standard of living and good quality of life (Hertfordshire forward, 2008). According to the above-mentioned report, Hertfordshire is also one of the Counties with a high proportion of older adults dwelling in it (HISC, 2018). Furthermore, it is estimated that with the increased life expectancy, the population of older people in the County will continue to increase over the years. Specifically, it is estimated that by 2025, the proportion of people aged 75 and above, which was approximately 86,325 in 2011 will increase to 116,000 (ONS, 2011). Considering this, evidence of this increment in the population of older adults in Hertfordshire has begun to manifest. For example, the proportion of individuals aged 60 and over increased by approximately 6.6% between 2011 and mid 2015 (ONS, 2017a).

Consequently, the above-mentioned information as well as the proximity and thus, accessibility of this site to the researcher all formed the basis for the selection of Hertfordshire County as the study sample site. A map of Hertfordshire County is provided in figure 19.

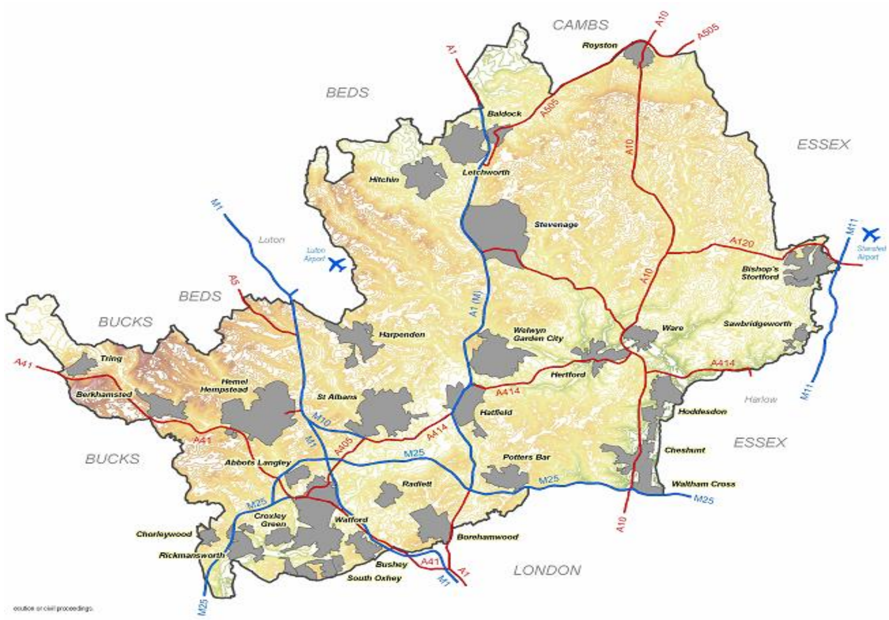

Figure 19: Map of Hertfordshire County

Source: Hertfordshire forward (2008)

3.6 Statistical data analysis method

For any data collected, analysis is required in order to draw a suitable conclusion from the information obtained (Bryman and Cramer, 2005). In data analysis, there are four scales of measurement namely: nominal, ordinal, interval and ratio (Allen and Seaman, 2007) all of which were utilised in this study. Further details regarding the measurement scales are provided below.

Nominal scale: This method is used to represent classifications that do not have numerical representations. For instance, data regarding gender, religious affiliation and ethnicity are classed as nominal data. Furthermore, in nominal scale, unique identifiers are assigned to the response categories of the observed data. However, these numbers are only labels and do not indicate a 'greater than' relationship (Boone and Boone, 2012).

Ordinal scale: This type of scaling method involves ranking response categories based on some levels of magnitude either in terms of quantity or value (Allen and Seaman, 2007). This ordering usually illustrates a 'greater than' relationship, however, it does not specify how much ‘higher’ or ‘lower’ is implied. Examples of ordinal scales include ordering from ‘most to least’ or ‘high to low’.

Interval scale: Similar to ordinal scaling method, this measurement scale involves ordering but at the same time indicates a difference or an equal distance between the categories (Allen and Seaman, 2007). For example, age in years (e.g.10 years, 20 years, 30 years…) and not grouped (18-24 years, 25-34 years, 35-44 years…).

Ratio scale: This is a measurement scaling method that encompasses ranking, distance, fractions and decimals. Unlike interval, this type of scale has a defined zero and it uses numbers to illustrate order as well as show a meaningful relative distance between response categories (Boone and Boone, 2012; Treiman, 2014). For instance, data regarding income is identified as a ratio scale.

Furthermore, another scaling technique employed in the research was the Likert-type scaling method (Boone and Boone, 2012). Specifically, a seven-point Likert-type scale was employed in measuring the behavioural aspects of the study.

Moreover, there are several techniques used for analysing statistical data (Treiman, 2014). Some of these methods include linear regression, Analysis of Variance (ANOVA), hypothesis testing, standard errors, confidence intervals and structural equation modelling (Efron and Tibshirani, 1991; Gefen, 2000). In recent times, these procedures are being conducted using electronic program packages (Treiman, 2014). In particular, some of the most common program packages currently available for the analysis of quantitative data including STATA, E-Views, R, Microsoft Excel, SMARTPLS and SPSS (Bryman and Cramer, 2005). These packages offer time saving and easier methods for analysing quantitative data. It also provides an avenue for selecting the most appropriate statistical technique for the data being analysed (Bryman and Cramer, 2005).

Furthermore, Gefen et al. (2000) suggested that data analysis techniques could be divided into two classes namely: first-generation data analysis technique and second-generation data analysis technique. Explanations of these techniques are provided below.

- First-generation data analysis technique is a term used to refer to correlation based analytic methods such as linear regression, LOGIT, ANOVA and Multiple Analysis of Variance (MANOVA). Generally, these methods are employed in analysing the item measurements or loadings of observed data on their expected latent variables separately from the connection of the independent variable to the dependent variable (Gefen, 2000). In other words, only analyses one level of relationship between dependent and independent variable at a time.

While,

- The second-generation data analysis methods such as structural equation modelling (SEM) are often used to test for the validity of a statistical conclusion. It also allows the simultaneous analysis of linkage among multiple independent and dependent constructs. In addition, it is a more suitable method for modelling complex and multivariate data acquired based on both theory and practice (Lei and Wu, 2007).

Considering the above argument as well as the usefulness of SEM in the study of behavioural and social phenomenon as suggested by Gefen et al. (2000), SEM was identified as suitable for this study.

3.7 Structural equation modelling

There is a growing interest in the application of structural equation modelling (SEM) technique for examining data among IS scholars (Gefen et al., 2000; Schreiber et al., 2006). SEM is a statistical modelling technique employed to examine the relationship between latent variables or factors (Lei and Wu, 2007). The term SEM has been used interchangeably with path analysis, causal modelling and covariance structure analysis in literature (Lei and

Wu, 2007). Furthermore, it is used to determine whether theoretical models are reasonable in comparison to the observed data. Several constructs examining human behaviour such as attitude, belief and intelligence cannot be measured directly (Schreiber et al., 2006). These types of constructs are called latent variables or latent factors. SEM can be used to measure these forms of constructs in one single, systematic and comprehensive analysis. In addition, it can be used to measure complex relationship between the measured variables and the latent variables (Schreiber et al., 2006).

There are two classifications of SEM namely: covariance-based (CB) SEM and partial least squares (PLS) SEM (Gefen et al., 2000). In CB-SEM, the main focus is to confirm theories and assess whether the selected model can generate a covariance matrix for the sample data (Hair Jr et al., 2014). On the other hand, PLS-SEM uses an iterative method to maximize the explained variance of dependent variables (Gefen et al., 2000; Hair et al., 2011). According to Hair Jr et al. (2014); Lee et al. (2011a), PLS-SEM is a better technique than CB-SEM notwithstanding that the latter is more popular than the former. This is because the PLS-SEM is more suited than CB-SEM in dealing with problematic modelling issues that arise when analysing highly complex models. It also produces a higher degree of statistical power and displays a better convergence behaviour than CB-SEM (Lee et al., 2011a).

Furthermore, the covariance based SEM is grounded on a set of assumptions such as the normality of data and the required minimum sample size (Gefen et al., 2000). Thus, cases where these set of assumptions are not fulfilled, using this technique will not be appropriate and can produce an imprecise result if used nonetheless (Hair et al., 2011). On the other hand, PLS-SEM is well suited for dealing with most sample sizes including small sample sizes and does not assume that the data are normally distributed (Lee et al., 2011a). Moreover, unlike CB-SEM, PLS-SEM can deal with both reflective and formative observed variables (Gefen et al., 2000). Overall, each classification of SEM has its own benefits and selecting either one for a study is dependent on the study's objectives. Considering this, this current study employed a PLS-SEM technique in analysing the construct variables.

Moreover, there are various software packages used to perform SEM statistical analysis. Some of these software packages include AMOS, LISREL, EQS and SMARTPLS (Hair et al., 2011). However, the software package used in this study is the SMARTPLS 3.0 by Ringle et al. (2015).

3.8 The research strategy

The main research method used for this study is the quantitative method because research was based on confirming existing theory. Considering this, the quantitative method utilised for collecting data is in the form of survey research. A survey research is commonplace among management and information systems researchers (Pinsonneault and Kraemer, 1993). It can be employed in various types of studies including explanatory and exploratory studies (Rea and Parker, 2014). A survey is a quantitative tool for collecting standardised data from a population with the intention of understanding or confirming some aspects of the studied population (Pinsonneault and Kraemer, 1993). Based on this, the quantitative method used was achieved through the use of a survey questionnaire.

Subsequently, surveys are often useful when obtaining information from a large sample of the population (Rea and Parker, 2014). It is also a data collection technique that is cost-effective, easier to administer and relatively easier for making generalisations (Glasow, 2005). In addition, Rea and Parker (2014) stated that surveys mostly gather three kinds of information including descriptive, attitudinal and behavioural information. Vroman et al. (2015) also suggested that surveys are useful for examining trends within a population as well as identifying features and frequency of attitude and practices in order to determine the relationship between involved constructs. Since this study intends to identify and understand the motivations and processes of adopting tablet devices from older adults' perspective, this method was confirmed suitable. However, it should be noted that surveys do not provide exact measures but only gives estimates for the true population (Glasow, 2005). According to a study conducted by Pinsonneault and Kraemer (1993), it is suggested that using survey might lead to biases due to the nature of the responses received or the lack of responses from the respondents.

For the purpose of this study, the survey research was developed using Surveymonkey.com to create the questionnaire. The questionnaire contained mainly close-ended questions and was divided into five sections. The first section addressed the demographic aspects of the respondents while the second section was for those who use tablet devices. The third assessed those who do not use tablet devices and had no intention of using the devices and the fourth section assessed those who currently do not use tablet devices but had the intention of purchasing and using one. Finally, the fifth section was created to address hypotheses one to eight and the scale used for this purpose is a seven-point Likert-type scale. In addition, the measurement items of each construct were adapted from previous studies with some modification to suit the context of this research.

Furthermore, Golafshani (2003) suggested that reliability and validity are essential tools associated with quantitative methods. In accordance with this, Collins (2003) suggested that to achieve a reliable and valid result, it is important to carry out a content validity and a pilot test before embarking on the main study. The process of content validity and pilot testing usually increases the likelihood of achieving a successful main study (Thabane et al., 2010). Based on this argument, the distribution of the questionnaire was carried out in three phases namely pretesting or content validity phase, pilot testing phase and the final version phase. The first two phases helped in modifying the questionnaire for the final phase. Detailed information regarding each of these phases can be viewed in chapters 4 and 5.

3.8.1 Accessing and selecting the survey participants

One of the important aspects in a research process is selecting the relevant participants that will be involved in the study (Saunders et al., 2009). As mentioned in section 3.8, this study undertook a pilot study and a main study. Thus, the following provides details on how the data selection for each phase was carried out:

Pilot study:

For the pilot study, the first step taken in the data selection process is to determine an adequate sample size. Hence, following the guideline of Dillman et al. (2014), the sample size targeted for the pilot study is 200 participants. Furthermore, the main reason for the pilot study is to identify whether there is an age-related digital divide between young and older adults in terms of tablet adoption and use. Therefore, participants that will be used for the pilot study will include those aged 18 years and over. Consequently, given that a small sample size is targeted for the pilot study, snowball sampling was considered as a suitable and cost-effective means for collecting data. Furthermore, because the sample for the pilot study will include those aged 18 and over, snowball sample was also viewed as an effective way for ensuring sample representativeness. Moreover, including the younger adults in the pilot study will ensure that the right knowledge was gained, which in turn will inform the main study.

Following the collection of relevant data, structural equation modelling was used to study the conceptual relationship between the constructs by comparing the empirical data with the FTDA framework provided in figure 17.

Main study:

As mentioned in section 1.2, the primary focus of this study is on a specific group of population, which is the older population. Thus, it is important to identify strategies that will ensure that the older population is represented. Furthermore, as mentioned in section 3.5, the site selected for collecting data for the research is the Hertfordshire County in UK. However, Hertfordshire County has a population that comprises of all age groups with the older population representing only 35% of the County's population (ONS, 2017c). Therefore, considering this information, the following strategies were employed to ensure the collection of a representative sample.

Firstly, an adequate sample size was required in order to ensure the feasibility of this research (Saunders et al., 2009). Drawing from the guidelines provided by Comrey and Lee (2013), the sample size targeted for this study is a sample of 1,000 participants. Considering that a large sample size is required for the main study, the purposive sampling technique is pursued. To achieve this, ONS data was used to identify towns in Hertfordshire that had high number of older adults and these towns were the main targets during the distribution of the survey fliers. Furthermore, in each town visited, road signs (see figure 20 for example) indicating the presence of older people was also used to identify the streets in which the survey fliers were distributed. The reason for this approach was to increase the likelihood of reaching the relevant participants.

Figure 20: Road sign indicating the presence of older people.

Source: Alexander (2015)

Figure 20, was provided to give an example of the road signs used to identify areas with high number of older adults. Following this identification, majority of the survey fliers were then randomly distributed in the houses found on the identified streets.

Furthermore, as with the pilot study, following the collection of relevant data, structural equation modelling was used to study the conceptual relationship between the constructs by comparing the empirical data with the FTDA framework provided in figure 17.

3.9 Reliability and validity testing

A fundamental aspect of behavioural research is the construction and application of psychometric measures for observing human behaviour (Dunn et al., 2014; Drost, 2011). In addition, the measurement of people’s behaviour is a method embedded in the positivist perspective (Dunn et al., 2014). Thus, it is essential that the selected measurement instruments for any research questionnaire are reliable and valid in order to achieve rigor. Furthermore, reliability and validity test are quality enhancers mostly used in quantitative research (Golafshani, 2003). Considering this, the following provides a detailed discussion on validity and reliability.

3.9.1 Validity

Validity testing is defined as the degree to which an item accurately measures what it is intended to measure (Heale and Twycross, 2015). It is possible for a measurement item to be reliable but not valid, however, for a measurement instrument to be valid, it must be reliable. For the sake of illustration, a bus arrives the bus station at 8:15am every morning but is scheduled for 8:11am; it is reliable because it arrives the same time each morning. However, it is not valid because it is not meeting its scheduled time. Previous research suggested that validating survey instruments are fundamental requirement before the conceptual framework of the study can be analysed (Straub, 1989). This is important for confirming the reliability of the instrument used which in turn will help gather valid data and produce thorough interpretation of findings (Moon and Kim, 2001; Dwivedi et al., 2006).

Most studies assessing human behaviour usually involve quantifying attributes that cannot be measured directly (Dunn et al., 2014). In its place, hypothetical constructs or concepts such as attitude, self-efficacy and perceived use are measured by inferring from observed behaviours, which could be indicators of the existence of the concept (Kimberlin and Winterstein, 2008). Considering that the study is dealing with the assessment of human behaviour, validation is therefore important for making an appropriate generalisation with regards to the sample population. Examples of validations commonly carried out in a study include the following:

Content validity: Content validity is a method used to assess whether the selected items address all aspects of the concept it is intended to address (Haynes, et al., 1995). It goes hand-in-hand with the pretesting of the questionnaire. In addition, it is a method that assesses if the measurement item is a true representative sample of the concept in question by ensuring that the theoretical and practical aspects are taken into consideration (Adamson and Prion, 2013; Heale and Twycross, 2015). According to Pandey and Chawla (2016), content validity is a fundamental element of construct validation given that it is sometimes applied in validating and refining the construct. This type of validation usually requires the judgement of experts who possess some knowledge in the area being studied. Furthermore, content validity ratio or index proposed by Lawshe (1975) is the most commonly used method for determining content validity. According to Lawshe (1975), the validity of a survey question is higher if over average of the number of selected experts agree that the question is essential. Further details regarding the content validity exercise carried out for this study are provided in chapter 4.

Criterion-related validity: According to Heale and Twycross (2015); Boudreau et al. (2001) this kind of validity is a form of construct validity and can be measured through concurrent and predictive validation. It assesses whether responses can predict a criterion measure as well as whether the results of the survey correlate with results from other sources (Glasow, 2005).

Construct validity: According to Schriesheim et al. (1993), a construct is defined as a hypothetical variable used in research to explain a phenomenon. Construct validity refers to the assessment of a measure as an effective indicator of a concept (Heale and Twycross, 2015). Overall, all steps of validation carried out in a study including content validity, criterion-related validity, convergent and discriminant validity are all important components for achieving construct validation (Pandey and Chawla, 2016).

3.9.2 Reliability

Reliability testing is defined as the degree to which a research item is consistent or stable in terms of producing the same results if applied in the same conditions. According to Golafshani (2003), reliability testing helps to determine if the result is replicable. A study conducted by Heale and Twycross (2015) states that there are three attributes for estimating reliability including internal consistency or homogeneity, stability or test – retest and equivalence or inter-rate. Further details on the techniques employed in estimating reliability are discussed below.

Internal consistency: Internal consistency is the most commonly used reliability estimator (Heale and Twycross, 2015). It is defined as the degree to which all the instruments in a test measure the same constructs in order to determine the inter-relatedness of the instruments in the test (Tavakol and Dennick, 2011). This helps to ensure the validity of the constructs being used in the research. Although there are various methods for evaluating the internal consistency of an instrument, however, Cronbach alpha (Cronbach, 1951) is the most widely used analysis for measuring reliability. According to the method, alpha ranges from 0 to 1 with acceptable alpha ranging between 0.7 and above (Litwin, 1995. p31). However, Streiner (2003) suggests that Cronbach alpha must be used carefully because the size of the scale has an effect on alpha. Streiner (2003) further suggested that one could derive an acceptable value for alpha if the number of items being measured is over 20. Concurring with Streiner (2003), Adamson and Prion (2013) recommended that alpha would be an acceptable method for determining reliability if items have over two response options. In this study, Cronbach alpha was considered alongside other reliability estimators such as composite reliability and Dijkstra-Henseler's rho_A (ρ_A) (Hinton and Brownlow, 2014).

Stability: Stability is the ability of an instrument to show that there is a high correlation between measurements from one time to another. Stability is usually assessed using test-retest and parallel-form reliability testing. Test-retest is used to examine the consistency of measures when an item is administered to the same participants more than once under the same conditions (Heale and Twycross, 2015). Parallel-form reliability is almost related to test-retest except that the same concept is being measured but it is administered to the participants in a different form, for instance, a change in wordings.

Equivalence: Equivalence also known as inter-rater reliability is defined as a process used to measure the degree of consistency between two or more judges / observers when scoring the same phenomenon (Heale and Twycross, 2015).

Having provided a detailed discussion on the reliability and validity processes, the next section discusses the ethical considerations employed in this research.

3.10 Ethical considerations in research

Ethics is an important aspect of any research especially studies that deal with human subjects (Punch, 2013). It is a set of principles that guide a researcher in ensuring that the study is conducted according to the required code of ethical practice (Punch, 2013). In addition, ethics is basically centred on respecting the privacy, anonymity and confidentiality of the participants (Marshall and Rossman, 2014). Ethically, it is the responsibility of the researcher to ensure the participants are informed about the study and give their consent (Punch, 2013). It is also essential to inform the participants of their right to withdraw at any time (Saunders et al., 2009). In addition, it is the moral responsibility of the researcher to protect the privacy and anonymity of participants in line with data protection (Marshall and Rossman, 2014). Considering this, ethical considerations were taken into account before the commencement of this study. For instance, ethics approval was received from the researcher's university before data collection commenced and the ethics form used for this purpose is provided in appendix 5. Furthermore, the issue of consent, confidentiality and anonymity were addressed in the cover letter or leaflet, which can be viewed in appendix 6.

3.11 Summary of chapter

In order to ensure that the conceptual model was suitable and applicable in practice, a research methodology was required. In this chapter therefore, the research methodology, which included the method used and the philosophy guiding the selection of the method used for the study was discussed. For instance, from this chapter, it is clear that the researcher took the positivist approach as well as applied a quantitative method for data collection. Also, the research site and the rationale for selecting the site were provided. In terms of analysis of data, the study employed the PLS-SEM technique in analysing the construct section of the questionnaire via the SMARTPLS 3.0 software package. Furthermore, the validity and reliability processes carried out in the study to ensure the research achieves rigor was also discussed in this chapter. To summarise, the ethical considerations of this study was also discussed in this chapter.

Having addressed the above-mentioned areas, the next chapter provides details of the content validity exercise and the pilot testing exercise carried out for the study.

Chapter 4: Pilot Findings and Analysis

4.0 Introduction to chapter

As earlier mentioned in chapter 3, section 3.8, to obtain a reliable and valid result as well as achieve rigor in a study, it is essential to conduct a pilot study before the main study. It is also necessary to carry out a content validity test before a pilot study (Bryman and Bell, 2015; Lawshe, 1975). These exercises will help to improve or modify the questionnaire for a better result. Therefore, in this chapter, the content validity exercise carried out for this study is provided. Additionally, information regarding a pilot study in general is provided. Specifically, the pilot study carried out for this research is described as well as the method used in achieving it. Furthermore, findings, analysis and results from this study are provided and discussed.

4.1 Content validity

It is essential to pre-test and validate the items used in a questionnaire to ensure the items represent the concept being assessed (Heale and Twycross, 2015). The term used to validate the items in a questionnaire is content validity. Content validity is defined as the degree to which a measurement instrument has an adequate collection of items for the construct being measured (Polit and Beck, 2006). It is mainly a judgement-based phase where the selected experts determine the relevance of proposed items (Polit et al., 2007). Healy and Twycross (2015) suggested that numerous benefits are achieved from conducting a content validity before any study. For instance, it will reduce the amount of resources that will be spent in conducting subsequent studies. However, it should be noted that it also has some drawbacks such as the subjective nature of the experts' judgement, which might lead to bias (Rubio et al., 2003).

Subsequently, to draw conclusions and provide evidence regarding the quality of the proposed measurement instruments, the experts' judgements are quantified (Polit and Beck, 2006). There are several methods for quantifying the degree of agreements or content validity ratio (CVR) provided by the experts (Heale and Twycross, 2015). These methods include consistency estimates method and the content validity index (Polit and Beck, 2007; Rubio, et al., 2003). Consistency estimates method examines the degree to which the experts produce reliable ratings and is calculated using coefficient of alpha (Rubio et al., 2003). However, this method is focused on the consistency of the ratings of experts thus, providing limited information on the agreement across individual item or expert (Polit and Beck, 2007; Rubio, et al., 2003). On the other hand, the content validity index (CVI) is a widely recognised method that averages the experts' ratings of relevance of individual items and is commonly used in studies that involves over 5 experts (Lawshe, 1975; Rubio et al., 2003). This method also provides a consensus estimate that shows the degree to which the experts demonstrate a common understanding of the measurement item (Lawshe, 1975; Polit and Beck, 2007). Given that the content validity of this study involved 20 experts, CVI method was identified as suitable and therefore was used in this study.

4.1.2 The content validation exercise for this study

This study utilised the content validity method to measure how suitable the survey is in achieving the intended purpose or if it effectively reflects the concepts of the study (Dwivedi et al., 2006; Polit and Beck, 2006). As previously mentioned, the content validation exercise involved pretesting the questionnaire among 20 experts. These experts consisted of academic practitioners (7), industrial specialist (4) and the prospective target population (9). The reason these experts were selected from different disciplines was to receive concrete suggestions and limit the bias that might result from individual expert's ideas (Rubio et al., 2003). Table 6 provides information on the experts used for the study.

Table 6: Details of the content validity experts

Category	Participant	Area of expertise
Academic / Practitioners	A	Computer science
	B	Engineering
	C	Environmental management
	D	Innovation management
	C	Information systems
	E	Information systems
	F	Computer science
Industrial specialists	G	Information systems
	H	Statistics
	I	Software development
	J	Accountancy
Older adults (50+ years)	K	Computer science
	L	Surveying
	M	Physics
	N	A' levels
	O	General science
	P	A' levels
Younger adults (18-49 years)	Q	Accountancy
	R	Financial analyst
	S	Engineering

Furthermore, the role of the experts was to provide the length of time it took to complete the questionnaire as well as provide some feedbacks. In addition, for the validation aspect, the experts were required to rate each item based on its relevance (Lawshe, 1975; Rubio et al., 2003). An example of the questionnaire providing information required from the experts for the content validity process is provided in appendix 7. Subsequently, the following provides details of the results gathered from the content validity exercise.

In terms of the total time it took to complete the questionnaire, this was calculated by averaging the total time it took each expert to complete the questionnaire. Thus, based on this, the average time it will take a participant to complete the questionnaire is approximately 14.6 minutes. Table 7 provides details of the total completion time of each expert.

Table 7: Calculating the average completion time of the questionnaire

Total Completion Time of Each Expert		
Ms O: **11mins**	**Dr N:** 30mins	**Average completion time: 14.6 minutes**
Dr E: **12mins**	**Dr C:** 15mins	
Dr S: **10mins**	**Dr Ch:** 14mins	
Mrs A: **15mins**	**Mr Ed:** 10mins	
Mr T: **12mins**	**Mr IA:** 30mins	
Mr D: **15mins**	**Dr A:** 18mins	
Prof C: **17mins**	**Mr V:** 19mins	
Mr M: **11mins**	**Mr O:** 10mins	
Mr C: **7mins**	**Ms T:** 12mins	
Mr I: **17mins**	**Mrs N:** 17mins	

Moreover, the experts were required to provide feedbacks with regards to the problems identified in the questionnaire as well as suggestions that will help in improving the questionnaire. Based on Rubio et al. (2003), these feedbacks are useful for producing a more concise and clearer questionnaire. Thus, based on the feedbacks provided by the experts during the content validity process, the questionnaire was modified before disseminating it for the pilot study. Table 8 presents some feedbacks provided by the experts.

Table 8: Some feedbacks from the experts

S/N	Feedbacks from experts
1.	'I did not get any further than question 18 - you have set this question up wrong, you cannot tick one column more than once, so if I strongly agree with the first statement, I cannot strongly agree with any other the other statements. Please correct this and check the other questions for the same problem, then send me the new link'
2.	'How often do you connect to the internet – repetition of Daily with less than 2 hours / more – rephrase so that the first word differentiates for the reader.'
3.	'The overall flow is okay; I guess my only concern is the length and the number of incompletes you might get, so maybe you need to assure yourself that the important data is at the front – so that you can still potentially use the survey data.'
4.	'Could you please check the flow of your questionnaire again? I am still faced with jump facility problem.'

Furthermore, as mentioned earlier, the experts were required to validate the content of the questionnaire based on the relevance of each item. This aspect of the content validity exercise was aimed at examining the feasibility of the research as well as assessing how suitable the survey is to the target population. Therefore, adopting from the work of Lawshe (1975), the experts were provided the following criteria for rating the relevance of each survey item:

- Essential
- Useful but not essential
- Not necessary

Subsequently, to quantify the CVR for each item based on the ratings of the experts, a content validity index needs to be estimated. Lawshe (1975) derived a formula for estimating the CVR for individual items, which is provided below:

$$CVR = \frac{n_e - \frac{N}{2}}{\frac{N}{2}}$$

From the above formula, n_e represents the number of experts indicating essential while, N is the total number of experts (Lawshe, 1975). Once the CVR is calculated for each item, the CVI is estimated by averaging the CVR of the accepted items and its cut-off is set as 0.8 (Polit and Beck, 2006).

Moreover, CVR is used to determine whether an item should be accepted or rejected. According to Ayre and Scally (2014), CVR ranges from -0.1 to 1.0. This implies that the higher the CVR value of an item, the greater the extent of its content validity (Lawshe, 1975; Polit and Beck, 2007). In addition, Lawshe (1975); Ayre and Scally (2014) stated that the minimum acceptable CVR value is based on the number of panellist. For instance, for 10 experts, the minimum CVR required is 0.62 while, for 20 experts the minimum value required is 0.42. Overall, depending on the result, CVR helps to explain the experts' opinion regarding the clarity and usefulness of a survey item (Dwivedi et al., 2006). Majority of the items for this study produced CVR value that is over 0.42 however; some of the items were below this cut-off. For example, in table 9, survey items 6,7 and 9 are proposed for rejection because the minimum CVR is below 0.42. However, based on the feedback regarding these survey items, it appeared that the selected questions were not clear to some of the experts. Acknowledging their suggestions, the questions were reviewed and readjusted. In addition, the CVI value for the overall items is 0.84, which is an acceptable value (Polit and Beck, 2006). Table 9 shows the result of the CVR calculation.

Table 9: Calculation of the content validity ratio

Question No:	Essential	Useful but not essential	Not necessary	CVR	Accept/Reject
1	20	0	0	1.00	Accept
2	17	3	0	0.70	Accept
3	18	2	0	0.80	Accept
4	17	3	0	0.70	Accept
5	15	5	0	0.50	Accept
6	10	6	4	0.00	**Reject**
7	11	5	4	0.10	**Reject**
8	16	4	0	0.60	Accept
9	11	6	3	0.10	**Reject**
10	20	0	0	1.00	Accept
11	18	1	1	0.80	Accept
12	18	2	0	0.80	Accept
13	16	4	0	0.60	Accept
14	20	0	0	1.00	Accept
15	18	2	0	0.80	Accept
16	19	1	0	0.90	Accept
17	20	0	0	1.00	Accept
18	19	1	0	0.90	Accept
19	20	0	0	1.00	Accept
20	20	0	0	1.00	Accept
21	20	0	0	1.00	Accept
22	19	1	0	0.90	Accept
23	19	1	0	0.90	Accept
24	18	2	0	0.80	Accept
25	18	2	0	0.80	Accept
26	20	0	0	1.00	Accept
27	20	0	0	1.00	Accept
28	18	2	0	0.80	Accept
29	19	1	0	0.90	Accept
30	19	1	0	0.90	Accept
31	18	2	0	0.80	Accept
32	18	1	1	0.80	Accept
33	18	2	0	0.80	Accept
34	16	4	0	0.60	Accept

Having discussed the content validity exercise in detail, the following section explains and discusses the pilot study, its findings and analysis.

4.2 Pilot study

A pilot study is an experimental study or trial with the intention of assessing whether the selected research methods and procedures are feasible, reliable and valid especially if it is to be used on a larger scale (Lancaster et al., 2004). More so, the result gathered from a pilot study helps to improve or modify the research methodology prior to conducting a larger and more in-depth examination (Thabane et al., 2010). A pilot study is also useful for pre-testing a particular research instrument such as a questionnaire or interview plan (van Teijlingen and Hundley, 2001). However, a pilot study does not necessarily insure the success of the main study, but it can increase the potential of achieving a successful main study (Thabane et al., 2010). For instance, a pilot study can help a researcher identify areas where the main study may have issues, which would then lead to its modification or cancellation. Furthermore, for a pilot study to make an impact, it is suggested that the recommended number of responses should be between 100 and 200 responses, which was the reasoning guiding this pilot study (Dillman et al., 2014).

To summarise, a content validity exercise was conducted, which aided in refining the questionnaire used for the pilot study. The pilot study for this research was aimed at ensuring the validity and reliability of the study before carrying out the main study. The pilot study was also intended to ascertain whether there was a difference in the pattern of adoption between the younger adults and the older adults. Considering this, this pilot study involved those aged 18 years and above. In addition, the pilot study also aided in further modification of the questionnaire for the purpose of conducting the final research study.

4.3 Pilot data collection

For the pilot data collection, the technique that was used was survey questionnaires, which contained close-ended and Likert-type scale questions. The questionnaires were distributed both online and in paper form. The reason for using these methods is to boost the response rate and reduce bias (Saunders et al., 2009). In addition, data for this pilot study was collected between the periods of 4th of May 2016 to 15th of July 2016. Recruitment of participants involved a non-random snowball sampling technique. Initially, the snowballing method involved the recruitment of already established contacts via emails and word-of-mouth. These selected contacts were then used to recruit more participants from their own established contacts and this led to the snowball sampling technique employed.

4.3.1 The sample population

The Country of interest in this research is the United Kingdom and it was selected because it is one of the nations whose population is ageing and ICT adoption continually improves (ONS, 2017a). For instance, the proportion of those aged 65 and over increased by 4.2% between the years 1976 to 2016 (ONS, 2017a). In addition, the UK is a country where tablet device adoption is currently striving especially among the older adults (BBC, 2014). Thus, it was identified as a suitable population for this research. However, it will be quite challenging to investigate the entire UK population and as a result, the Hertfordshire County in UK was selected as the sample site for this pilot study. Therefore, the questionnaire was distributed to participants who reside in Hertfordshire County, UK.

As previously mentioned, Hertfordshire is one of the major Counties in UK and it is located in the East of England (Herts Insight, 2017; Age UK, 2015). It is also suggested to be the second most populated County in the UK with approximately 1.2 million people dwelling in it (Herts Insights, 2017). In addition, the life expectancy in the County is above national average and the proportion of those aged 50 and over in the County is 35% (ONS, 2017b; Hertfordshire forward, 2008). Thus, it was based on these details as well as its proximity to the researcher that the Hertfordshire County was selected as a suitable site for the study.

4.3.2 Method used for distributing the questionnaire

As mentioned in section 4.3, the survey questionnaire was distributed in both online and paper form in order to improve the response rate and ensure the target population is represented. The questionnaire was created using the Survey monkey tool for designing surveys. For online method, the questionnaire was distributed by sending a link to the survey via emails to established contacts with a request to forward to their own contacts. For paper method, 50 hardcopy questionnaires were distributed to some other contacts and it was required that each one should administer to their own personal and work contacts. This pilot testing exercise resulted in 203 completed responses out of which 35 were paper based. Thus, based on the recommendation of Dillman et al. (2014), the number of responses (203) collected for this pilot study is suitable.

4.3.3 Questionnaire used for data collection

As mentioned in section 3.8, a survey questionnaire was developed to obtain information about the adoption and use of tablet devices. This questionnaire was divided into 5 sections, which include:

Section one, which required the demographic details of the participants. This was followed by sections that sought replies based on:

i) Those who use tablet devices

ii) Those who do not use tablet devices and have no intention of using the device

iii) Those who currently do not use tablet devices but intend to use the device in the future

Although, the pilot study included those aged 18 years and above, however, the main target population in this research is the 50+ years adults. Thus, due to the age of the main target population, the questionnaire also included questions addressing the state of health, ailments preventing adoption as well as question on the use of the Internet generally.

Finally, a section addressing the research construct was also created for examining influencing factors with respect to the adoption and use of tablets. This aspect of the survey questionnaire was necessary for testing and validating the FTDA framework developed for the study. To do this, measurement items used in this study were adapted from previous studies with some modifications to suit this research context. Details of these measurement items and their source are provided in table 10.

Table 10: Pilot study construct measures

Constructs	Measurement item	Source
Compatibility (COMP)	Using a tablet device fits with my personal needs and preferences (e.g. measuring my workout)	Taylor and Todd (1995); Al-Jabri and Sohail (2012)
	Using a tablet device fits with my lifestyle or work (e.g. style of entertaining self, working from home)	
Perceived ease of use (PEOU)	Learning how to use a tablet is easy for me	Davis (1989); Hong et al. (2013)
	I find it easy to get a tablet device to do what I want it to do	
	Overall, I find a tablet device easy to use	
Perceived usefulness (PU)	Use of a tablet device can significantly improve the quality of my life (e.g. monitoring my weight, blood pressure)	Davis (1989); Hong et al. (2013)
	Using a tablet device is useful for my daily activities and preferences	
	Using a tablet device helps me accomplish things more quickly (e.g. quicker response to emails)	
Trust (TRU)	I believe a tablet device will help me access the Internet whenever I want	Kim et al. (2008); Gefen and Pavlou (2012); Featherman and Pavlou (2003)
	I worry that using tablet devices to complete certain Internet activities (such as Internet banking, online shopping) is not secure	
	Using tablet devices has me concerned about the privacy of my personal information	
	Using tablet devices could lead to my personal information being used without my knowledge	
Attitude (ATT)	I have a positive opinion of tablet devices (e.g. based on its size, my experience of it)	Taylor and Todd (1995); Al-Debei et al. (2013)
	Using a tablet device is a good idea	
	I think using a tablet device is appropriate for me (e.g. for work, daily routine)	
Subjective norm (SN)	People who influence my behaviour think I should use a tablet device (e.g. family, friends, colleagues)	Ajzen (2002); Al-Debei et al. (2013)
	Using a tablet device makes me look trendy, knowledgeable and wealthy	
	Using a tablet device also reflects my intelligence and level of knowledge among my friends	
Perceived behavioural control (PBC)	I can afford to pay for and use a tablet device	Taylor and Todd (1995); Ajzen (2002); Verkasalo et al. (2010);
	I can use a tablet device without help from friends, family or colleagues	
	I have the knowledge and skills to use a tablet device on my own	
Intention to use (INT)	I intend using a tablet device in the next few months	Ajzen (2002); Verkasalo et al. (2010); Hong et al. (2013)
	I think I will continue using a tablet device in the next few months	
	I will consider continuing to use a tablet device in the next few months	

Furthermore, when seeking responses, a cover letter is essential for boosting the response rate of a research (Saunders et al., 2009). Using this reasoning, the research survey questionnaire provided a cover letter that included a brief description of the research project, an introduction of the researcher and the university, a request for consent to participate, the ethics approval number obtained for the research, assurance of confidentiality and anonymity and finally the contact details of the researcher and supervisor in case there is a problem or to verify the authenticity of the questionnaire. An example of the questionnaire is provided in appendix 8.

4.4 Analysis of pilot data

The pilot study included those aged 18 years and over in order to assess the pattern of adoption between the older and younger adults. This was essential for ascertaining if the argument regarding the digital gap existing between the young and old as stated in literature (van Dijk, 2006; Warschauer, 2004) applied to tablet device adoption. The data was analysed using SMARTPLS 3.0, SPSS version 23, E-views and Microsoft Excel 2011. The following provides more details of findings.

4.4.1 Demographic section

All participants of the study were required to complete this section of the questionnaire. This section contained nine questions and was intended to collect basic background details such as age, gender, area in Hertfordshire, education status, employment status, occupation, ethnicity, marital status and health status. As mentioned earlier, pilot exercise resulted in 203 completed responses. For this section, SPSS version 23 was used to analyse the data. From the result, there were 114 females (56.2%) respondents and 89 males (43.8%) respondents. In terms of age, participants were split into seven age groups including 18-29 years old, 30-39 years old, 40-49 years old, 50-59 years old, 60-69 years old, 70-79 years old and 80+ years old. Result based on these age groups showed that 38 (18.7%) of the respondents were 18-29 years old, 30 (14.8%) were 30-39 years old, 17 (8.4%) were 40-49 years old, 26

(12.8%) were 50-59 years old, 58 (28.6%) were 60-69 years old and 70-79 and 80+ age groups were 34 (16.7%) and 0 (0%) respectively.

Furthermore, in terms of ethnicity, it was found that slightly over half of the respondents 50.7% were white British. In connection to employment status, the first three categories dominating the result are reported as follows: 63 (31%) of the respondents were in full time employment, 45 (22.2%) were in part time employment and 29 (14.3%) were pensioners (65+). More details concerning these results are presented in table 11.

Table 11: Gender, age, ethnicity and employment status

Category		Count	Total (%)
Gender	Female	114	56.2
	Male	89	43.8
	Total	**203**	**100.0**
Age group	18 – 29	38	18.7
	30 – 39	30	14.8
	40 – 49	17	8.4
	50 – 59	26	12.8
	60 – 69	58	28.6
	70 – 79	34	16.7
	80 +	0	0.0
	Total	**203**	**100.0**
Ethnicity	White British	103	50.7
	Other white background	13	6.4
	Black African/British African	39	19.2
	Other black backgrounds	9	4.4
	Asian/British Asian	12	5.9
	Mixed white & black African	14	6.9
	Mixed white & Asian	4	2.0
	Other mixed background	5	2.5
	White Irish	1	0.5
	Mauritian	2	1.0
	Afro-Caribbean	1	0.5
	Total	**203**	**100.0**
Employment status	Employed full time	63	31.0
	Employed part time	45	22.2
	Self-employed	19	9.4
	Student (unemployed)	9	4.4
	Student (part time employment)	12	5.9
	Student (full time employment)	4	2.0
	Unemployed	4	2.0
	Retired (under 65+)	17	8.4
	Pensioner (65+)	29	14.3
	Housewife	1	0.5
	Total	**203**	**100.0**

Additionally, more details on the demographic profile of the participants are provided in appendix 9. In terms of education, the Bachelor's degree holders dominated the result with 58 (28.6%) of respondents belonging to this group. In connection to health status, 49.8% of respondents indicated they had an excellent health status while 41.4%, 7.4% and 1.5% indicated that their health status was good, fair and poor respectively. Additionally, 36 (17.7%) of the respondents indicated that their occupation was linked to services and sales. Also, in terms of marital status, those who were married dominated the result with 49.5% of the respondents belonging to this group.

Furthermore, in terms of the areas surveyed, result showed that the town with the highest usable sample was Hatfield with 31% of respondents representing the town. Details of the result are presented in appendix 9.

4.4.2 Tablet devices and the demographic profile of respondents

In the survey questionnaire, an aspect was created to assess the use or non-use of tablet devices. The intention is to identify those who use the device, those who do not use the device and had no intention of using it and those who do not currently use the device but intended to use it sometime in the future. Furthermore, the survey also examined the use or non-use of the Internet. To analyse these aspects of the questionnaire, a cross-tabulation of the demographic characteristics of the respondents with the use of tablet devices was carried out. Also, a cross-tabulation of Internet use with tablet use was carried out to assess if the owners of tablet use it with the Internet or not. The following gives accounts of the result gathered.

Regarding Internet usage, 94.6% of the respondents used the Internet, 4.4% did not use the Internet and had no intention of using it while 1% did not currently use the Internet but intended to use it sometime. Also, assessing Internet use with tablet use, result revealed that out of the 94.6% Internet adopters, 56.7% used the Internet on their tablet device.

Subsequently, result showed that out of the 203 respondents, 115 (56.7%) currently used a tablet device, 54 (26.6%) did not use a tablet device and had no intention to use one while 34

(16.7%) did not currently use a tablet device but had the intention of using one in the future.

Additionally, to assess whether there was a gap in the use of tablet devices with respect to age group, the age group were further grouped into two categories with those who are 18-49 years old representing the younger group and those who are 50+ years old representing the older group. Considering this, result showed that 44.3% of the adopters of tablet device belonged to the younger group while 55.7% of adopters belonged to the older group category. Furthermore, in comparison to other age groups, it was noted that the 60-69 years age group were the highest adopters of tablet device with 31.4% while the highest non-adopters were from the 70-79 years age group with 37%. The 30-39 years age group dominated the result of those planning to adopt a tablet device soon with 35.3%. In addition, it was observed that among the category of those planning to adopt tablets, 44.1% belongs to the older group.

In terms of education, result indicated that the most adopters of tablets devices were the Bachelor's degree holders with 31.3% indicating they use a tablet device. Subsequently, in terms of gender, it was noted that women use the device more than men with 57.4% of adopters representing women and 42.6% representing men. Table 12 provides more details on the cross-tabulation of age, gender and education with tablet adoption.

Table 12: Cross-tabulation of age, gender and education with tablet adoption

Cross-tabulation of age, gender, education with tablet adoption						
Classification		**Tablet adoption**				
		Adopters (%)	**Non-adopters (%)**	**Planning to adopt (%)**	**Total (%)**
Gender	Female	57.4	40.7	76.5	56.2
	Male	42.6	59.3	23.5	43.8
	Total	**100.0**	**100.0**	**100.0**	**100.0**
Age group	18 - 29	21.7	13.0	17.6	18.7
	30 - 39	9.6	13.0	35.3	14.8
	40 - 49	13.0	1.9	2.9	8.4
	50 - 59	13.0	11.1	14.7	12.8
	60 - 69	31.4	24.1	26.5	28.6
	70 - 79	11.3	37.0	2.9	16.7
	80 +	0.0	0.0	0.0	0.0
	Total	**100.0**	**100.0**	**100.0**	**100.0**
Education	Postgraduate degree (PhD, MA, MD, MSc, MBA...)	24.3	13.0	35.3	23.2
	Bachelor's degree (BA, BSc, BEng...)	31.3	37.0	5.9	28.6
	HND, HNC, Teaching	8.7	3.7	0.0	5.9
	A levels	14.8	20.4	11.8	15.8
	BTEC/College Diploma	8.7	11.1	23.5	11.8
	GCSE/O level	8.7	14.8	17.6	11.8
	C & G	1.7	0.0	0.0	1.0
	Certificate in education	1.7	0.0	5.9	2.0
	Total	**100.0**	**100.0**	**100.0**	**100.0**

Furthermore, ethnicity, health status and employment status were compared with tablet adoption and more details can be viewed in table 13. In terms of ethnicity, majority of the adopters of a tablet device were of the white British origin with 59.1% identifying with this category. Those in full time employment were shown as the highest adopters with 38.3% of adopters belonging to that group. Furthermore, in terms of health status those with an excellent health status dominated the group of adopters with 56.5% being from that group.

Table 13: Cross-tabulation of ethnicity, health status and employment status with tablet adoption

Classification		Tablet adoption			
		Adopters (%)	Non-adopters (%)	Planning to adopt (%)	Total (%)
Ethnicity	White British	59.1	53.7	17.6	50.7
	Other white background	2.6	13.0	8.8	6.4
	Black African/British African	15.7	9.3	47.1	19.2
	Other black backgrounds	2.6	9.3	2.9	4.4
	Asian/British Asian	6.1	5.6	5.9	5.9
	Mixed white & black African	7.8	3.7	8.8	6.9
	Mixed white & Asian	1.7	1.9	2.9	2.0
	Other mixed background	3.5	1.9	0.0	2.5
	White Irish	0.0	0.0	2.9	0.5
	Mauritian	0.9	1.9	0.0	1.0
	Afro-Caribbean	0.0	0.0	2.9	0.5
	Total	**100.0**	**100.0**	**100.0**	**100.0**
Employment status	Employed full time	38.3	14.8	32.4	31.0
	Employed part time	25.2	18.5	17.6	22.2
	Self-employed	5.2	14.8	14.7	9.4
	Student (unemployed)	7.0	1.9	0.0	4.4
	Student (part time employment)	3.5	1.9	20.6	5.9
	Student (full time employment)	0.0	3.7	5.9	2.0
	Unemployed	0.9	5.6	0.0	2.0
	Retired (under 65+)	10.4	5.6	5.9	8.4
	Pensioner (65+)	8.7	33.3	2.9	14.3
	Housewife	0.9	0.0	0.0	0.5
	Total	100.0	100.0	100.0	100.0
Health status	Excellent	56.5	27.8	61.8	49.8
	Good	35.7	57.4	35.3	41.4
	Fair	6.1	14.8	0.0	7.4
	Poor	1.7	0.0	2.9	1.5
	Total	**100.0**	**100.0**	**100.0**	**100.0**

Furthermore, a comparative analysis between the demographic variables marital status and occupation with tablet adoption were carried out. In terms of occupation, majority of the adopters of a tablet device 17.7% were in service and sales. Subsequently, majority of the non-adopters 16.7% were in service and sales while majority of those planning to adopt a tablet device 23.5% were students. The rest of the respondents were in various industrial and commercial sectors. Additionally, in terms of marital status, those who indicated that they were married dominated the group of adopters, non-adopters and those planning to adopt a tablet device with 60.9%, 35.8% and 32.4% respectively. Further details on this comparative analysis can be viewed in appendix 9.

4.4.3. The direct effect of the demographic variables

Moreover, the study assessed whether the demographic variables had a direct effect on the adoption of tablet devices. This was analysed using E-views software for statistical analysis with a significance level of 0.05. Result showed that not all the demographic variables had direct effect on tablet device adoption. For instance, the variable age had a *p*-value of 0.36, which indicates that it does not directly impact on individual's tablet adoption behaviour. Additionally, findings showed that gender, employment, ethnicity, health status, and town did not directly impact on tablet adoption with *p*-values of 0.27, 0.24, 0.21, 0.51 and 0.4 respectively. However, education, Internet use and marital status showed a significant relationship with tablet device adoption with *p*-values of 0.03, 0.007 and 0.001 respectively. Moreover, although occupation illustrated a negative effect, it also proved to have a significant relationship with tablet adoption.

More so, the r-squared (R^2) value was approximately 18%, which means that only 18% of tablet adoption could be explained by the demographic characteristics. Although the F-statistics with a value of 0.00003 indicates that the inclusion of the entire demographic variable is required, however, the overall result indicates identifying other factors. Table 14 shows more details of the result gathered.

Table 14: The effect of the demographic variables on tablet adoption

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	0.543242	0.286320	1.897330	0.0513
Age	0.035264	0.038214	0.922801	0.3573
Town	-0.001343	0.001591	-0.844264	0.3996
Education	0.067238	0.029988	2.242130	0.0261
Employment status	0.021675	0.018512	1.170849	0.2431
Ethnicity	0.029801	0.023925	1.245602	0.2144
Gender	0.115840	0.104732	1.106064	0.2701
Health status	-0.056413	0.084626	-0.666619	0.5058
Internet use	0.496112	0.182249	2.722169	0.0071
Occupation	-0.016057	0.007731	-2.076856	0.0391
Marital status	0.076056	0.023380	3.252966	0.0013
R-squared	0.178723	Mean dependent variable		1.600985
Adjusted R-squared	0.135948	S.D. dependent variable		0.760015
S.E. of regression	0.706467	Akaike info criterion		2.195584
Sum squared residual	95.82641	Schwarz criterion		2.375117
Log likelihood	-211.8518	Hannan-Quinn criterion.		2.268216
F-statistic	4.178233	Durbin-Watson stat		2.025636
Prob (F-statistic)	0.000030			

4.4.4. The tablet adopters

As previously mentioned, a section was mapped out for assessing those who currently use tablet devices. The sets of questions in this section was intended to provide information on what the tablets are used for, how long each of the adopters had used the tablet for and what influenced their decision to adopt and use the device. Additionally, this section also included questions regarding the brand of tablet device being used, how long it had been owned and the Internet provider being used. The following gives accounts of the result gathered.

In terms of brands of tablet device, result showed that the most common tablet device is the Apple iPad with 47.7% of the tablet owners indicating they owned an iPad. Figure 21 shows the different brands of tablet device and the percentage of ownership.

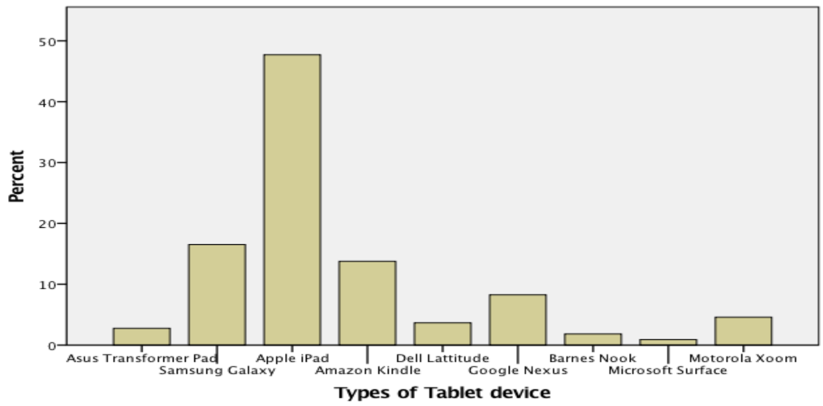

Figure 21: Brands of tablets and the percentage of ownership

Furthermore, in connection to what the tablet devices are used for, the most popular use of tablet device was for browsing activities such as emails and social networking with 88 (80%) out of 110 respondents identifying with this option. Following this was ‘reading online’ with 63.6% while 56.4 % indicated that they used it to shop online. Furthermore, the uses of tablets were compared with the two age groups (younger group and older group). It was found that ‘for browsing (emails and social media)’ was more common among the older group with 48.2% while ‘for work purposes’ was the least popular among this group with 6.4%. Additionally, it is noteworthy that the percentage of online shoppers was higher among the older group (35.4%) in comparison to the younger group (21.8%). Meanwhile, the percentage of those using online banking on their tablet device was higher among the younger group (30%) in comparison to the older group (20.9%). More details regarding the comparison of age groups with the uses of tablet can be viewed in table 15.

Table 15: Comparing age group with the uses of tablet

Classification		Age group					
		Younger group (N=42)		Older group (N=68)		Total (N=110)	
		Count	%	Count	%	Count	%
Tablet uses	For reading offline	20	18.2	36	32.7	56	50.9
	For reading online	26	23.6	44	40.0	70	63.6
	For browsing (for instance emails, Facebook, LinkedIn...)	35	31.8	53	48.2	88	80.0
	For shopping online	24	21.8	38	34.5	62	56.4
	To interact with the central Government	8	7.3	10	9.1	18	16.4
	To interact with the local Government	5	4.5	13	11.8	18	16.4
	For watching movies offline	14	12.7	15	13.6	29	26.4
	For banking online	33	30.0	23	20.9	56	50.9
	For watching movies online	16	14.5	20	18.2	36	32.7
	For playing games offline	15	13.6	29	26.4	44	40.0
	For playing games online	15	13.6	9	8.2	24	21.8
	For health and well being	16	14.5	24	21.8	40	36.4
	For work purposes	4	3.6	7	6.4	11	10.0

With regards to what influenced their decision to use tablets, 59.5% of adopters (over half of the adopters) indicated that their use of tablet devices was influenced by family/friends' recommendations. Figure 22 shows the possible factors that can influence tablet device adoption.

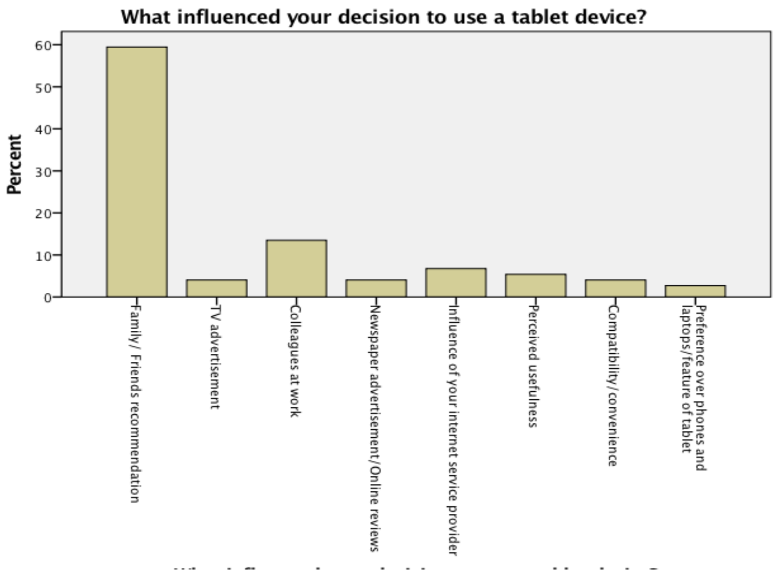

Figure 22: Factors that might influence tablet adoption

Moreover, in connection to the length of use of a tablet device, result showed that 49.1% had used their tablet device for between a year and 3 years and 24.5% had used it for less than a year. Additionally, 20.0% had used it for between 3 years and 6 years while 6.4% had used it for over 6 years. Figure 23 shows a graphical representation of the duration of use.

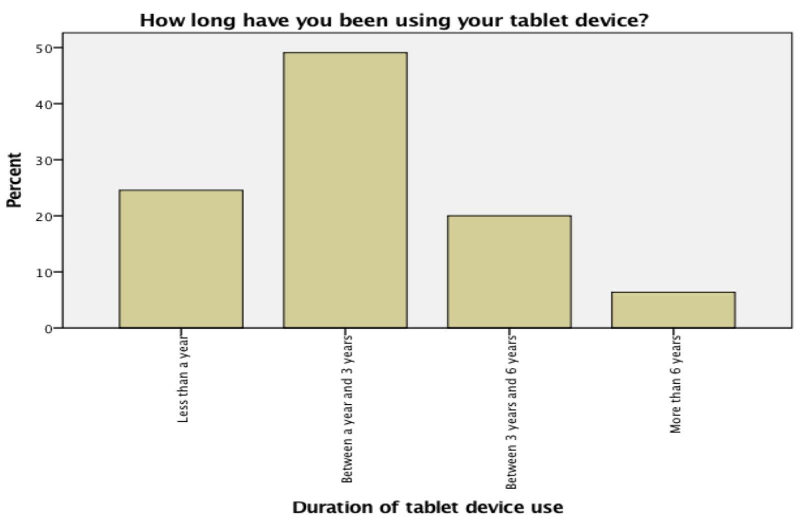

Figure 23: Duration of tablet use

Additionally, in terms of service providers, the most popular was Virgin media with 25.5% of respondents indicating that their service provider is Virgin media. Following this is Sky with 19.4% and BT with 18.9%. Figure 24 provides more details with regards to the service providers.

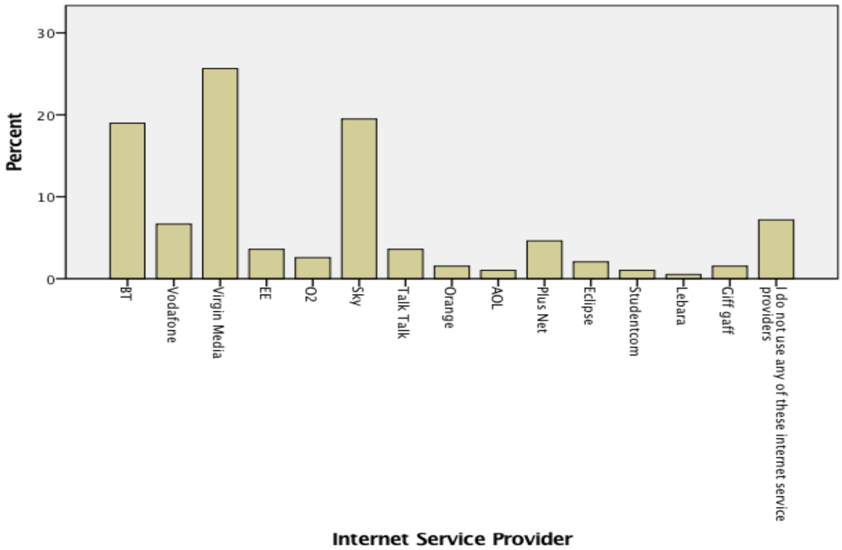

Figure 24: Internet service providers in UK

4.4.5 Non-adopters of tablets

As previously mentioned, a section assessing tablet non-users was created in the survey questionnaire. In this section, it was intended that the reasons behind non-adoption as well as what could possibly inspire use will be identified. As stated earlier, result showed that 26.6% of the participants did not currently use a tablet and had no intention of using one. Reasons for non-use included factors such as cost, design, accessibility, age and compatibility etc. From the result, majority (58.5%) of the non-users indicated that there was no particular reason for non-use and that they were simply not interested. This was followed by 30.5% of the non-users stating the reason for non-use was the cost of the tablet device. While, 20.7% stated they do not use the tablet because it is not compatible with their daily needs. The other reasons given for non-adoption of tablets can be viewed in figure 25.

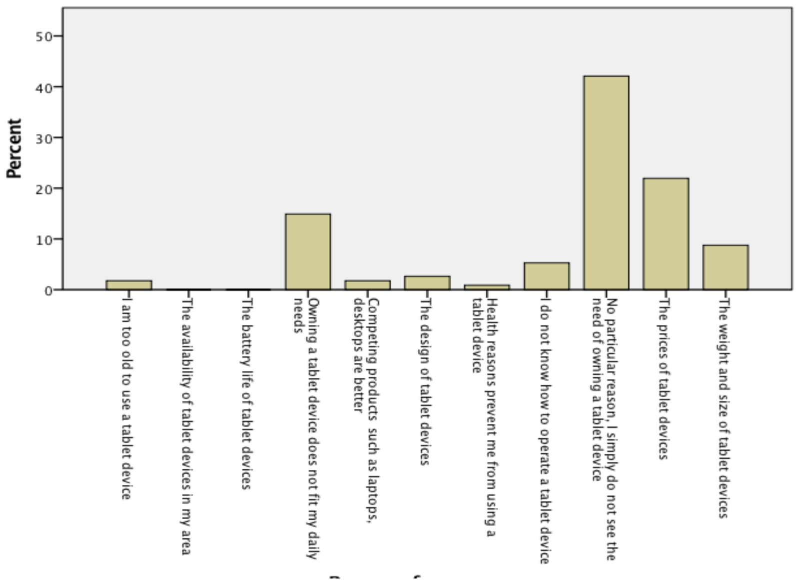

Figure 25: Reasons for the non-adoption of tablet devices

Furthermore, with the intention of identifying what strategy can help in encouraging non-adopters, a question regarding possible factors that might encourage usage of the tablet device was asked. Majority of the non-adopters (78.9%) indicated that nothing would change their mind with regards to adopting tablets. This was followed by 9.9% stating that a reduction in the cost of tablets might inspire them to adopt the device. Other factors that might inspire adoption can be viewed in figure 26.

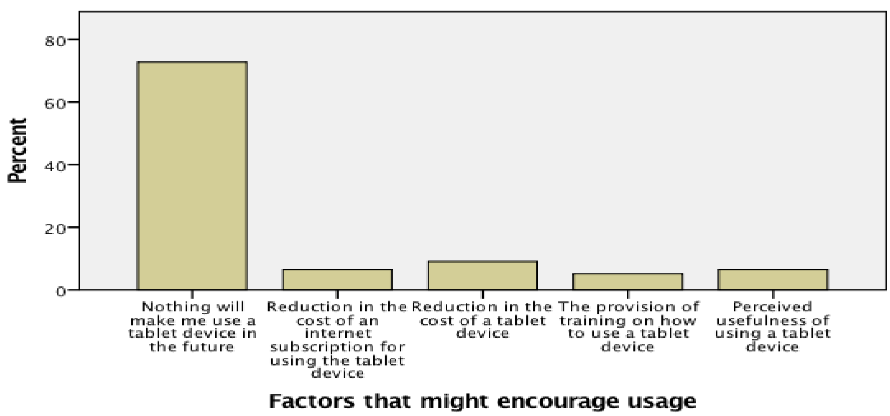

Figure 26: Factors that might encourage tablet adoption

4.4.6. Those planning to purchase / adopt tablets

As mentioned earlier, a section was created in the questionnaire to address those who do not currently use tablets but had the intention of using it in the near future. It included questions on how soon the device will be purchased, what brand will be purchased and the aim of purchasing the device. From the result, 16.7% of respondents indicated that they currently do not own tablets but intended to own one.

In terms of how soon, the respondents were asked if they intended to purchase the tablets within the next six months. This was measured using 5 items ranging from 'yes' to 'not at all likely'. From the result, out of the 16.7% of the respondent falling in this category, 7.4% indicated that they intended to purchase a tablet in the next six months, 8.4% indicated that they intend to purchase a tablet device much later than six months while, 0.9% skipped the question.

In terms of the brand of tablets, majority of the respondents (35.7%) stated that the brand they intended to purchase is the Samsung Galaxy tablet. Following this, Amazon Kindle and Apple iPad were the second most preferred tablets to be purchased with 17.9% each. The other brands and their percentages can be viewed in figure 27.

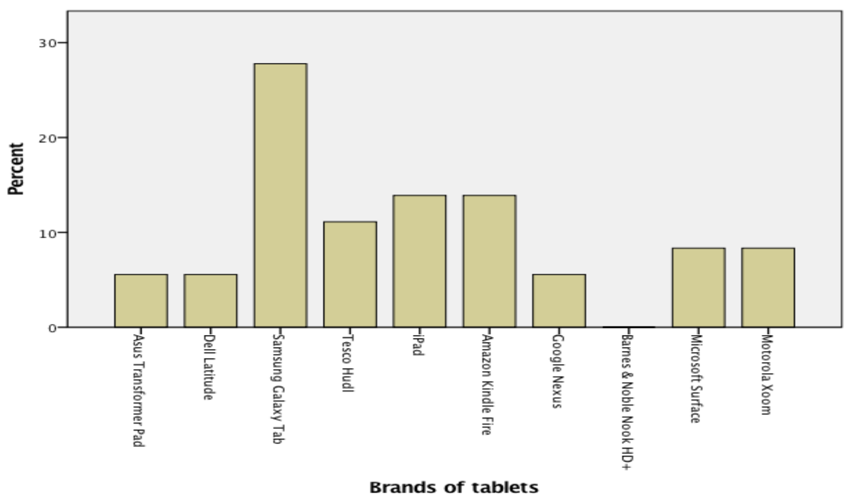

Figure 27: Brands of tablets that might be purchased

Furthermore, to assess reasons behind the intention to purchase, result indicated that over half of the respondents (69%) intended to purchase the tablets in order to use it for reading offline. Following this, 65.5% wanted the tablet for reading online while, 62.1% wanted to use it for browsing (emails, social media, etc.).

4.4.7. Reliability and validity test

To measure the reliability and validity of the constructs used in this study, the PLS-SEM technique was employed via the SMARTPLS 3.0 statistical package (Ringle et al., 2015). Cronbach's alpha, rho_A (ρ_A), composite reliability and average variance extracted (AVE) were determined to test for internal consistency and validity. As a rule of thumb, the acceptable values for each respective measurement used for internal consistency and validity analysis are greater than or equal to 0.7 for the first three mentioned and greater than or equal to 0.5 for AVE (Hair et al., 2014; Hulland, 1999). However, Hulland (1999) recommended that it might not be appropriate to use a fixed threshold value because the values calculated often vary depending on the number of constructs included. Furthermore, in terms of Cronbach's alpha (α), Hinton and Brownlow (2014); Litwin (1995) suggests four thresholds values for α: excellent (≥ 0.9), high (between 0.7 to 0.9), moderate (between 0.5 to 0.7) and low (≤ 0.5). In contrast, Gliem and Gliem (2003), maintains that there is no set limit to the coefficient of alpha but the closer alpha's coefficient is to 1, the greater the reliability of the item being measured. Considering the thresholds recommended by Hinton and Brownlow (2014), values found for each of the measurement test exceeded 0.7, 0.7, 0.7 and 0.5 respectively. This result indicates that the measurement items have met the reliability measurement criteria. Table 16 presents the result of the reliability and validity test.

Table 16: Reliability and validity results

Constructs	Cronbach alpha	rho_A	Composite reliability	AVE
COMP	0.967	0.967	0.967	0.936
PEOU	0.965	0.965	0.965	0.902
PU	0.923	0.923	0.923	0.800
TRUST	0.917	0.921	0.913	0.727
ATT	0.952	0.952	0.952	0.869
SN	0.907	0.914	0.910	0.772
PBC	0.961	0.961	0.961	0.891
INT	0.958	0.960	0.958	0.883

4.5 Factor analysis

Factor analysis is a multivariate method used to assess discriminant and convergent validity (Hair et al., 1998). However, it is necessary to evaluate if a sampling data is suitable for factoring (Henson and Roberts, 2006). Based on this, this pilot's data was assessed for its adequacy for factor analysis using the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and the Bartlett test of sphericity. The value of KMO ranges from 0 to 1 with acceptable value of 0.5 or greater (Henseler et al., 2016). While, achieving a *p*-value of less than 0.05 for the Bartlett test indicates significance. The result of the KMO test produced a value of 0.937, which is within the required threshold. For the Bartlett test, the *p*-value derived is 0.000, which is less than 0.05. Therefore, these results indicate that factor analysis is suitable for assessing the sampling data. Table 17 presents the results derived for the KMO and Bartlett's test.

Table 17: The KMO and Barlett's sphericity test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.937
Bartlett's Test of Sphericity	Approx. Chi-Square	7081.189
	df	276
	Sig.	.000

Table 17 above confirms the appropriateness of using factor analysis, thus the following provides details of the test for convergent and divergent validity using factor analysis.

4.5.1 Convergent and discriminant validity

Convergent validity is the extent to which the different subscale or measurement items of a construct represent the same conceptual construct (Agarwal and Prasad, 1998). This implies that the different subscales of a construct should demonstrate a substantial correlation with the construct being measured. It is recommended that for convergent validity to be established, the loadings of the items of each construct should be above 0.7 (Hair et al., 1998).

On the other hand, discriminant or divergent validity is the extent to which the measurement items of each constructs are distinguishable from other constructs (Agarwal and Prasad, 1998). This implies that constructs that are not theoretically linked should demonstrate a distinction. Furthermore, in assessing discriminant validity, it is recommended that an item's loading should be higher than all of its cross loadings (Hair et al., 2011).

Therefore, to provide evidence of convergent and divergent validity in the pilot study, a correlation factor analysis in the form of cross loading was utilised (Litwin, 1995). The following provides information regarding the convergent and divergent validity result.

As earlier discussed, eight constructs were assessed in this study and measurement items were generated for each construct. In order to establish the correlation between the subscales and their respective construct, cross loadings using SMARTPLS 3.0 were generated. According to Hair et al. (2014), to establish convergence, the correlation coefficients of each loading should be above 0.7. However, in IS research, a cross loading value of at least 0.4 is the acceptable cut-off (Straub et al., 2004). In this pilot study, all the correlation coefficients showed a strong load of above 0.8. In addition, all the factors demonstrated divergent validity. For example, Int3 in relation to COMP produced the value 0.604, which is lower than 0.947 produced when the same Int3 is related to INT (the conceptual construct linked to Int3). Table 18 shows the cross loading of items with the shaded region indicating the cross-loading values of the measurement items and its corresponding construct.

Table 18: Cross-loading of items

Measurement items	ATT	COMP	INT	PBC	PEOU	PU	SN	TRUST
Att1	0.964	0.738	0.667	0.825	0.743	0.544	0.719	0.736
Att2	0.967	0.634	0.631	0.812	0.635	0.622	0.692	0.707
Att3	0.936	0.744	0.683	0.808	0.608	0.514	0.713	0.756
Comp1	0.759	0.984	0.633	0.723	0.617	0.728	0.653	0.693
Comp2	0.768	0.984	0.639	0.726	0.654	0.731	0.636	0.714
Int1	0.694	0.636	0.954	0.714	0.681	0.684	0.527	0.589
Int2	0.655	0.620	0.979	0.666	0.668	0.672	0.551	0.575
Int3	0.640	0.604	0.947	0.635	0.647	0.661	0.512	0.590
Pbc1	0.826	0.691	0.672	0.947	0.761	0.715	0.765	0.757
Pbc2	0.802	0.704	0.675	0.970	0.602	0.750	0.690	0.705
Pbc3	0.836	0.732	0.677	0.972	0.517	0.734	0.686	0.739
Peou1	0.627	0.654	0.620	0.775	0.955	0.755	0.573	0.662
Peou2	0.643	0.513	0.676	0.701	0.980	0.774	0.580	0.669
Peou3	0.746	0.497	0.715	0.614	0.964	0.602	0.604	0.668
Pu1	0.507	0.767	0.658	0.707	0.752	0.931	0.653	0.695
Pu2	0.612	0.567	0.634	0.743	0.742	0.949	0.645	0.636
Pu3	0.797	0.621	0.666	0.675	0.752	0.912	0.603	0.612
Sn1	0.658	0.574	0.463	0.697	0.563	0.570	0.854	0.741
Sn2	0.683	0.594	0.518	0.661	0.544	0.631	0.954	0.635
Sn3	0.702	0.636	0.538	0.690	0.566	0.671	0.946	0.642
Trust1	0.795	0.699	0.576	0.757	0.702	0.710	0.637	0.831
Trust2	0.578	0.561	0.492	0.634	0.512	0.548	0.631	0.906
Trust3	0.653	0.630	0.548	0.642	0.575	0.598	0.675	0.922
Trust4	0.684	0.643	0.548	0.669	0.644	0.605	0.652	0.918

4.6 Path analysis

Path analysis is a technique used to determine model fit of the correlation matrix against two or more causal indicators (Garson, 2013). It is also used to test the hypothesized constructs and determine the path coefficient, which in turn will help determine significance (Ringle et al., 2015). Using SMARTPLS 3.0, path analysis for all age group was conducted in order to determine the path coefficient (β). Furthermore, bootstrapping was applied to the PLS analysis using 0.05 level of significance and this generated *t*-values and corresponding *p*-values. From the result, it was observed that perceived behavioural control had the strongest influence on intention to use tablets with β= 0.382, t=2.954 and p=0.003. This was followed by attitude towards using tablets with β=0.314, t=2.461 and p=0.014. However, subjective norm was considered insignificant in predicting the intention to use tablets with β=-0.043, t=0.464 and p=0.643. Trust also was considered insignificant in determining the intention to use with β=0.108, t=1.206 and p=0.228. Result indicated that perceived ease of use had the strongest impact on attitude towards using tablets with β=0.293, t=4.128 and p=0.000. Additionally, compatibility, perceived usefulness and trust proved to be significant in determining the attitude towards using tablets with values (β=0.258, t=2.913 and p=0.004), (β=0.286, t=3.375 and p=0.001) and (β=0.183, t=3.362 and p=0.001) respectively. The hypothesis result and the structural model of all age groups can be viewed in table 19 and figure 28 respectively.

Table 19: Results of the hypotheses testing

Hypothesis	**Paths**	**Coefficient**	**Standard deviation (STDEV)**	***t*-Statistics**	**Result**
H1	COMP -> ATT	0.258	0.088	2.913*	Supported
H2	PU -> ATT	0.286	0.087	3.375*	Supported
H3	PEOU -> ATT	0.293	0.074	4.128*	Supported
H4	TRUST -> ATT	0.183	0.177	3.362*	Supported
H5	TRUST -> INT	0.108	0.105	1.206	Not supported
H6	ATT -> INT	0.314	0.127	2.461*	Supported
H7	SN -> INT	-0.043	0.089	0.464	Not supported
H8	PBC -> INT	0.382	0.133	2.954*	Supported

Note: * denotes significance at p<0.05

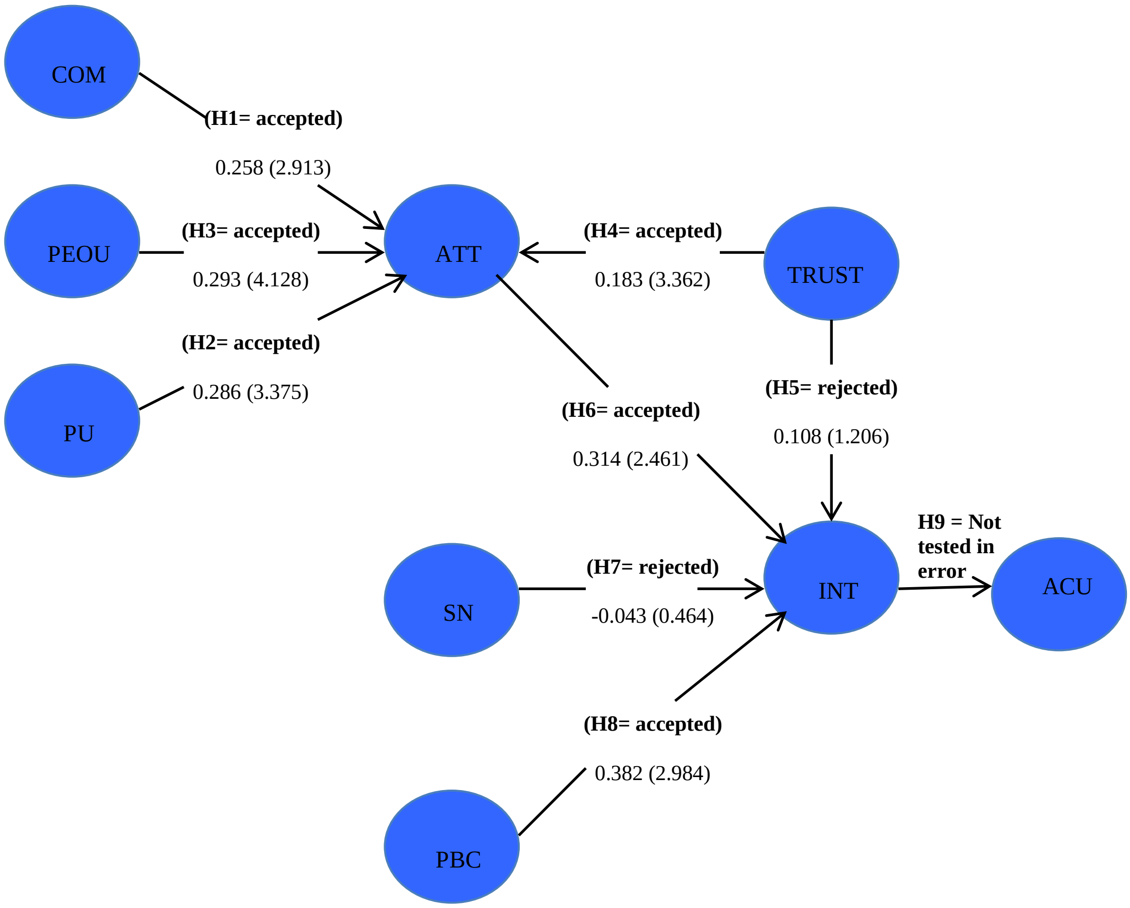

Figure 28: The pilot structural model for all age groups

Figure 28 was provided to show the results derived from the SEM or path analysis conducted using the data gathered from all the participants involved in the pilot study. That is, it includes data from all age groups (18 and over) in the pilot study. This is in order to have a general overview of how each construct affects the adoption and use of tablet devices by individuals. Considering this, it can be observed that figure 28 shows the general hypotheses results involving all the age groups in the pilot study with the inclusion of the value of the path coefficient for the hypothesised constructs as well as the t-values respectively. Furthermore, it can also be observed from figure 28 that six of the hypotheses (1,2,3,4,6 and 8) tested in this pilot study were supported. In particular, results (including all age groups) demonstrated in figure 28 indicate that compatibility (H1), perceived usefulness (H2), perceived ease of use (H3) and trust (H4) all have significant influence on individual's attitude towards adopting and using a tablet device. This is almost similar to the study of Lin

(2011) where it was found that perceived relative advantage, perceived ease of use, perceived compatibility and some knowledge-based trust attributes (perceived competence and integrity) have significant influence on attitude towards using mobile banking. Result including all the age groups also demonstrated that attitude (H6) and perceived behavioural control (H8) have significant impact on intention to use behaviour. This is almost similar to the findings from the study of Hsaio (2013); Hur et al. (2014) where it was indicated that attitude has a positive influence on intention behaviour.

Additionally, from figure 28, it can be observed that 2 of the hypotheses (5 and 7) were not supported, which implies that these hypotheses generally had little or no effect on the intention to use tablet devices among all the age groups in the pilot. This is an interesting result given that trust and subjective norm have been found to be important factors for adopting new innovations (Gu et al., 2009; Choudrie and Vyas, 2014). For instance, Gu et al. (2009) found trust to be a key determinant for users behaviour intention towards mobile banking. Meanwhile, Choudrie and Vyas (2014) found that friends, family and co-workers influence people's behaviour intention towards adopting and using online social networks (OSN).

In addition, it can be noted from figure 28 that in error, one of the hypotheses (9) was not tested. This is because the measurement items for the actual use construct was omitted mistakenly during the development of the questionnaire used for this pilot study.

Following the path analysis conducted, multi-group analysis (MGA) was also performed in order to compare the age group categories (younger and older group). Parametric test was also conducted to assess the significance of the difference between groups in relation to the hypothesised constructs. Among the older and younger group, perceived behavioural control had the strongest influence on the intention to use tablet with (β=0.360, t=2.265 and p=0.024) and (β=0.455, t=2.091 and p=0.037) respectively. Additionally, both groups showed that subjective norm and trust were insignificant in determining the intention to use tablets. Furthermore, it is noteworthy that among the older group, perceived ease of use

(β=0.384, t=5.186 and p=0.000), perceived usefulness (β=0.375, t=4.214 and p=0.000) and trust (β=0.127, t=2.651 and p=0.008) were significant in determining attitude while compatibility was insignificant in relation to attitude with β=0.147, t=1.600 and p=0.110.

For the younger group, result indicated that trust (β=0.255, t=2.063 and p=0.040) and compatibility (β=0.378, t=2.080 and p=0.038) were significant in determining attitude. Meanwhile, perceived ease of use (β=0.143, t=1.107 and p=0.269) and perceived usefulness (β=0.223, t=1.722 and p=0.086) were insignificant in determining attitude.

Additionally, attitude was significant in determining intention among the older group (β=0.302, t=1.983 and p=0.048) while it was insignificant among the younger group (β=0.374, t=1.646 and p=0.100). Results of the path analysis for the older and younger group can be viewed in table 20 and table 21 respectively.

Table 20: the path analysis result of the older group

Hypothesis	Paths	Coefficient	Standard deviation (STDEV)	*t*-Statistics	Result
H1	COMP -> ATT	0.147	0.092	1.600	Not supported
H2	PU -> ATT	0.375	0.089	4.214*	Supported
H3	PEOU -> ATT	0.384	0.074	5.186*	Supported
H4	TRUST -> ATT	0.127	0.048	2.651*	Supported
H5	TRUST -> INT	0.170	0.104	1.632	Not supported
H6	ATT -> INT	0.302	0.153	1.983*	Supported
H7	SN -> INT	-0.045	0.110	0.407	Not supported
H8	PBC -> INT	0.360	0.159	2.265*	Supported

Note: * denotes significance at p<0.05

Table 21: The path analysis of the younger group

Hypothesis	Paths	Coefficient	Standard deviation (STDEV)	*t*-Statistics	Result
H1	COMP -> ATT	0.378	0.182	2.080*	Supported
H2	PU -> ATT	0.223	0.129	1.722	Not supported
H3	PEOU -> ATT	0.143	0.129	1.107	Not supported
H4	TRUST -> ATT	0.255	0.124	2.063*	Supported
H5	TRUST -> INT	-0.033	0.182	0.183	Not supported
H6	ATT -> INT	0.374	0.227	1.646	Not supported
H7	SN -> INT	-0.061	0.142	0.432	Not supported
H8	PBC -> INT	0.455	0.218	2.091*	Supported

Note: * denotes significance at p<0.05

From tables 20 and 21 it can be observed that there are some differences in the hypotheses results of the groups. For instance, table 20 shows that the hypothesis H1 was not supported among the older group. Meanwhile, table 21 shows that H1 was supported among the younger group. In the light of this, a parametric test was conducted to verify whether these identified differences between the groups were significant. The result of this parametric test is provided in table 22.

Table 22: The parametric test result

Hypothesis	**Paths**	**Path Coefficients-diff**	***t*-Value (Older group vs. Younger group)**	***p*-Value (Older group vs. Younger group)**
HI	COMP -> ATT	0.231	1.235	0.218
H2	PU -> ATT	0.152	1.007	0.315
H3	PEOU -> ATT	0.241	1.728	0.086
H4	TRUST -> ATT	0.129	1.087	0.278
H5	TRUST -> INT	0.203	1.038	0.301
H6	ATT -> INT	0.071	0.272	0.786
H7	SN -> INT	0.016	0.093	0.926
H8	PBC -> INT	0.095	0.363	0.717

From the parametric test result provided in table 22, it can be observed that, there was no significant difference between the groups with regards to the hypothesised constructs because all the *p*-values were greater than 0.05.

Moreover, after splitting the age groups into two categories (younger and older group), SEM analysis was also conducted for each of these groups. Thus, the SEM diagram derived for both the older and younger age groups are provided in figure 29 and 30 (younger group) respectively.

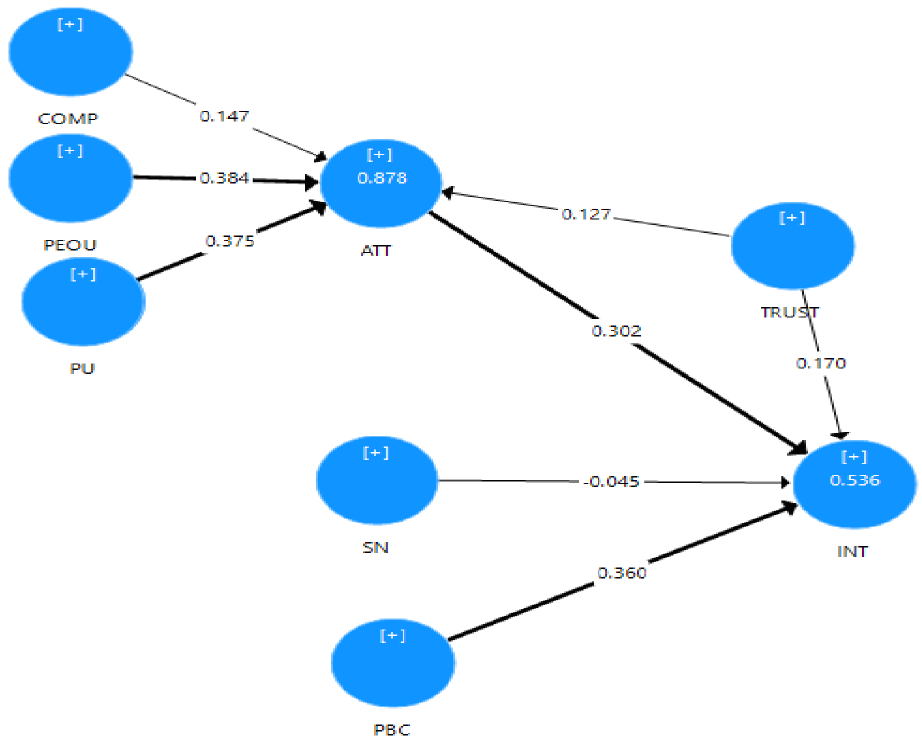

Figure 29: Structural model of the older group with absolute values

Figure 29 was provided to show the results derived from the SEM or path analysis conducted using the data gathered from the older age group in the pilot study. In particular, the data used for this SEM analysis was from those aged 50 years and over in the pilot study. This was to provide a picture of the relationship between constructs in determining the adoption and use of tablet devices from the perspective of older adults specifically. Figure 29 also shows the absolute or r^2 values derived for the independent variables: attitude and intention to use. Furthermore, figure 29 also presents the path coefficients of the hypothesised constructs.

In terms of the r^2 values, it can be observed that the r^2 values derived for attitude and intention to use are 87.8% and 53.6% respectively. This values therefore, indicates that the FTDA framework is sufficient for explaining older adults' attitude towards as well as their intention to adopt and use tablet devices.

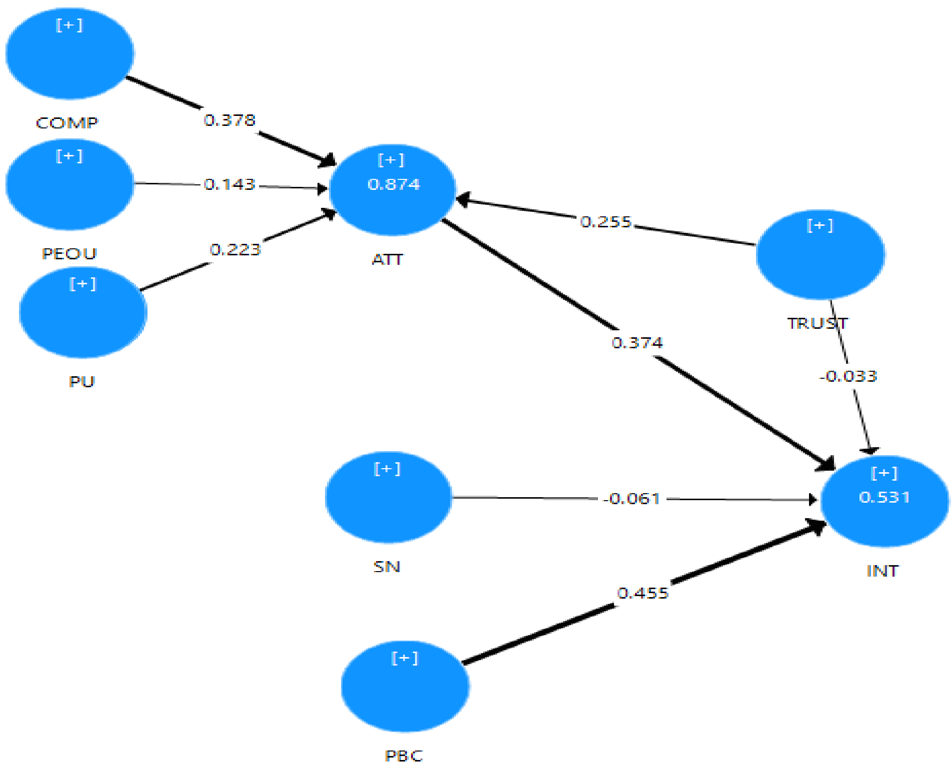

Figure 30: Structural model of the younger group with absolute values

Figure 30 presents the results derived from the path analysis carried out using the data gathered from the younger age group in the pilot study. In particular, the data used for this path analysis was from those aged between 18 years to 49 years in the pilot study. This was to provide an understanding on how the relationship between the constructs affects the adoption and use of tablet devices from the perspective of younger adults specifically. Moreover, figure 30 also shows the absolute or r^2 values for the independent variables: attitude and intention to use. In addition, it also presents the coefficient of each path with regards to the hypothesised constructs.

Finally, with regards to the r^2 values, it can be observed that the values derived for attitude and intention to use are 87.4% and 53.1% respectively. This result thus, indicates that the FTDA framework is sufficient for explaining younger adults attitude towards and their intention to adopt and use tablet devices.

4.6.1 Coefficient of determination

The coefficient of determination (R^2) is the most common statistical measure for indicating quality in a research work (Moksony, 1990). It is a measure used to describe the proportion of variance that can be explained by the independent variable (Renaud and Victoria-Feser, 2010). According to Moksony (1990), R^2 can be applied if the aim of the study is for either prediction or to test a theory. Since this research is intended to predict behaviour in terms of tablet adoption and subsequently test the research model, therefore, R^2 is considered important in this study. In light of this, based on the overall sample, R^2 derived for the key dependent variable (intention to use tablets) is 0.527. This implies that the framework FTDA can explain about 52.7% of the variability in respondents' intention to use tablets. This value indicates significance and the sufficiency of FTDA in predicting behaviour intention with regards to tablet devices. Additionally, the R^2 value for the attitude variable is 0.868, which means that about 86.8% of the respondents' attitude formation can be explained by their perception of the tablet device in terms of compatibility, trust, perceived ease of use and perceived usefulness.

Additionally, as mentioned earlier, the sample was split into two groups in terms of age and analysis of each group was conducted. For older adults, the R^2 derived for intention to use is 0.536, which means that about 53.6% of an older adult's intention to use tablets can be explained by the FTDA framework. In addition, about 87.8% of an older adult's attitude formation towards adopting tablets is determined by their perception with regards to the compatibility, trust, ease of use and usefulness of the device.

Meanwhile, for the younger adults, the R^2 derived for the intention to use tablet is 0.531, which means that about 53.1% of a younger adult's intention to use tablets can be explained by the model. More so, for the attitude variable, 87.4% of a younger adult's attitude towards tablet devices is formed based on their perception of its compatibility, ease of use, usefulness and trust.

4.7 Pilot discussion

As mentioned earlier, there is currently an issue termed the digital divide, which is a resultant effect of the presence of ICT in society (van Dijk and Hacker, 2003). Age has been identified as one of the factors associated with this digital divide (Choudrie et al., 2013). Therefore, the main aim of the pilot study was to identify if there is an age difference existing in the adoption and use of the tablet device between the young adults and older adults. In the light of this, result indicated that older adults are on the positive side of the digital divide in terms of adopting tablets. This goes contrary to many studies such as that of Selwyn (2003) that found older adults to be on the negative side of the digital divide in comparison to their younger counterpart. Thus, the lesson drawn from this is that tablet devices might be a solution needed to encourage older adults' participation in the e-society and subsequently, the successful diffusion of ICT in society. Therefore, to further explore this finding, the final study examined only those aged 50+ years.

Subsequently, the pilot study was conducted with the intention of testing the reliability and validity of the FTDA framework developed for the research. This procedure also required the testing of the study's hypotheses. In addition, the pilot study was also used to pre-test the procedures for data collection and analysis as well as identify errors in order to ensure a successful final study. As can be seen in chapter 2, nine hypotheses were developed for the study. From the pilot result, six of these hypotheses were supported however; two of the hypotheses (**H5** and **H7**) were insignificant. Subsequently, it was noted that in error, there was no measurement developed to test **H9**. Based on this discovery, the identified error was rectified in the main study. Additionally, even though **H5** and **H7** were found insignificant in the pilot study, it was still used in the final study to verify if the findings from the pilot (which was a mix of younger and older adults aged 18+ years) also applied to the main study (which was for only those aged 50+ years). Table 23 shows a summary of the hypothesised constructs.

Table 23: Summary of the hypothesised constructs

Hypothesised constructs	Result
H1: Compatibility has a significant effect on an individual's attitude towards adopting and using a tablet device	Supported
H2: Perceived usefulness will significantly influence an individual's attitude towards adopting and using a tablet device	Supported
H3: Perceived ease of use will significantly influence an individual's attitude towards adopting and using a tablet device	Supported
H4: An individual's perception of trust significantly affects his/her attitude towards adopting and using a tablet device	Supported
H5: An individual's perception of trust significantly affects his/her intention to adopt and use a tablet device	Not supported
H6: An individual's attitude towards using a tablet device directly influences his/her intention to adopt and use the device	Supported
H7: Subjective norm has a significant effect on an individual's intention to adopt and use a tablet device	Not supported
H8: Perceived behavioural control has a direct effect on an individual's intention to adopt and use a tablet device	Supported
H9: An individual's intention towards a tablet device determines their actual use of the tablet	Not tested

Note: supported at a significant level of $p<0.05$

In terms of the reliability and validity of constructs, all the tested constructs were verified to be reliable and valid thus, supporting the use of the measurement items for the final study. Moreover, the FTDA framework was confirmed fit for predicting behaviour in terms of tablet adoption and use. This is because the R^2 values (all above 0.5) derived were found to be significant (Hair et al., 2011; Moksony, 1990). This result established the sufficiency of the FTDA framework for use in the final study.

4.8 Summary of chapter

In this chapter, the pre-testing phases for the study were presented. The first phase after the development of the survey questionnaire was the content validity exercise. This phase was conducted with the intention of verifying whether the content of the survey questionnaire was fit for purpose. The content validity exercise was conducted among 20 experts from academia, industry and the target population and these experts provided feedbacks that were used in modifying the questionnaire before pilot testing was done.

Following this process, the second phase was the pilot study, which resulted in 203 complete response. Moreover, this phase was used to test for the validity and reliability of the FTDA framework. It was also used to verify whether there was an existing 'age divide' between young adults and older adults in terms of tablet device adoption. Findings revealed that there was an age difference in the use of tablet devices and the FTDA framework was also confirmed fit for purpose. Furthermore, lessons learned from conducting the pilot survey helped to further modify the questionnaire for the final phase.

Consequently, these processes employed in the first and second phases assisted in the development of the final survey questionnaire, which was used for the final data collection phase.

Having provided these details, the next chapter discusses the details of the final phase including findings and analyses.

Chapter 5: Final Phase Findings and Analysis

5.0 Introduction to chapter

As mentioned earlier in chapter 4, sections 4.1 and 4.2 respectively, content validation and a pilot study was conducted in order to pre-test the study's procedures before the final study. Lessons drawn (e.g. actual use was erroneously not measured during the pilot study) from these phases helped in modifying and improving the survey questionnaire, which was used for the final study. In this chapter, the steps taken during this final phase are discussed. These steps include, the methods used to collect data, the analyses of the data collected and the results gathered. Additionally, the areas (see appendix 8) corrected in the questionnaire based on the lessons learned from the first two phases are also provided.

5.1 Final study questionnaire development

As with the pilot study, the questionnaire used for this final phase was split into five sections (see appendix 8). The first section was aimed at collecting the demographic profile of all participants. This first section also included questions addressing the state of health, ailments preventing adoption as well as question on the use of the Internet generally.

Furthermore, the second section addressed those who currently use tablet devices, third section addressed those who do not use tablets and had no intention of doing so while the fourth section addressed those who currently did not use tablets but intended to do so soon.

Subsequently, in chapter 2, section 2.7; nine constructs were selected for generating the research hypotheses. These constructs include: COMP, PU, PEOU, TRU, ATT, SN, PBC, INT and AC. Thus, the fifth section in the questionnaire was employed to assess the first 8 constructs in order to test the research hypotheses generated for each construct. Similar to the pilot study, using a Likert-type scale, the measurement items for each construct were adopted from previous studies with some modification to suit the research context. Meanwhile, using an ordinal scale, an aspect assessing actual use was also created and this construct was measured using 5 measurement items. Table 24 illustrates the measurement used for the constructs with the inclusion of actual use measurement items.

Table 24: Constructs measured in the final study

Constructs	Measurement item	Source
Compatibility (COMP)	Using a tablet device fits with my personal needs and preferences (e.g. measuring my workout)	Taylor and Todd (1995); Al-Jabri and Sohail (2012)
	Using a tablet device fits with my lifestyle or work (e.g. style of entertaining self, working from home)	
Perceived ease of use (PEOU)	Learning how to use a tablet is easy for me	Davis (1989); Hong et al. (2013)
	I find it easy to get a tablet device to do what I want it to do	
	Overall, I find a tablet device easy to use	
Perceived usefulness (PU)	Use of a tablet device can significantly improve the quality of my life (e.g. monitoring my weight, blood pressure)	Davis (1989); Hong et al. (2013)
	Using a tablet device is useful for my daily activities and preferences	
	Using a tablet device helps me accomplish things more quickly (e.g. quicker response to emails)	
Trust (TRU)	I believe a tablet device will help me access the Internet whenever I want	Kim et al. (2008); Gefen and Pavlou (2012); Featherman and Pavlou (2003)
	I worry that using tablet devices to complete certain Internet activities (such as Internet banking, online shopping) is not secure	
	Using tablet devices has me concerned about the privacy of my personal information	
	Using tablet devices could lead to my personal information being used without my knowledge	
Attitude (ATT)	I have a positive opinion of tablet devices (e.g. based on its size, my experience of it)	Taylor and Todd (1995); Al-Debei et al. (2013)
	Using a tablet device is a good idea	
	I think using a tablet device is appropriate for me (e.g. for work, daily routine)	
Subjective norm (SN)	People who influence my behaviour think I should use a tablet device (e.g. family, friends, colleagues)	Ajzen (2002); Al-Debei et al. (2013)
	Using a tablet device makes me look trendy, knowledgeable and wealthy	
	Using a tablet device also reflects my intelligence and level of knowledge among my friends	
Perceived behavioural control (PBC)	I can afford to pay for and use a tablet device	Taylor and Todd (1995); Ajzen (2002); Verkasalo et al. (2010);
	I can use a tablet device without help from friends, family or colleagues	
	I have the knowledge and skills to use a tablet device on my own	
Intention to use (INT)	I intend using a tablet device in the next few months	Ajzen (2002); Verkasalo et al. (2010); Hong et al. (2013)
	I think I will continue using a tablet device in the next few months	
	I will consider continuing to use a tablet device in the next few months	
Actual use (ACU)	Monthly	van Dijk and Hacker (2003); Friemal (2016)
	Several times in a week (more than 3 times in a week)	
	Weekly (less than 3 times in a week)	
	Daily (more than 2 hours)	
	Daily (less than 2 hours)	

Furthermore, based on the lessons learned in conducting the pilot study, the following adjustments were made before disseminating the questionnaire for the final study.

- In the demographic section, the age group of the participants, which was initially from 18+ years for the pilot study, was adjusted to fit only the population of those aged 50+ years.
- Considering the error of not including a measurement item for assessing actual use of tablets, a question using 5 measurement items with an 'other please specify option' was included in the questionnaire to address this aspect
- In the construct section of the questionnaire, a 'not applicable' option was included alongside the Likert-type scale in the pilot study, however, considering that this option is almost like having a missing value, it was removed.
- Additionally, the cover letter stating the category of participants being targeted was adjusted to fit the 50+ years age band.

Having made these above-mentioned changes, the following discusses the procedures carried out in this final phase.

5.2 Sampling technique and sample size

Similar to the pilot study, data was collected from Hertfordshire County, UK. However, in order to explore further on the discovery from the pilot study regarding older adults and the tablet device, the final study was limited to people aged 50 years and above. Furthermore, data was collected using quantitative method in the form of survey questionnaires.

Moreover, as mentioned earlier, the aim of this study is to obtain an insight into the adoption and use of tablets by those aged 50 years and over. As a result, the main focus was to collect a representative sample of these target population in order to understand this phenomenon. Considering this, non-probability sampling method in the form of purposive or judgement sampling technique was identified as suitable for drawing a representative sample. The reason for selecting the purposive sampling technique is because it is often useful when focusing on specific group, in this case, older adults aged 50 years and over in Hertfordshire

County (Onwuegbuzie and Collins, 2007). Furthermore, the purposive sampling technique is a rational strategy that has the potential of recruiting a large sample and gathering a cross-section of information (Marshall, 1996).

Moreover, to achieve this, the 2011 census data of UK's population was explored for details regarding the number of older adults dwelling in Hertfordshire by towns to ensure a representative sample of the target population was achieved (ONS, 2011). From the census data, towns with high number of older adults were identified and majority of the survey fliers were randomly distributed in houses in these towns. Subsequently, within the identified towns, streets with high population of the older adults were also identified.

Furthermore, considering that structural equation modelling would be utilised in analysing the data, it was necessary to determine an adequate sample size (Saunders et al., 2009). There are numerous recommendations regarding the acceptable sample size for a study. For instance, Hair et al. (2014) suggested using a ratio of at least 20 to 1 times the number of variables while, Kline (2014) recommended a sample size of at least 100. However, Comrey and Lee (2013); Cudeck and O'dell (1994) suggested that the larger the sample size, the better. Specifically, Comrey and Lee provided the following guidelines for determining sample size: 50=very poor, 100=poor, 200=fair, 300=good, 500=very good and 1,000=excellent. Therefore, following the guideline of Comrey and Lee (2013), the sample size targeted for this study was 1,000.

5.3 Data collection

Data was collected between the periods of 30th of March 2017 to 31st of July 2017. Considering that in this study, an online survey was developed using Survey monkey, however, the study was interested in both Internet users and non-users. Therefore, to increase the coverage and reduce bias, the participants were recruited using both online and paper medium (Saunders et al., 2009). For online, it was distributed via emails, Facebook, LinkedIn and twitter. Meanwhile, for paper, leaflets were created and distributed via letterboxes by a team of three people. The reason for using these leaflets was to ensure that the data collected would include both Internet users and non-users, thus, reducing bias in the study.

Moreover, for the Internet users, a link to the online survey was provided on each leaflet. Meanwhile, for the non-users of the Internet as well as for those who experienced problems with assessing the link, a telephone number was provided. Moreover, each leaflet contained brief information about the research, ethics protocol number and information regarding anonymity and confidentiality (Saunders et al., 2009). All these processes were carried out with the intention of improving the response rate of the survey. This final study resulted in 1,008 completed responses. Considering that this number is above the targeted sample size and is consistent with the recommendation of Comrey and Lee (2013), this sample size is adequate for this study. A sample of the survey questionnaire is provided in appendix 8. Furthermore, a sample of the leaflet used for the recruitment process can be viewed in appendix 6.

5.4 Response rate of the study

According to Saunders et al. (2009), in any study using surveys, the aim is to achieve a high response rate in order to increase the explanatory power of the study. It is an important factor for indicating the level of representativeness in a research work (Baruch and Holtom, 2008). Generally, a response rate of 50% is considered to be adequate, however, it can be affected by several factors including participants refusal to respond, eligibility criteria and the inability to locate respondents (Nulty, 2008; Saunders et al., 2009). Adapting from Saunders et al. (2009), the response rate can be calculated using the formula below:

$$\boldsymbol{Response\ rate}\ (\%) = (number\ of\ responses \div number\ of\ sample) \times 100$$

In the final study, a total of 6,792 questionnaires were distributed and 1,038 responses were received. However, only 1,008 of the responses were considered complete and valid thus, achieving a 14.8% response rate. Although this response rate is quite low, however, it is considered reasonable because only those aged 50 years and over were eligible for the study and the likelihood of identifying their specific location in each town in Hertfordshire is limited (Saunders et al., 2009).

5.5 Analysis of data

As mentioned earlier, the participants used for this study are those aged 50 years and over with mean age of between 60-69 years old. According to Kothari (2004), in surveys, bias can arise due to the sampling technique and or non-response. As a result, weight adjustment techniques or bootstrapping can be employed to reduce the sampling variance for estimates (Beaumont and Patak 2012). Despite the efforts made to maximise the response rate, a low response rate of 14.8% was achieved. Considering this, weight adjustment was used to correct non-response bias as well as the limitations that resulted from the eligibility criteria of the study (Beaumont and Patak 2012). It was also applied to the data in order to compensate for the unequal distribution of the sample population that was probably caused by the sampling technique used (Pfeffermann, 1993). Based on this, the variable gender was used to generate weights in this study and this was achieved using SPSS version 23.

5.6 Demographic profile

The demographic section was split into nine questions and the following provides the details of each question.

In terms of gender, result showed that the participants of this study consisted of 537 (53.3%) females and 471 (46.7%) males. However, applying weights using the gender variable, this resulted in a 50:50 representation of each gender class therefore, ensuring equal distribution of males and females. In addition, this weight adjustment was also applied to the rest of the data.

In terms of age, the participants were initially split into five age groups in the questionnaire namely: 50-59 years old, 60-69 years old, 70-79 years old, 80-89 years old and 90+ years old. However, considering the suggestion of Lee and Bowes (2016), these age groups were condensed into four groups later in the report (see section 5.5.3.2). Participants per age group include 50-59 years old (30.3%), 60-69 years old (40.5%), 70-79 years old (17.3%), 80-89 years old (9.2%) and 90+ years old (2.7%).

In terms of education, majority of the participants had an A level certificate with 40.1% of the sample population belonging to this group. Following this were the Bachelor's degree holders with 34.4% representing this group. While those who had a teaching qualification, represented 11.0% of the sample population. Overall, all participants had undergone basic education with mean score derived for this question equal to 3.16 (where 3 indicates teaching qualification/HND).

In terms of employment, majority (32.9%) of the participants indicated that they were in full employment while, 31.9% of the participants were pensioners (65+). Additionally, 21.5% of the participants were self-employed while 8.9% was employed part time. Moreover, 2.8% indicated that they were retirees (under 65), 0.9% were unemployed, 0.6% were redundant, 0.3% were part time students and 0.1% and 0.1% were students in full time employment and unemployed students respectively.

In terms of occupation, academics and those in service and sale had the highest percentage with 23.4% respectively. Following this were the legislators and managers with 16.0% representing this group. In addition, the third highest percentage were the doctors / lawyers / engineers with 13.6% representing this group.

In terms of health status, 50.7% indicated that their health status was excellent, 44.3% stated their health status as good. Meanwhile, 4.3% stated their health status as fair and 0.7% indicated that their health status was poor.

In terms of town in Hertfordshire County, there was at least one respondent in all the sampled towns. However, majority (16.3%) of the sample population lived in Cole green town and following this were those who lived in Potters Bar (12.9%). In addition, 9.0% of the participants indicated that they lived in St. Albans. In line with this result, ONS statistics confirmed that the population of these towns are ageing. For instance, statistics indicated that the population of older adults residing in Cole green is above national average and also above Hertfordshire's average (ONS, 2016). ONS statistics also showed that St Albans has a high concentration of older adults with 50,862 people representing the age band of 50+ years. Furthermore, it was also indicated in their statistics that the population of Potters bar is ageing with 36.5% of the population belonging to the age group of 50 years and over (ONS, 2016).

In terms of ethnicity, the highest representation was the white British with 39.1% while the least represented were those who indicated that they belonged to 'other mixed background (e.g. African/Asian)' (0.4%).

In terms of relationship status, over half (74.8%) of the respondents were married, 12.6% widowed, 2.8% were divorced and 2.8% also represented those separated. However, the least represented (0.1%) were those engaged to be married.

In addition to the 9 questions regarding the demographic profile of the participants, their Internet usage behaviour was also assessed. The following provides details of the result in terms of usage as well as frequency of use.

5.7 Internet adoption among participants

On assessing Internet usage, it was observed that 95.6% of the participants currently use the Internet while 4.4% do not use the Internet. Additionally, out of the number of the participants who currently use the Internet, majority (33.7%) indicated that they use it daily (less than 2 hours on average). Meanwhile, 32.7% indicated that they use the Internet weekly (less than 3 times a week) and 16% stated that they use it daily (more than 2 hours). Figure 31, provides a bar chart showing the Internet usage frequency.

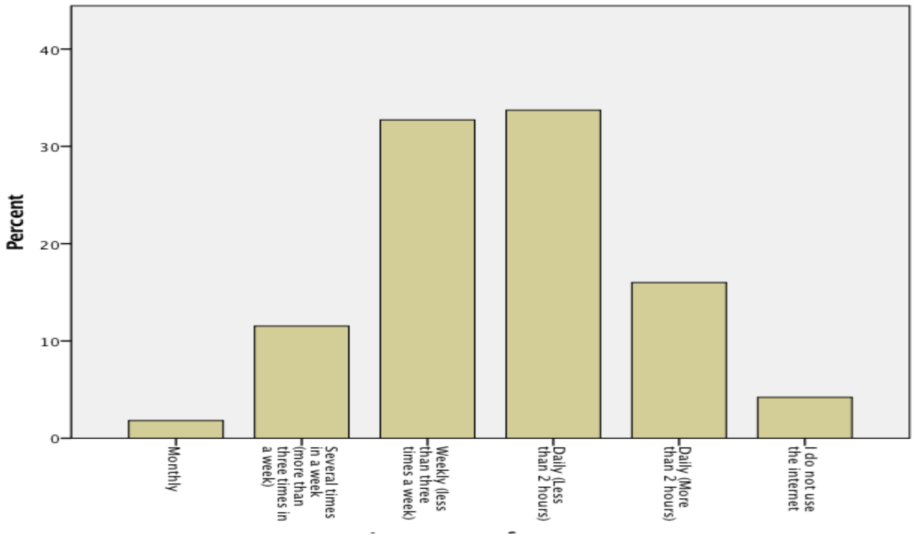

Figure 31: Internet use frequency

From figure 31, it can be observed that majority of the participants use the Internet for less than 2 hours daily.

Furthermore, to test for difference in adoption, a comparative analysis of the age groups with Internet adoption was conducted. Result showed that majority (42.1%) of those who indicated that they use the Internet belonged to the 60-69 years age group. Meanwhile, over half (52.3%) of those who indicated that they did not currently use the Internet and had no intention of doing so belonged to the 80-89 years age group. Table 25 gives further details of the comparative analysis between age and Internet adoption.

Table 25: Comparative analysis of age and Internet adoption

Classification		Internet adoption		Total (%)
		Adopters (%)	Non-adopters (%)	
Age	50-59 years	30.9	11.4	30.1
	60-69 years	42.1	11.4	40.7
	70-79 years	17.6	9.1	17.2
	80-89 years	7.3	52.3	9.3
	90+ years	2.1	15.9	2.7
Total		100	100	100

From table 25, it can be observed that the highest percentage of those currently adopting the Internet belongs to the 60-69 years age group. While, the highest percentage of those currently not adopting the Internet belongs to the 80-89 years age group.

Moreover, the study assessed how the Internet was being used among the participants. Results showed that 79.6% of the Internet users use it to search for information on search engines such as Google, Bing, Ask and Yahoo. Meanwhile, 76.1% use it for online banking activities such as viewing statements and transferring funds. Additionally, 67.4% use the Internet to book appointments. Figure 32 shows the bar chart of the reasons for Internet use.

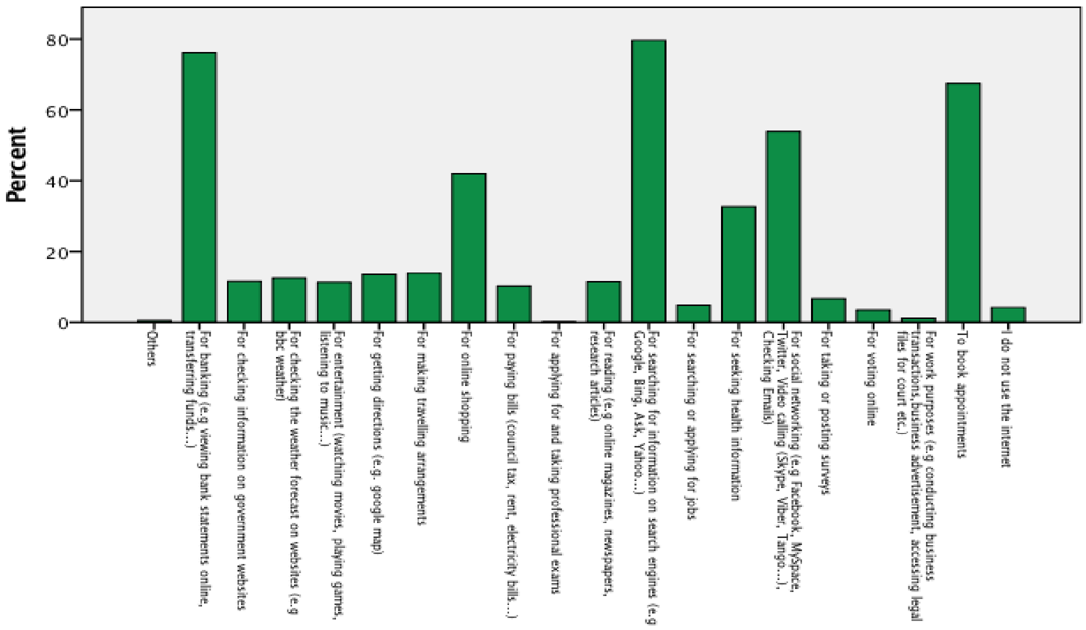

Figure 32: Reasons for using the Internet

Furthermore, due to the characteristics of the sampled participants, the ailments that might impact on usage were assessed. Ailments such as Alzheimer, dementia, Parkinson disease learning difficulties, arthritis etc. were suggested to impact on the participants' technology usage. Specifically, over half (77.5%) of the participants indicated that no ailment prevented their use of the Internet. However, out of those who indicated that certain ailments impact on their use of the Internet, 12.7% indicated high blood pressure (HBP) as one of such ailments. This result is similar to a study that indicated that one of the consequences of technostress is an increase in cortisol (stress hormone) level, which in turn leads to a raised blood pressure (Riedl et al., 2012). For clarification purposes, technostress is defined a user's perception of pressure or stress that results from using technology (Çoklar and Sahin, 2011). Technostress is also suggested to increase anxiety towards technologies (Çoklar and Sahin, 2011).

Furthermore, 4.3% stated that they suffer from vision impairment such as difficulty with seeing text or colours on screens and this impacted on usage. In addition, 3.4% indicated that mobility problems impacted on their use of the Internet.

Moreover, it was noted that out of the 4.4% of the non-adopters of Internet, majority (3.0%) indicated that certain ailments impact on their use of the Internet. For instance, 1% of the 3.0% stated that vision impairment prevents usage while 0.9% stated that they suffer from learning difficulties such as the inability to see words correctly.

5.8 Variation in the adoption of tablets

In order to determine whether there was an existing difference in terms of adoption, a comparative analysis was conducted using cross-tabulation technique on SPSS version 23. This involved comparing tablet adoption with some of the demographic factors including age, gender, education, employment status, health status and marital status. The variables selected were based on the suggestion of previous studies that these factors are often significant in determining adoption patterns (Choudrie et al., 2010; Hanson, 2009, Selwyn, 2003). In addition, to assess tablet adoption, three measurement items were used namely: ‘yes’, ‘no, I do not use a tablet and do not intend to do so’ and ‘no, I do not currently use a tablet but I intend to do so’. This distinction helped in identifying tablet adopters, non-adopters and those planning to adopt. Result showed that 753 (74.7%) of the sample used a tablet device, 223 (22.1%) did not use a tablet device and had no intention of doing so while, 32 (3.2%) did not currently own a tablet but intended to purchase one in the near future. Furthermore, a test for comparing the relationship between selected demographic variables and tablet adoption was conducted. To achieve this, the statistical test employed is the Pearson Chi-square test for independence. This statistical test is a robust test popularly used to examine categorical or cross-tabulated variables (Sharpe, 2015). In addition, chi-square test is a non-parametric test, which does not assume equal frequency or variance (Sharpe, 2015). Based on this, the Pearson Chi-square test was identified as a suitable method for testing the relationship between the demographic variables and tablet adoption. The following gives details of the comparative analysis.

5.8.1 Gender and tablet adoption

As previously mentioned, the participants of this study consisted of 537 (53.3%) females and 471 (46.7%) males. On assessing whether there was a difference in tablet adoption in terms of gender, result showed that within the tablet adopters, 51.3% were men while 48.7% were females. For non-adopters, the female participants dominated this group with 53.4% while, 46.6% were male. In addition, the female respondents with 56.3% dominated the group of those planning to purchase a tablet while 43.8% were males. However, in assessing the relationship between gender and tablet adoption, the Chi-square test result indicated insignificance with $\chi^2 =$ 1.988, 2 degrees of freedom and p=0.370. This implies that the adoption of tablet is not dependent on gender. Table 26 provides an overview of the cross-tabulation of gender with tablet adoption.

Table 26: Cross-tabulation of gender with tablet adoption

Classification			**Tablet adoption**			**Total**
			Adopters	**Non-adopters**	**Planning to adopt**	
Gender	**Female**	Count	367	119	18	504
		% within tablet adoption	48.7%	53.4%	56.3%	50.0%
	Male	Count	386	104	14	504
		% within tablet adoption	51.3%	46.6%	43.8%	50.0%
Total		Count	753	223	32	1008
		% within tablet adoption	100.0%	100.0%	100.0%	100.0%

5.8.2 Age and adoption of tablets

In assessing adoption pattern among older adults, Lee and Bowes (2016); Hanson (2009) split the older population into categories. The aim was to carry out a comparative analysis in order to assess if there was a variation in adoption pattern among each group. In acknowledgement, this study adopted this categorisation method to examine whether there is a difference in the adoption of tablets by age groups. To achieve this, the participants were split into four age groups namely: 50-59 (pre-seniors), 60-69 years old (young old), 70-79 years old (old-old) and 80+ years (very old). Furthermore, Pearson's Chi-square test for independence was used to test whether there was a relationship between adoption/non-adoption of tablet device and the age group of the respondents.

From the result of this test, it was observed that $\chi^2 =$ 226.232 with 8 degrees of freedom indicated significance with p=0.000. This implies that the adoption or non-adoption of tablet device is dependent on the age group of the individual. For instance, the highest percentage of adopters of tablets is the 60-69 years age group while, the highest percentage of non-adopters of tablets is the 80+ years age group.

Furthermore, the age groups were cross-tabulated with tablet adoption question, which was measured with three items namely: adopters, non-adopters and those planning to adopt. Result showed that the highest adopters of tablets were those aged 60-69 years old with 45.9% while the least adopters of tablets were the 80+ years old with 4.7%. In the group of non-adopters, the 80+ years old dominated this group with 37.5% while the least non-adopters were the 50-59 years old with 14.3%. Furthermore, half (50%) of those indicating that they have the intention of purchasing tablets belonged to the 60-69 years age group while; the least percentage (6.3%) in this category was from the 80+ years age group. Table 27 provided more details regarding the comparative analysing of age with tablet adoption.

Table 27: Comparative analysis of age with tablet adoption

Classification			Tablet adoption			Total
			Adopters	**Non-adopters**	**Planning to adopt**	
Age	**50-59 years**	Count	263	32	10	305
		% within tablet adoption	34.9%	14.3%	31.3%	30.2%
	60-69 years	Count	346	47	16	409
		% within tablet adoption	45.9%	21.0%	50.0%	40.5%
	70-79 years	Count	109	61	4	174
		% within tablet adoption	14.5%	27.2%	12.5%	17.2%
	80+ years	Count	35	84	2	121
		% within tablet adoption	4.7%	37.5%	6.3%	12.0%
Total		Count	753	223	32	1008
		% within tablet adoption	100.0%	100.0%	100.0%	100.0%

5.8.3 Comparing education with tablet adoption

Pearson's Chi-square test for independence was also employed to investigate whether adoption or non-adoption was dependent on education. From this test, it was observed that $\chi^2 =$ 136.033 with 26 degrees of freedom indicated significance with *p*=0.000. This implies that adoption or non-adoption is dependent on the education level of the older adult. In addition, in terms of the cross-tabulation between education and tablet adoption, findings revealed that among tablet adopters, those who had 'A levels' dominated the group with 41% and following this were those who had a Bachelor's degree (38.9%). Among the non-adopters, those with 'A' levels also had the highest percentage (41.5%). Meanwhile, 34.4% of the participants intending to purchase tablets belonged to the group of Bachelor's degree holders. Further details of the result in terms of education and tablet adoption are presented in table 28 .

Table 28: Comparative analysis between education and tablet adoption

Classification		Tablet Adoption			
		Adopters (%)	Non-adopters (%)	Planning to adopt (%)	Total (%)
Level of education	Postgraduate degree (PhD., MA, MD, MSc, MBA...)	6.5%	4.4%	21.9%	6.6%
	Bachelor degree (BA, BSc, BEng...)	38.9%	19.2%	34.2%	34.4%
	HND, HNC, Teaching	9.7%	13.9%	21.5%	11.0%
	A Levels	41.0%	41.7%	6.3%	40.1%
	BTEC / College Diploma	1.8%	13.7%	6.7%	4.6%
	GCSE / O Level	1.1%	6.1%	9.3%	2.4%
	Others	0.7%	0.9%	0%	0.9

5.8.4 Health status and tablet adoption

The demographic variable 'health status' was also compared with tablet adoption. Given that previous research on older adults have identified that certain health decline impact on ICT adoption and use, it was relevant to analyse this aspect in this study (Heart and Kalderon, 2013). Thus, from the result, it was noted that majority (60.3%) of the tablet adopters indicated they were in excellent health.

Moreover, Chi-square test was also conducted to test for relationship between the health status of the participants and tablet adoption. The result from this test showed significance with $\chi^2 = 157.658$, 6 degrees of freedom and p=0.000. This implies that the adoption or non-adoption of the tablet device is also dependent on the health status of the older adult. Further details of the result in terms of health status and tablet adoption are presented in figure 33.

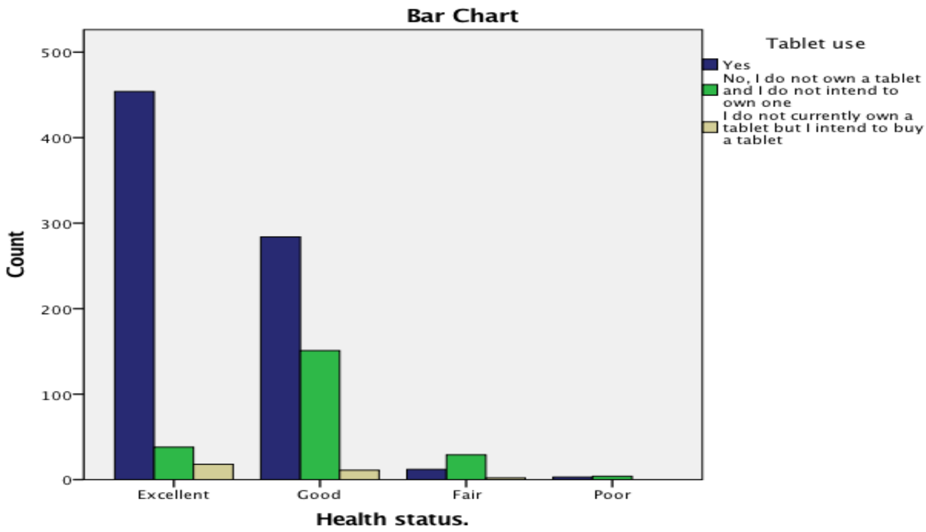

Figure 33: Comparative analysis of health status and tablet adoption

In addition, a cross-tabulation of the ailments with tablet adoption was carried out in order to examine the impact of health issues on tablet adoption. From the result, ailments identified to be impacting on adoption and use includes, high blood pressure, vision impairment, mobility issues, learning difficulties, and arthritis of the hand and anxiety disorder. Notably, result showed that majority of the tablet adopters (89.8%) indicated that they suffered from no ailments. Similarly, majority of those planning to adopt the tablet device (67.9%) also indicated that they suffered from no ailments. On the other hand, majority of the non-adopters (67.7%) indicated that they suffered from high blood pressure (HBP). This result suggests that there might be a relationship between the ailments and tablet adoption. To explore further, a comparative analysis between the ailments and tablet adoption was considered. However, given that the question on ailments was a multiple response question, a multiple comparison and post hoc test was required to examine the difference in the group means simultaneously (Ruxton and Beauchamp, 2008). Considering this, a one-way between the subjects' ANOVA was conducted to assess the significance of the effect of the ailments on tablet adoption, which was split into the categories of adopters, non-adopters and those planning to adopt. One-way ANOVA is a test often utilised for assessing the statistical significance when comparing more than two groups (Ross and Willson, 2017). It is also a robust technique for dealing with a large sample size and does not require the assumption of normal distribution (Ross and Willson, 2017). Considering that the ailment question contained more than three variables, this procedure was therefore, suitable for carrying out the comparative analysis (Ross and Willson, 2017). In terms of post hoc testing, the Games Howell procedure was selected for this purpose. This is because this procedure can deal with an unequal group size, does not assume homogeneity and is mostly suitable for dealing with a large sample size (Ruxton and Beauchamp, 2008; Shingala and Rajyaguru, 2015). Considering that all the groups had unequal size and some indicated heterogeneity, thus, Games Howell post hoc test was identified as suitable (Shingala and Rajyaguru, 2015). From the result, there were some significant mean differences between the mean of the three groups of the tablet adoption variable with respect to the individual ailments. For instance, there was a significant effect of high blood pressure on tablet adoption at the $p<0.05$ level for the three conditions of tablet adoption [F (2,1004) = 105.439, p=0.000]. To determine which particular groups differed from each other, post hoc testing was utilised for this aspect. Thus, with respect to HBP, the post hoc test using the Game Howell procedure indicated that the mean score for the tablet adopters (M = 0.054, SD = 0.226) differed significantly from the mean score of the non-adopters (M = 0.383, SD = 0.487) and the mean score of those planning to adopt (M = 0.000, SD = 0.000). Overall, these results suggest that high blood pressure has an impact on tablet adoption and use. Therefore, this shows that certain ailments can affect the adoption and use of technology.

5.8.5 Marital status and tablet adoption

In terms of marital status and the adoption of tablets, result showed that 86.7% of the tablet adopters are married, 43.7% of the non-adopters are widowed and 56.3% of those planning to adopt a tablet device are married. Moreover, Chi-square test for independence was also used to compare marital status with tablet adoption. Finding indicated that tablet adoption was dependent on marital status with $\chi^2 =$ 361.559, 16 degrees of freedom and p=0.000. Further details of the comparative analysis are presented in table 29.

Table 29: Comparative analysis of marital status and tablet adoption

Classification		Tablet adoption			Total
		Adopters	Non-adopters	Planning to adopt	
Marital status	Married	86.7%	36.9%	56.3%	74.8%
	Widowed	4.0%	43.7%	0.0%	12.6%
	Divorced	1.9%	4.5%	15.6%	2.9%
	Separated	2.1%	4.1%	9.4%	2.8%
	In a domestic or civil partnership	1.5%	2.7%	18.8%	2.3%
	Single, but cohabiting with a significant other	0.8%	3.6%	0.0%	1.4%
	Single, never married	2.8%	4.5%	0.0%	3.1%
	Others	0.1%	0%	0%	0.1%

Having discussed the comparative analysis conducted in terms of tablet adoption and some demographic variables, the following provides more details on the tablets adopters, non-adopters and those planning to adopt respectively.

5.8.6 Tablet adopters

As previously mentioned in section 5.8, a segment in the questionnaire was mapped out to specifically assess the participants that indicated that they own a tablet device. The aim of this section was to identify the brands of tablets commonly adopted, the frequency of using the tablets and what activities are carried out on these tablets. In addition, the duration of the participants' ownership of their tablet device was also assessed as well as the reason behind their decision to own a tablet. Overall, the aim of this section in the questionnaire was to examine the actual use aspect of the study. The following provides further details regarding the results gathered from this section.

In terms of the brands of tablets, it was found that the most commonly used brand is the Apple iPad with 52.6% of the tablet adopters indicating they owned an iPad. This was followed by 24% of the tablet adopters indicating they owned the Samsung Galaxy Tablet while, 11.4% indicated they owned the Google Nexus Tablet. Figure 34 shows the overall result of the brands of tablets used by the participants.

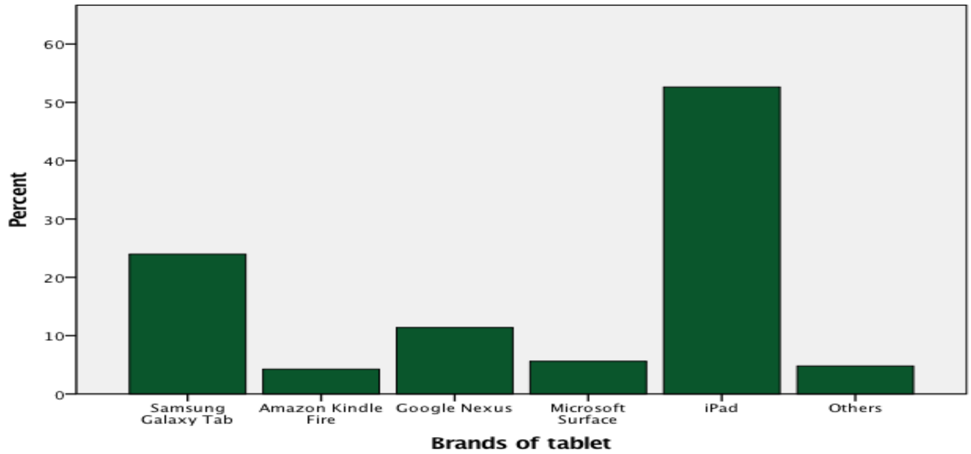

Figure 34: Brands of tablet used by the participants

Furthermore, the participants were asked to identify the activities commonly performed via their tablet devices. It was noted that 91.5% of the tablet adopters use their device for browsing activities such as checking emails and social networking. While, 83.9% of the tablet adopters used it for shopping online and 47.9% used their tablets for reading online. Furthermore, a comparative analysis between the age groups and the activities carried out on the tablet was conducted. The aim was to identify whether there was a difference in the type of activities conducted by age group. Based on this, it was observed that while the 50-59 years age group (92.8%) used their tablets for browsing activities more than the other age groups, the 90+ years age group (66.7%) used their tablet device for health and wellbeing more than the other age groups. Figure 35 presents graphical representation of the activities performed with the tablet device.

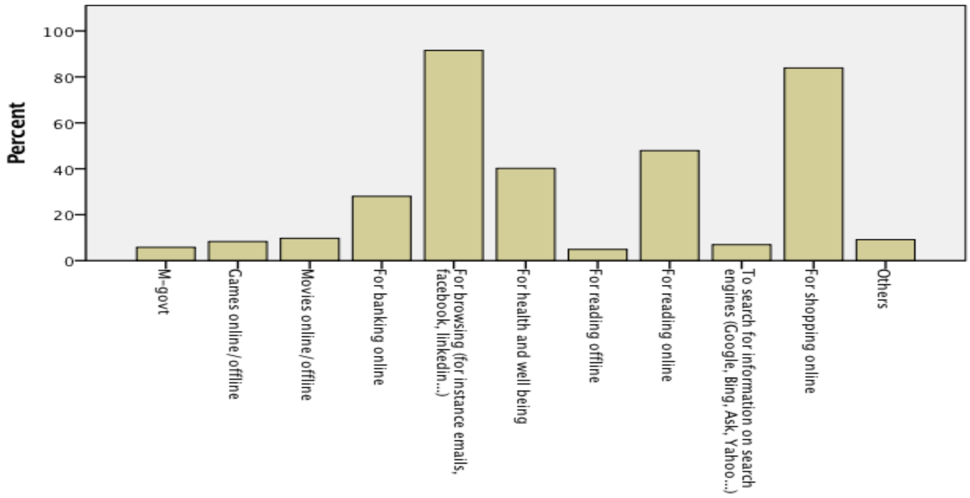

Figure 35: Activities performed with the tablet device

In addition, to identify the factors that promote the adoption of the tablet devices, participants were asked to state what influenced their decision to adopt tablet device. From the result, it was observed that 45.7% of the tablet adopters indicated that their Internet service provider influenced the decision to purchase their device. 19.5% indicated that their decision to purchase was influenced by adverts they saw on newspaper while, 15.1% of the tablet adopters purchased their device based on the recommendation of family and friends. Further details on the factors that influenced the purchasing decision of the participants are presented in figure 36.

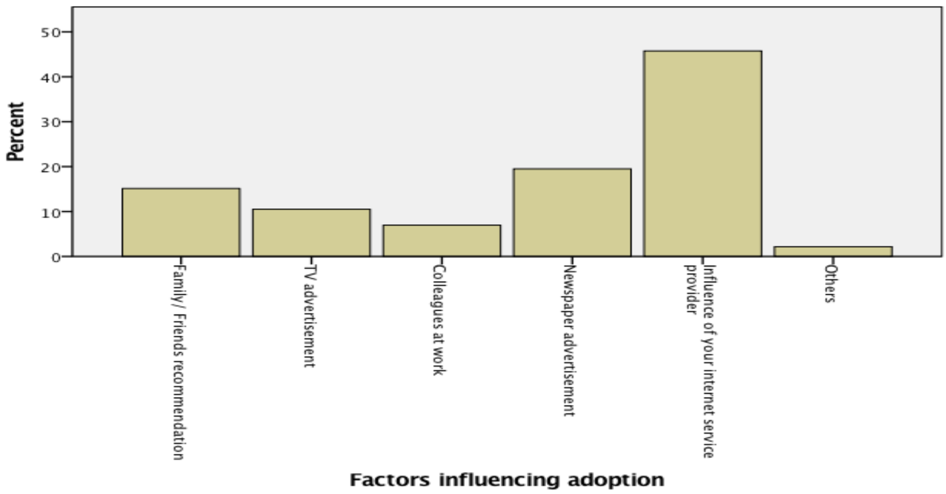

Figure 36: Factors that influence purchasing/adoption decision

5.8.7 Testing for actual use

As suggested by van Dijk and Hacker (2003); Friemal (2016), actual use of tablet was measured based on the frequency of use. From the result it was noted that majority (29.5%) of the tablet adopters used their device weekly (less than 3 times a week) while 23.4% used their device daily (less than 2 hours). On the other hand, 20.9% stated that they use their device several times in a week (more than 3 times a week). Figure 37 shows further details of the actual use of tablets by the participants.

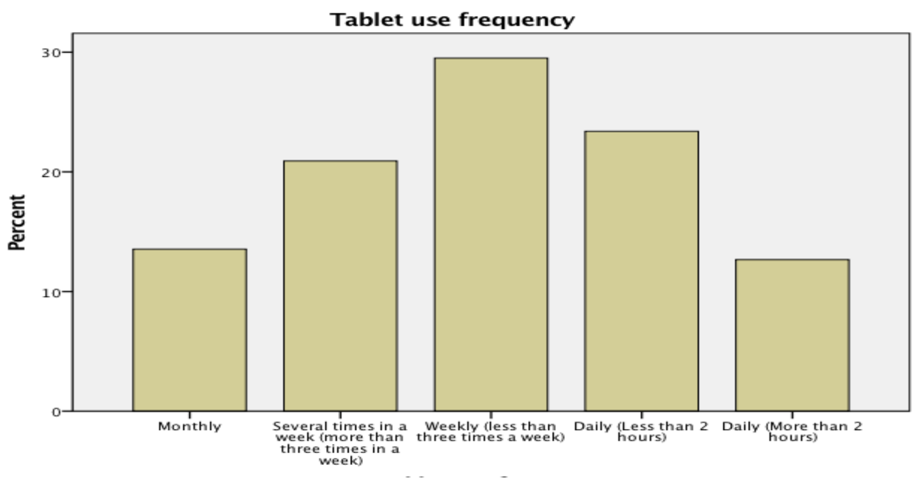

Figure 37: Actual use of tablet based on frequency of use

Moreover, Pearson Chi-square test was used to measure the relationship between the frequency of use and the age groups. The relationship between these variables showed no significance with χ^2 = 18.855, 16 degrees of freedom and *p*=0.276. This implies that there is no relationship between age group and frequency of use. For instance, the monthly users showed consistency by age group meanwhile, the category 'daily (less than 2 hours)' did not show consistency by age group. Table 30 provides further details of the cross tabulation of age group and tablet use frequency.

Table 30: Age group by frequency of use

Classification		**Age of respondents**				**Total**
		50-59 years	60-69 years	70-79 years	80+ years	
Actual use frequency	Monthly	12.9%	13.5%	14.9%	15.2%	13.5%
	More than 3 times a week	24.5%	19.5%	20.8%	5.2%	20.9%
	Less than 3 times a week	28.5%	30.0%	32.7%	40.2%	29.5%
	Less than 2 hours daily	21.3%	24.3%	19.8%	30.7%	23.4%
	More than 2 hours daily	12.9%	12.6%	11.9%	8.6%	12.7%
Total		100%	100%	100%	100%	100%

Furthermore, in terms of duration of ownership, majority of the tablet adopters (61.5%) had owned their tablet device for more than six years. While, 26.6%, 9.8% and 2.1% had owned their tablet device for between 3-6 years, 1-3 years and less than a year respectively. The duration of ownership was further compared with the age groups and result showed that 49.2% of those who had owned their tablet for more than six years belonged to the 60-69% age group. In addition, the Pearson Chi-square test [$\chi^2(12)$ = 40.285, *p*=0.000] showed significance at *p*<0.05. This means that the duration of tablet use is dependent on the age group of the respondents. Figure 38 shows a graphical representation of the duration of tablet use in comparison to the age group of the participants.

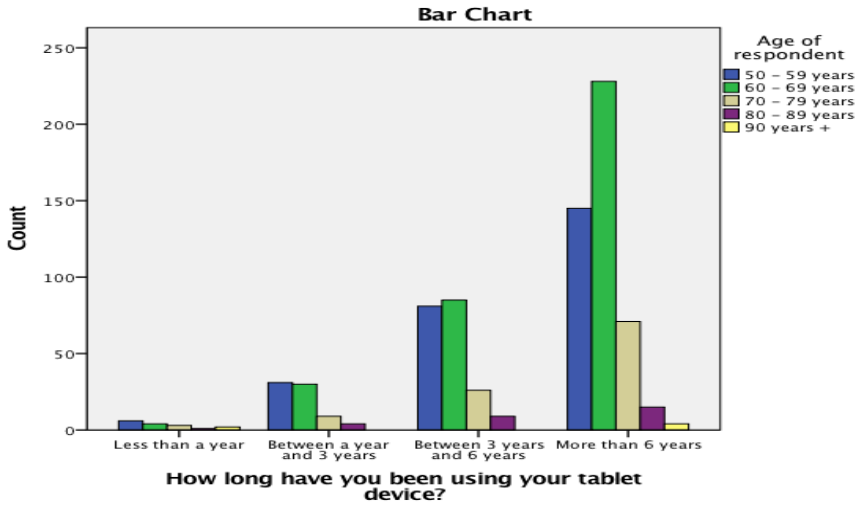

Figure 38: Duration of use by age group of the participants

Having provided details of the results gathered with regards to the tablet adopters, the next section provides the result gathered from the non-adopters.

5.8.8 Non-adopters of tablet device

As mention earlier in section 5.8, a segment assessing non-adopters of tablets was also created in the questionnaire to examine reasons behind non-adoption. It was also intended to identify factors that might possibly encourage the adoption of tablet devices. The following therefore provides the results gathered from this section.

In analysing the reasons given for non-adoption, result showed that majority of the non-adopters (42.5%) stated that there was no particular reason for non-adoption of tablets and that they simply did not see the need to own one. Following this, 36.1% indicated that they did not use tablets because owning one did not fit with their daily needs while, 8.7% indicated that the reason for not using the tablet device is because competing products such as laptops and desktops are better than the tablet. Other reasons given are provided in figure 39.

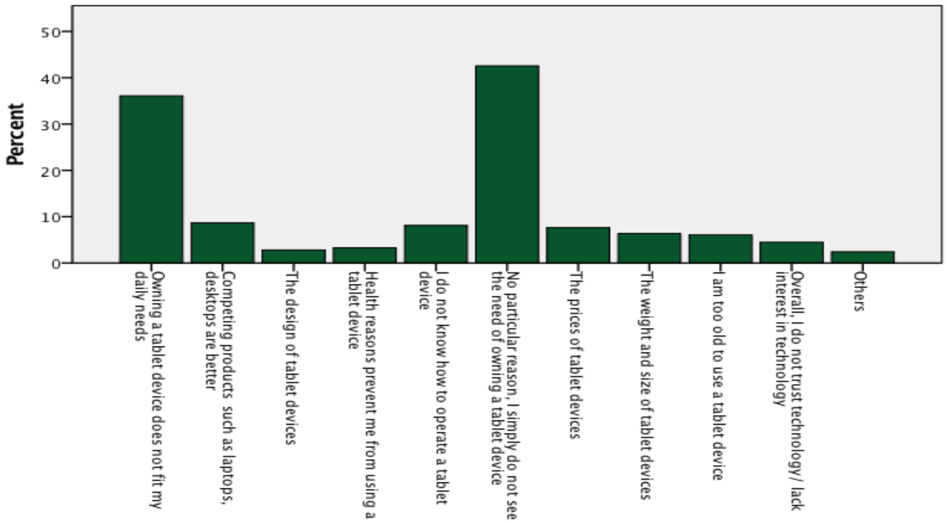

Figure 39: Reasons for the non-adoption of tablets

Furthermore, to test whether there was a relationship between the reasons for non-adoption and the age of individuals, these reasons were compared to the age groups using one-way ANOVA. This method was chosen because this comparison is dealing with more than two groups. From the result, there were some significant mean differences between the mean of the age groups variable with respect to the reasons for non-adoption. For instance, there was a significant effect of ‘lack of interest or no reason’ on non-adoption at the $p<0.05$ level for the five age groups [F (4,1002) = 20.781, p=0.000]. However, to determine the specific age groups that differed, a post hoc test was conducted. The post hoc test selected for the multiple comparisons is the Games Howell procedure. This test is designed to conduct a pairwise comparison for each of the age groups against all the reasons given for non-adoption. The result derived from the post hoc test indicated that in relation to ‘lack of interest or no reason’, the mean score for the 50-59 years age group (M = 0.046, SD = 0.210) significantly differed from the age groups of 70-79 years (M = 0.144, SD = 0.352), 80-89 years (M = 0.254, SD = 0.439) and 90+ years (M = 0.376, SD = 0.494). However, in terms of ‘lack of interest or no reason’, there was no significant difference between the 50-59 years age group (M = 0.046, SD = 0.210) and the 60-69 years age group (M = 0.051, SD = 0.220). For illustration purposes, result showed that the 70-79 years age group represented about

26.6% of those who indicated the ‘lack of interest or no reason’ option as their reason for non-adoption. Meanwhile, in comparison, 14.9% within the same category represented the 50-59 years age group. Thus, it can be observed that there was 11.7% difference between the two groups.

Moreover, it was also observed that the option ‘too old for technology’ given as a reason for non-adoption was significantly different at the $p<0.05$ level for the five age groups [F (4,1002) = 23.129, p=0.000]. However, to determine which of the age groups differed from each other, post hoc testing using Games Howell was also conducted. The result of this test revealed that in terms of the option ‘too old for technology’, the mean score of the 80-89 years significantly differed from the mean scores of the age groups of 50-59 years, 60-69 years and 70-79 years with p-values of 0.015, 0.019 and 0.015 respectively. However, there was no significant difference between the 80-89 years and the 90+ years with p-value of 1.0. For illustration purposes, it was observed that the 80-89 years age group represented about 69.2% of those who indicated ‘too old for technology’ as their reason for non-adoption. Meanwhile, in comparison, 7.7% within the same category represented the 60-69 years age group. Therefore, it can be observed that there is a significant difference of 61.5% between both groups. Furthermore, it was also observed that 0% of the 50-59 years age group indicated that their reason for non-use is because they are too old to use the tablet. The deduction from this finding is that as an individual gets older, they begin to consider themselves too old for technology especially advanced technologies such as the tablet device. It also implies that those aged 50-59 years old do not consider themselves too old for technology, which means that other factors influence non-adoption within this group.

Overall, these findings suggest that the reasons for non-adoption of tablets depend on the age group of the individual.

Moreover, the non-adopters were asked to indicate factors that might encourage their adoption of the tablet device. The reason for this element in the questionnaire is to identify those factors that might help to improve the adoption of tablet devices amongst the population, and subsequently improve ICT diffusion in the society. The result showed that

91.3% of the non-adopters indicated that nothing will make them use a tablet device in the future or they were unable to use any device. 4.5% indicated that the reduction in the price of the tablet device might encourage their adoption of the device while, 3.2% indicated that if training on how to use the tablet device is provided, then they might be inclined to adopt it. In addition, 1.8% indicated that if the necessity of owning one arises or they perceived that it is compatible with their lifestyle then the device would be adopted. On the other hand, 1.7% indicated that a reduction in the cost of Internet subscription used on tablet device will encourage the adoption of the device while, 1.4% stated that if the tablet device has more similarities such as the ability to run windows like the laptop or desktop, this will incline them to adopt the device.

5.8.9 Planning to adopt a tablet device

This section assessed those participants that indicated that they do not currently use the tablet device, however, they intended to use it in the future. To assess this, participants were asked whether they were likely to adopt a tablet device in the next six months. Following this, the participants were also required to indicate the brand of tablet they intend to purchase as well as the reasons behind the intended decision to adopt the tablet device. Based on this, the following result was gathered. Generally, for those planning to adopt or purchase tablets, the mean value derived is 1.37. This implies that about an average of those who stated that they do not currently use a tablet but intend to do so were likely to purchase a tablet in the next six months. Specifically, result showed that 62.9% of those planning to adopt tablet device intended to do so within the next six months. While, 37.1% stated that they intend to purchase a tablet however, their purchasing of the device might be later than six months. In addition, the intention to adopt was measured against the age group of the respondents. The result of this comparison is presented in table 31.

Table 31: Age group by likelihood of adopting a tablet device

Classification		Likelihood of adopting a tablet device within the next 6 months		Total
		Yes	No, but maybe later	
Age of respondent	50 - 59 years	30.0%	33.3%	31.3%
	60 - 69 years	50.0%	50.0%	50.0%
	70 - 79 years	10.0%	16.7%	12.5%
	80+ years	10.0%	0%	6.3%
Total		100.0%	100.0%	100.0%

It can be observed from table 31 above that majority of those who intend to adopt a tablet device within the next six months belong to the 60-69 years age group. In addition, it was noted that within the 80+ years age group, all the respondents who stated that they intend to adopt tablet device, indicated that they plan to do so within the next six months. This indicates the willingness of the very-old group towards adopting and using ICT especially the tablet device.

Furthermore, in this category, the participants were required to state the brand of tablet, which they intended to adopt. From the result, it was observed that majority (76.2%) of those planning to adopt the tablet device indicated the Samsung Galaxy tab as the brand that they intend to adopt. Meanwhile, 39.9% of those planning to adopt the tablet selected the Apple iPad as the brand that they intend to adopt. Figure 40 provide more brands selected by the participants in this category.

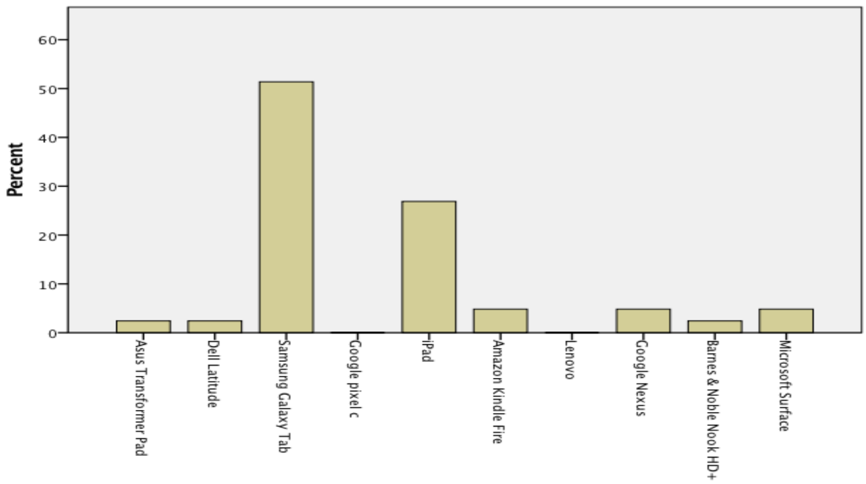

Figure 40: Brands of tablets that participants intend to adopt

Having provided the details of the analysis of the data gathered from the first four sections of the questionnaire, the following provides details of the fifth and final section of the questionnaire, which was analysed using the SEM analysis technique.

5.10 Structural equation modelling

As mentioned earlier structural equation modelling (SEM) was used to analyse the hypothesised constructs. One of the aims of using the SEM analysis technique is to obtain the reliability and validity result of the constructs. Additionally, it will assist in testing all the hypotheses of the study as well as compare the age groups through path analysis and multi-group analysis. Considering this, the following results were obtained from the SEM procedure.

5.10.1 Instruments reliability and validity

In structural equation modelling using SMARTPLS, there are four estimators used for assessing the reliability and validity of measurement items (Ringle et al., 2015). These estimators include Cronbach alpha (CA), Dijkstra-Henseler's rho_A (ρ_A), composite reliability (CR) and average variance extracted (AVE). Further details of these estimators are discussed below.

Cronbach alpha (CA): Cronbach alpha also known as coefficient alpha is the most widely utilised estimator for internal consistency reliability (Hulland, 1999). However, it is referred to as an inconsistent estimator and it tends to assume that all the items measuring a construct are equally reliable (Hair, et al., 2014). Thus, it underestimates the true reliability of scores and is referred to as a lower boundary of reliability (Henseler et al., 2016). Furthermore, when using coefficient alpha, the accepted value for indicating sufficient reliability of the measurement items is 0.7 or higher (Litwin, 1995; Hair et al., 2014).

Composite reliability (CR): Composite reliability is suggested to offer a more suitable measure of internal consistency reliability than Cronbach alpha (Hair et al., 2014). This is because unlike Cronbach alpha, it does not assume that all the items of a construct are equally reliable (Hair et al., 2011). However, similar to CA, composite reliability is also referred to as an inconsistent reliability estimator because it tends overestimate the true reliability of scores (Miltgen et al., 2016). Furthermore, the recommended threshold value for composite reliability coefficient is 0.7 or greater (Hulland, 1999).

Dijkstra-Henseler's rho_A (ρ_A): The reliability estimator ρ_A is suggested as the only consistent reliability estimator for construct scores (Miltgen et al., 2016). While CA and CR often refer to sum scores, the ρ_A reliability estimator measures the true reliability of the construct scores (Henseler et al., 2016). Furthermore, similar to CA and CR, to indicate sufficient reliability using $\rho_{A,}$ it is recommended that the value of ρ_A for each of the measurement item should be 0.7 or higher (Henseler et al., 2016).

Average variance extracted (AVE): Average variance extracted assesses the level of measurement errors associated with the measurement items of constructs. In addition, it is one of the criteria for measuring convergent and discriminant validity (Hair et al., 2014). It is also a way of assessing the percentage of variance that is explained by the measurement items of a construct (Miltgen et al., 2016). Furthermore, Henseler et al. (2016) suggested that the acceptable value for AVE coefficient should be 0.5 or greater. Moreover, values greater than 0.5 indicates that majority of the variance are accounted for by the construct.

Considering the above discussion, Cronbach's alpha, rho_A, composite reliability and average variance extracted (AVE) were used to provide evidence of reliability and validity. Majority of the values derived for each the constructs using these above-mentioned estimators all met the recommended thresholds except the values obtained for the actual use construct (Hair et al., 1998; Hulland, 1999). Specifically, it can be observed that apart from actual use (ACU), all the other constructs had values ranging from 0.712 to 0.962, which exceeds the recommended cut-off of the reliability and validity estimators (Hair et al., 2014). Thus, this result indicates that majority of the constructs used for this final study are reliable and valid in testing tablet adoption. Table 32 presents the result of the reliability and validity test.

Table 32: Construct reliability and validity result

Constructs	**CA**	ρ_A	**CR**	**AVE**
ACU	-69.555	0.335	0.017	0.256
ATT	0.937	0.940	0.960	0.888
COMP	0.712	0.714	0.874	0.776
INT	0.919	0.919	0.949	0.862
PBC	0.932	0.934	0.957	0.880
PEOU	0.842	0.845	0.905	0.760
PU	0.906	0.906	0.941	0.842
SN	0.940	0.941	0.962	0.894
TRU	0.913	0.939	0.939	0.795

5.10.2 Factor analysis

Factor analysis is a multivariate technique used for examining complex and multidimensional relationships or correlation among the measurement items in a study (Hair et al., 2014). This analytic technique is also used to either summarise or reduce many variables into a set of factors or components (Hair et al., 2014). Furthermore, factor analysis also provides evidence of construct validation (Litwin, 1995). Henson and Roberts (2006) also suggested that factor analysis is a technique employed to study the structure of a set of constructs or tests. Moreover, the output of a factor analysis is commonly in the form of a table with cross-loadings or factor loadings (Straub et al., 2004). According to Leech et al. (2013), cross-loadings or factor loadings is a form of correlation matrix that indicates the intercorrelations among constructs and their measurement items. It is also used to provide evidence of convergent and discriminant validity (Litwin, 1995).

However, before performing factor analysis in a study, it is essentially to examine its appropriateness for the study (Henson and Roberts, 2006). In other words, the sampling data should be proven conceptually adequate before factor analysis is utilised (Hair et al., 2014; Straub et al., 2004). The following provides details on the processes conducted in evaluating the appropriateness of using factor analysis in this study.

5.10.3 Evaluating the appropriateness of factor analysis

As earlier stated, it is necessary to determine whether the sampling data is good for factoring (Henson and Roberts, 2006). This is because conducting this procedure prior to the extraction of factors validates the significance of the correlation matrix (Leech et al., 2013). There are two most common statistical tests recommended for evaluating the factorability of sampling data (Hair et al., 2014; Henseler et al., 2016). These tests include the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and the Bartlett's test of sphericity (Hair et al., 2014). The following provides details on each of these tests.

5.10.4 Measure of sampling adequacy

The Kaiser-Meyer-Olkin measure of sampling adequacy is an assessment of the degree of common variance in the items (Henson and Roberts, 2006). The values of the KMO measure of sampling adequacy ranges from 0 to 1. As a rule of thumb, when conducting the KMO statistical test, values derived for both the overall test and the individual measurement items should exceed 0.5 (Hair et al., 2014). SPSS version 23 was used to calculate the measure of sampling adequacy as well as the Bartlett's test. From table 33, it can be observed that the KMO sampling adequacy test resulted to a value of 0.967, which supports the factorability of the data set.

5.10.5 Bartlett's test of sphericity

This statistical test assesses whether sufficient correlation exists among variables for the purpose of factorability (Henson and Roberts, 2006). It is used to measure if the observed correlation matrix is different from the identity matrix (Leech et al., 2013). As a rule of thumb, achieving a *p*-value that is less than 0.05 indicates significance, which will then imply that the correlation matrix is different from the identity matrix and thus, factor analysis is suitable for the sampling data (Hair et al., 2014). From table 33, it can be observed that *p*-value is less than 0.05, which also suggest the suitability of conducting factor analysis.

Table 33: The KMO and Bartlett's test result

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.967
Bartlett's Test of Sphericity	Approx. Chi-Square	27310.830
	df	276
	Sig.	.000

5.10.6 Factor analysis and construct validity test

The results of the above KMO and Bartlett's tests confirmed the factorability of the data set. As a result, factor analysis was conducted with the aim of testing the validity of the constructs used in this study.

To establish construct validity, the constructs must indicate both convergent and discriminant validity (Chen and Hung, 2010; Henseler et al., 2016). Considering this, the demonstration of construct validity in this study was in terms of convergent validity and discriminant validity. To assess this, cross-loadings of items were derived using SMARTPLS 3.0 (Ringle et al., 2015). Table 34 presents the details of the cross-loading result with the shaded region indicating the cross-loading values of the measurement items and its corresponding construct. Further details of the validation procedures using this cross-loading result are also presented.

Table 34: The cross-loading result

Measurement items	ACU	ATT	COMP	INT	PBC	PEOU	PU	SN	TRU
Acu1	0.337	0.008	-0.017	0.013	-0.017	-0.047	0.007	-0.019	0.011
Acu2	-0.193	-0.013	0.049	-0.009	0.004	-0.025	-0.014	-0.018	-0.025
Acu3	-0.801	-0.023	-0.003	-0.029	0.016	0.054	-0.016	0.029	0.028
Acu4	0.268	0.015	-0.028	0.009	-0.003	-0.017	-0.008	0.016	-0.001
Acu5	0.645	0.020	-0.002	0.027	-0.005	0.027	0.043	-0.020	-0.017
Att1	0.027	0.922	0.641	0.775	0.380	0.538	0.655	0.469	0.654
Att2	0.053	0.941	0.591	0.816	0.605	0.665	0.499	0.593	0.575
Att3	0.011	0.963	0.835	0.750	0.452	0.505	0.630	0.557	0.438
Comp1	-0.017	0.696	0.888	0.576	0.655	0.419	0.250	0.457	0.529
Comp2	-0.014	0.658	0.874	0.331	0.338	0.609	0.536	0.257	0.420
Int1	0.041	0.699	0.716	0.953	0.568	0.411	0.312	0.616	0.418
Int2	0.049	0.595	0.619	0.943	0.565	0.514	0.214	0.524	0.516
Int3	0.018	0.810	0.543	0.877	0.658	0.524	0.347	0.476	0.548
Pbc1	-0.014	0.171	0.409	0.746	0.942	0.525	0.516	0.361	0.382
Pbc2	-0.033	0.386	0.728	0.452	0.946	0.531	0.717	0.270	0.379
Pbc3	-0.003	0.865	0.577	0.615	0.926	0.496	0.558	0.223	0.237
Peou1	-0.061	0.243	0.681	0.505	0.727	0.859	0.453	0.650	0.640
Peou2	-0.011	0.675	0.414	0.547	0.669	0.863	0.236	0.313	0.312
Peou3	-0.003	0.546	0.643	0.494	0.528	0.894	0.671	0.494	0.288
Pu1	0.037	0.567	0.432	0.312	0.316	0.604	0.916	0.754	0.595
Pu2	0.035	0.687	0.438	0.528	0.623	0.514	0.926	0.607	0.381
Pu3	0.026	0.571	0.690	0.411	0.508	0.665	0.911	0.696	0.695
Sn1	-0.032	0.304	0.639	0.454	0.200	0.422	0.524	0.932	0.364
Sn2	-0.018	0.433	0.572	0.669	0.803	0.624	0.767	0.964	0.327
Sn3	-0.028	0.491	0.455	0.237	0.272	0.694	0.330	0.940	0.578
Trust1	0.002	0.686	0.605	0.331	0.358	0.594	0.404	0.334	0.870
Trust2	-0.038	0.325	0.467	0.295	0.561	0.473	0.484	0.582	0.780
Trust3	-0.017	0.446	0.664	0.395	0.477	0.462	0.662	0.516	0.952
Trust4	-0.022	0.456	0.668	0.706	0.785	0.664	0.664	0.822	0.952

5.10.7 Convergent validity

Convergent validity is a measure of the strength of the correlation between measurement items and their respective constructs. According to Chen and Hung (2010); Hair et al. (1998), there are three criteria used to establish convergent validity namely:

a. All the item loadings should be significant and have values greater than or equal to 0.7

b. The composite reliability of each construct should be greater than or equal to 0.7

c. The AVE of the constructs should also exceed 0.5

In line with the above stated criteria, it can be observed from table 34 that majority of the items had loading values ranging from 0.780 to 0.964 except the loadings of actual use. In addition, it can be observed from table 32 that all the constructs except actual use also produced composite reliability values that exceeded 0.7 and AVE values that exceeded 0.5. Thus, this establishes the convergent validity of all the constructs except actual use. Furthermore, considering that actual use did not establish reliability and validity, this suggests that the measurement items of actual use needs to be revised in order to meet the required standard.

5.10.8 Discriminant validity

Discriminant or divergent validity is established when measures of constructs that are not theoretically linked demonstrates divergence (Henseler et al., 2016). To assess this, item loading of a construct should be greater than its other cross-loadings. In addition, the square root of the AVE of the construct should be greater than the correlation between the construct and other constructs. Using the cross-loading criteria, it can be observed from table 34 that all of the items except actual use indicated discriminant validity. For instance, the cross-loading value of Att1 with its construct ATT is 0.922 and this is greater than 0.641, which is its cross-loading value with COMP. In terms of AVE, table 35 shows the AVE of the constructs and the correlation of constructs with the square root of the AVE on the diagonal and highlighted. From the table, it can be observed that all the diagonal values are greater than the correlation values between any pair of constructs, which establishes that the constructs have sufficient discriminant validity.

Overall, majority of the constructs except actual use displayed sufficient construct validity because these constructs satisfied the criteria for both convergent and divergent validity. Although the construct actual use demonstrated discriminant validity based on the AVE criteria. However, it did not demonstrate discriminant validity based on the cross-loading criteria, thus, indicating that the discriminant validity of this construct was insufficient.

Furthermore, the actual use construct also failed to demonstrate convergence, which means that it did not establish adequate construct validity. Table 35 shows the discriminant validity using AVE and the descriptive statistics of constructs.

Table 35: Discriminant validity using AVE

Constructs	AVE	ACU	ATT	COMP	INT	PBC	PEOU	PU	SN	TRU
ACU	0.256	**0.506**								
ATT	0.888	0.032	**0.942**							
COMP	0.776	0.002	0.569	**0.881**						
INT	0.862	0.039	0.664	0.542	**0.928**					
PBC	0.880	-0.018	0.563	0.534	0.523	**0.938**				
PEOU	0.760	-0.016	0.513	0.497	0.469	0.380	**0.872**			
PU	0.842	0.039	0.644	0.330	0.682	0.502	0.350	**0.917**		
SN	0.894	-0.027	0.657	0.546	0.597	0.438	0.549	0.583	**0.945**	
TRU	0.795	-0.018	0.538	0.409	0.585	0.453	0.343	0.452	0.571	**0.892**
Average mean		3.007	5.347	4.074	5.015	5.457	4.418	4.612	5.251	5.389

5.11 Path analysis of the overall sample

For the final data, path analysis was used to test the study's hypotheses as well as determine the coefficient of determination (R^2). Initially, this procedure was performed on the overall sample. However, to compare difference in the impact the hypothesised constructs has on each age group category, multi-group analysis was performed and the path analysis of each individual age group was obtained. The following provides details of the steps taken in conducting the path analysis.

5.11.1 Bootstrapping

Bootstrapping is a non-parametric procedure that increases the extent of conclusion that can be drawn from a sample distribution (Henseler et al., 2016). It is defined as the process of re-sampling randomly with replacement from the existing sampling and estimating the indirect effect in each bootstrap re-sample (Preacher and Hayes, 2008). In addition, it does not assume the normality of a data set rather evaluates how precisely or the probability that the sample distribution estimates represents the true population (Preacher and Hayes, 2008).

Moreover, Henseler et al. (2016) recommended using 4,999 bootstrap iterations because it is adequately close to infinity and is reasonable in terms of the computation time.

Considering that this study used a non-probability sampling technique, bootstrapping was identified as a suitable technique for assessing the data set. In addition, bootstrapping was applied to reduce the sampling variance and derive the path coefficients (Henseler et al., 2016). Moreover, considering the recommendation of Henseler et al. (2016), 4,999 bootstrap iterations were applied to the data set, which generated the followings results.

5.11.2 Path coefficients and hypothesis test

On conducting path analysis using SMARTPLS 3.0, the following results were generated. From the general path analysis, seven of the hypotheses were supported at a significance level of 0.05 (p<0.05).

In terms of the actual use construct, the intention to use tablets was found insignificant in determining actual use in the model with β=0.039, t=1.071 and p=0.284.

In terms of the intention to use construct, an older adult's attitude towards tablets had the strongest impact on their intention to use the device with β=0.532, t=13.199 and p=0.000. However, trust was found insignificance in determining the intention to use tablet device with β=0.047, t=1.252 and p=0.211. SN and PBC were also found significant in determining the older adults' intention to use tablet device.

Furthermore, in terms of attitude, perceived usefulness had the strongest effect on an older adults' attitude towards using a tablet device with β=0.324, t=11.868 and p=0.000. COMP, PEOU and TRU were also found significant in determining attitude. Table 36 presents further details on the result of the hypothesised constructs.

Table 36: Result of the hypothesised constructs

Paths	Coefficient	STDEV	*t*-statistics	*p*-Value	Result
ATT -> INT	0.532	0.040	13.199	0.000	Supported
COMP -> ATT	0.144	0.022	6.572	0.002	Supported
INT -> ACU	0.039	0.036	1.071	0.284	Not supported
PBC -> INT	0.244	0.040	6.112	0.002	Supported
PEOU -> ATT	0.232	0.025	9.314	0.001	Supported
PU -> ATT	0.324	0.027	11.868	0.000	Supported
SN -> INT	0.096	0.044	2.181	0.029	Supported
TRU -> ATT	0.320	0.028	11.428	0.000	Supported
TRU -> INT	0.047	0.037	1.252	0.211	Not supported

Note: significant at $p<0.05$

Table 36 presents the general hypotheses result derived from the data gathered from all the age groups. From the table, it can be observed that 7 of the hypothesis including H1, H2, H3, H4, H6, H7 and H8 were accepted. However, 2 of the hypothesis including H5 and H9 were rejected.

Furthermore, a structural model for all age groups was developed from the SEM analysis conducted. Thus, figure 41 presents the structural model for all the age groups involved in the main study.

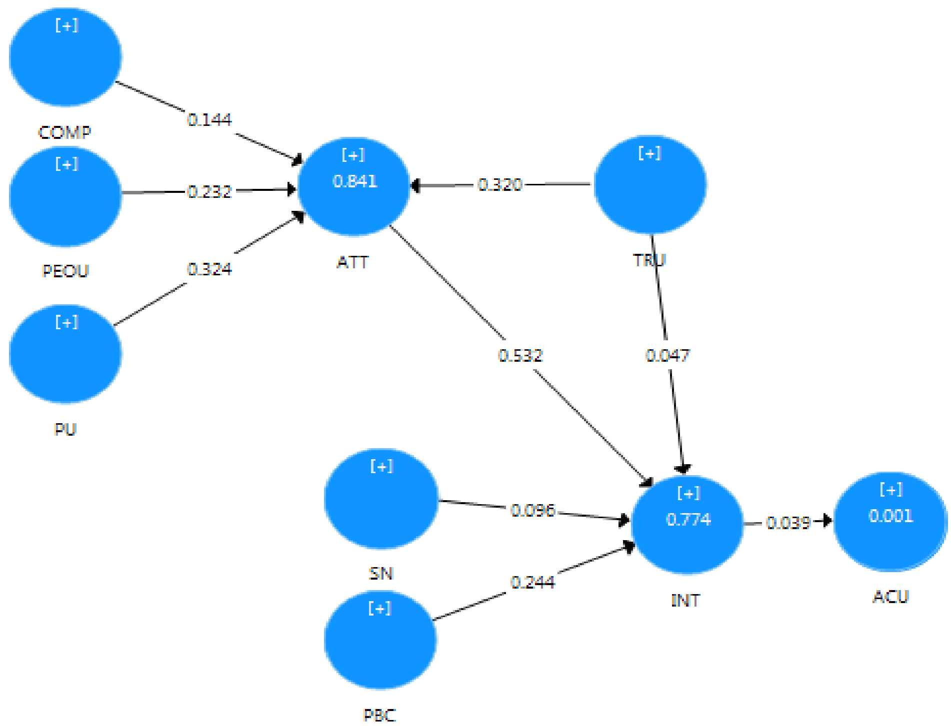

Figure 41: Structural model for all the groups in the main study

As with the data gathered for the pilot study, SEM was also used on the final data to analyse the conceptual relationship between the constructs. To achieve this, the FTDA framework was compared with the data gathered from the survey conducted for the main study. Thus, figure 41 presents the results derived from the SEM or path analysis conducted using the data gathered from all the age groups (50 and over) involved in the main study. The reason for including data gathered from all the age groups to derive the result shown in figure 41 is in order to have a general overview of how each construct affects the adoption and use of tablet devices among the older population. Considering this, it can be observed that figure 41 shows the path coefficient result derived for the hypothesised constructs. For example, it can be observed that the path coefficient derived for H4 is 0.320.

Furthermore, the R^2 values for the independent variables attitude, intention to use and actual use of tablet devices are also presented in figure 41. For instance, it can be observed that the R^2 value for the independent variable attitude is 0.841. The details of these derived R^2 values and their implications are discussed further in section 5.11.3.

5.11.3 Coefficient of determination

The coefficient of determination (R^2) was derived to measure the proportion of variance that can be explained by the independent variable (Moksony, 1990). In the final study, there were three independent variables namely, actual use, intention to use and attitude.

For actual use, the R^2 value derived for the dependent variable actual use is 0.001, which is less than the acceptable value of 0.5 (Renaud and Victoria-Feser, 2010). This implies that the research framework cannot explain the variability in the older adults' actual use of tablets. This result indicates that the FTDA framework is not significant or sufficient for determining actual use.

Furthermore, for the intention to use construct, the R^2 value derived for the dependent variable intention to use is 0.774, which implies that about 77.4% of the variability in the older adults' intention to use can be explained by the attitude, subjective norm and perceived behavioural control and trust constructs. Thus, this result indicates that the FTDA framework is significant and sufficient for determining intention to use tablet device.

Furthermore, the R^2 value derived for the dependent variable attitude is 0.841, which shows that about 84.1% of an older adult's attitude formation can be explained by their perception in terms of compatibility, trust, ease of use and usefulness. Therefore, FTDA framework is sufficient for determining the attitude formation towards tablet devices.

5.12 Structural equation modelling of the individual age groups

Considering that the main focus of this research is age and its impact on the adoption of tablet devices, it was necessary to evaluate the relationship between age and the factors that impact on adoption and use. Therefore, in order to analyse the difference in the pattern of tablet adoption in terms of age, the age group was split into four segments namely pre-seniors (50-59 years), young-old (60-69 years), old-old (70-79 years) and very-old (80+). In addition, to compare these age segments, PLS and multi-group analysis (MGA) was performed.

5.13 Path analysis of the age groups

The PLS-SEM result showed that attitude was significant (p<0.05) in determining behaviour intention among all the four age segments namely; pre-seniors, young-old, old-old and the very-old age groups with (β=0.379, t=5.253 and p=0.000), (β=0.514, t=7.249 and p=0.000), (β=0.595, t=8.068 and p=0.000) and (β=0.886, t=10.103 and p=0.000) respectively. It also showed that intention to use was insignificant (p>0.05) in determining actual use among the four age segments with pre-seniors (β=0.065, t=0.650 and p=0.516), young-old (β=0.100, t=1.900 and p=0.057), old-old (β=-0.095, t=1.146 and p=0.252) and very-old (β=-0.115, t=0.449 and p=0.653).

Moreover, in addition to attitude, perceived behavioural control was also found significant in determining intention among the pre-seniors, young-old and old-old group with β=0.226, t=2.670 and p=0.008; β=0.297, t=4.975 and p=0.000 and β=0.255, t=2.650 and p=0.008 respectively. However, it was not significant in determining intention to use among the very-old group with β=-0.162, t=1.774 and p=0.076. In addition, trust was found significant in determining intention only among the very-old group with β=0.236, t=3.432 and p=0.001.

In addition, subjective norm was found significant in determining the intention to use only among the old-old group with β=0.164, t=2.013 and p=0.044. However, it was insignificant among the other three groups with pre-seniors (β=0.164, t=1.727 and p=0.084), young-old (β=0.032, t=0.493 and p=0.622) and very-old (β=0.013, t=0.098 and p=0.922).

Furthermore, perceived ease of use, perceived usefulness and trust were significant in determining attitude among all the age segments with p<0.05. Compatibility was also found significant in determining attitude among the pre-seniors and young-old group with β=0.168, t=4.128 and p=0.000 and β=0.117, t=3.578 and p=0.000 respectively. In contrast, it was insignificant in determining attitude among the old-old and very-old group with β=0.081, t=1.522 and p=0.128 and β=0.144, t=1.416 and p=0.157 respectively. Table 37 shows the details of the path analysis of all age categories and the result of their hypothesised constructs.

Table 37: Summary of the hypothesis testing for all the age groups

Hypothesis	Pre-seniors	Young-old	Old-old	Very-old
ATT -> INT	✔	✔	✔	✔
COMP -> ATT	✔	✔	✗	✗
INT -> ACU	✗	✗	✗	✗
PBC -> INT	✔	✔	✔	✗
PEOU -> ATT	✔	✔	✔	✔
PU -> ATT	✔	✔	✔	✔
SN -> INT	✗	✗	✔	✗
TRU -> ATT	✔	✔	✔	✔
TRU -> INT	✗	✗	✗	✔

Note: ✔ denotes supported and ✗ denotes not supported at $p<0.05$

Furthermore, the structural model for each segment was developed and this also produced the R^2 values. The following presents the details of the structural model of each age segment.

5.13.1 Structural model for the Pre-seniors group

Figure 42 represents the structural model for the pre-seniors group with R^2 values and the path coefficients. In terms of R^2 values, the value for actual use is 0.004 (0.4%), which implies that the research framework is not sufficient for explaining the variability in the pre-seniors' actual use of tablets.

Meanwhile, the R^2 value for the intention to use is 0.590, which implies that 59% of the variability in the pre-seniors' intention to use can be explained by the attitude, subjective norm and perceived behavioural control and trust constructs. Thus, this result indicates that the FTDA framework is significant and sufficient for determining intention to use tablet device among the pre-seniors.

Furthermore, the R^2 value for attitude is 0.712, which implies that 71.2% of the variability in the pre-seniors' attitude formation can be explained by the compatibility, perceived ease of use, perceived usefulness and trust constructs. Thus, this result indicates that the FTDA framework is adequate for determining the attitude formation towards using tablet device among the pre-seniors.

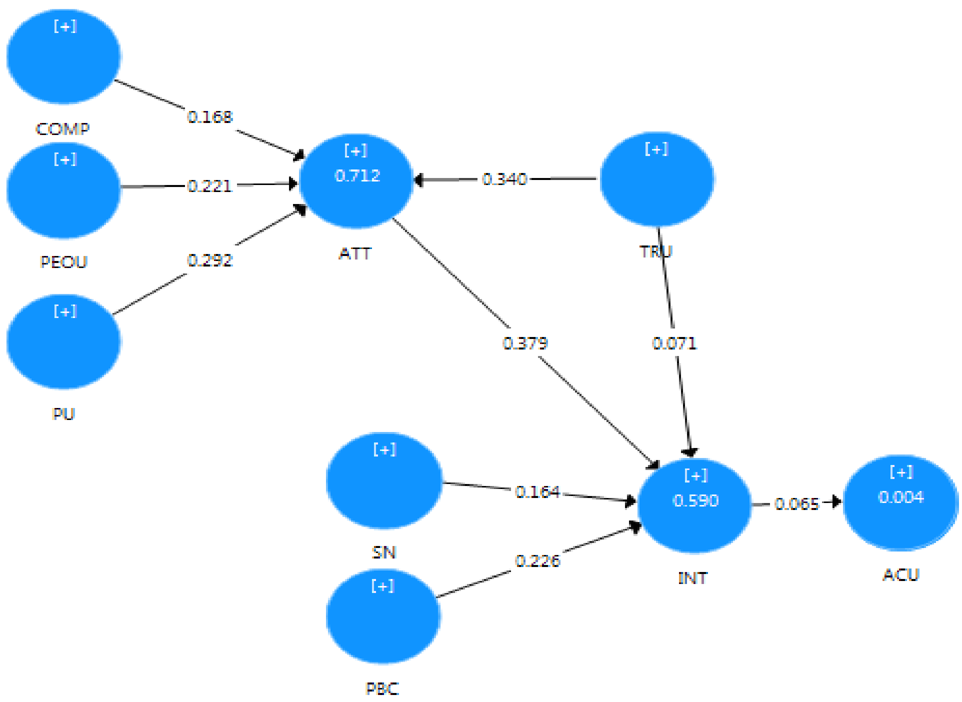

Figure 42: Path model with r-squared values for the Pre-seniors group

As mentioned in section 5.11.4, the age groups involved in the main study were split into 4 groups. Following this, SEM analysis was performed on each individual group in order to determine how the conceptual relationships hypothesised affected each of the four age groups. Thus, figure 42 shows the path analysis result derived for the pre-seniors group (50-59 years). In other words, figure 42 shows how the each constructs affects the adoption and use of tablet devices among the pre-seniors group. In addition, it also presents the hypothesis result derived for the pre-seniors group with the inclusion of the path coefficient result. From this result, it can be observed that 6 of the hypothesis including H1, H2, H3, H4, H6 and H8 were accepted for this age group. Meanwhile, 3 of the hypothesis including H5, H7 and H9 were rejected for this group.

Furthermore, the R^2 values derived for the independent variables attitude, intention to use and actual use of tablet devices are also shown in figure 42. For instance, it can be observed that the R^2 value for the independent variable intention to use is 0.590.

The next section shows the structural model for the young-old group and discusses the details of the R^2 values derived.

5.13.2 Structural model for the young-old group

Figure 43 represents the structural model for the young-old group with R^2 values and the path coefficients.

In terms of R^2 values, the value for actual use is 0.010 (1%), which implies that the research model is not adequate for explaining the variability in the young-old group's actual use of tablets.

Meanwhile, the R^2 value for the intention to use is 0.670, which implies that 67% of the variability in the young-old group's intention to use can be explained by the attitude, subjective norm and perceived behavioural control and trust constructs. Thus, this result indicates that the FTDA framework is significant for determining intention to use tablet device among the young-old group.

Furthermore, the R^2 value for attitude is 0.783, which implies that 78.3% of the variability in the young-old group's attitude formation can be explained by the compatibility, perceived ease of use, perceived usefulness and trust constructs. Thus, this result indicates that the FTDA framework is adequate for determining the attitude formation towards using tablet device among the young-old group.

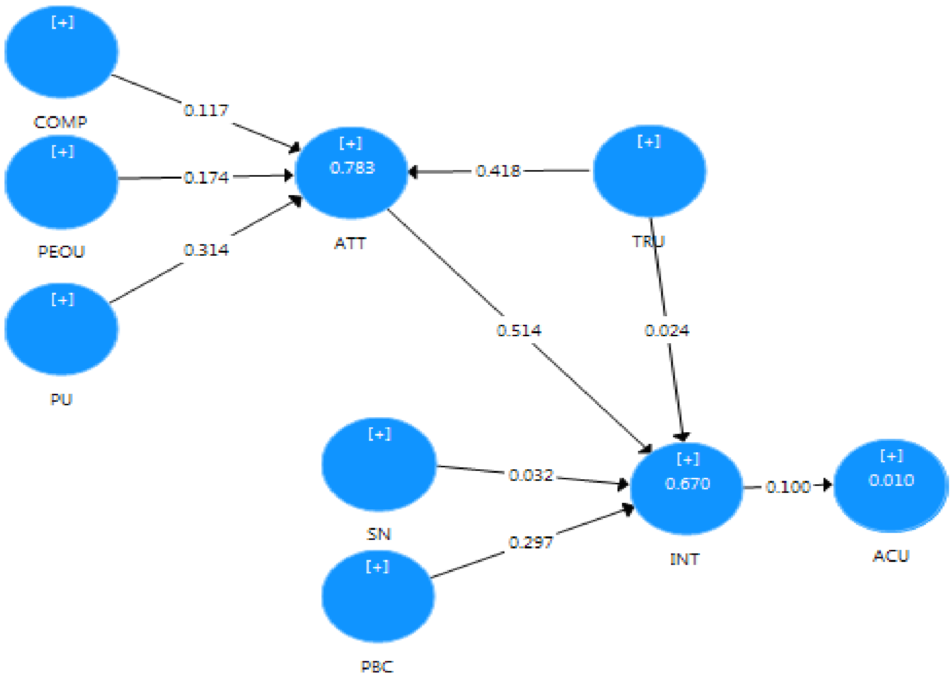

Figure 43: Path model with r-squared values for the Young-old group

SEM analysis was also performed on the young-old group (60-69 years old) in order to determine how the conceptual relationships hypothesised affected those within this group. Thus, figure 43 shows the SEM analysis result derived for the young-old group. In other words, figure 43 shows how each constructs affects the adoption and use of tablet devices among the young-old group. Furthermore, it also presents the hypothesis result derived for the young-old group with the inclusion of the path coefficient result. From this result, it can also be observed that 6 of the hypothesis including H1, H2, H3, H4, H6 and H8 were accepted for this group. Meanwhile, 3 of the hypothesis including H5, H7 and H9 were rejected for this age group.

Furthermore, the R^2 values derived for the independent variables attitude, intention to use and actual use of tablet devices are also provided in figure 43. For instance, it can be observed that the R^2 value for the independent variable actual use is 0.010.

The next section shows the structural model for the old-old group and discusses the details of the R^2 values derived.

5.13.3 Structural model for the old-old group

Figure 44 represents the structural model for the old-old group with R^2 values and the path coefficients.

In terms of R^2 values, the value for actual use is 0.009 (0.9%), which is less than the cut-off value of 0.50 (Renaud and Victoria-Feser, 2010). This implies that the research model is not adequate for explaining the variability in the old-old group's actual use of tablets.

In addition, the R^2 value for the intention to use is 0.846, which implies that 84.6% of the variability in the old-old group's intention to use can be explained by the attitude, subjective norm and perceived behavioural control and trust constructs. Thus, this result indicates that the FTDA framework is significant for determining intention to use tablet device among the old-old group.

Furthermore, the R^2 value for attitude is 0.885, which implies that 88.5% of the variability in the old-old group's attitude formation can be explained by the compatibility, perceived ease of use, perceived usefulness and trust constructs. Thus, this result indicates that the FTDA framework is suitable for determining the attitude formation towards using tablet device among the old-old group.

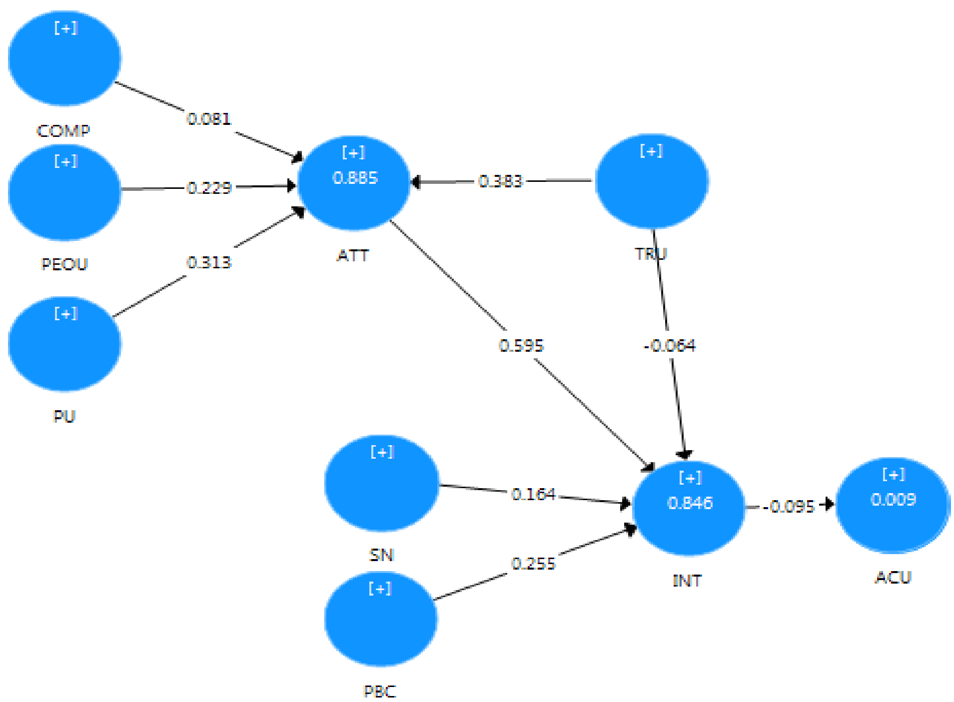

Figure 44: Path model with r-squared values for the Old-old group

SEM analysis was also performed on the old-old group (70-79 years old) in order to assess the conceptual relationships between the constructs. This assessment will help to understand how these constructs affects the adoption and use of tablet devices among this group. Thus, figure 44 shows the SEM analysis result derived for the old-old group. It also shows the hypothesis result derived for this age group with the inclusion of the path coefficient result. From this result, it can be observed that 6 of the hypothesis including H2, H3, H4, H6, H7 and H8 were accepted for the old-old group. Meanwhile, 3 of the hypothesis including H1, H5 and H9 were rejected for this age group.

Furthermore, the R^2 values derived for the independent variables attitude, intention to use and actual use of tablet devices are also provided in figure 44. For instance, it can be observed that the R^2 value for the independent variable intention to use is 0.846.

The next section presents the structural model for the very-old group and discusses the details of the R^2 values derived.

5.13.4 Structural model for the very-old group

Figure 45 represents the structural model for the very-old group with R^2 values and the path coefficients.

For actual use, the R^2 value is 0.013 (1.3%), which is less than the threshold value of 0.50 (Renaud and Victoria-Feser, 2010). This implies that the research framework is not suitable for explaining the variability in the very-old group’s actual use of tablets.

In addition, the R^2 value for the intention to use is 0.899, which implies that 89.9% of the variability in the very-old group’s intention to use can be explained by the attitude, subjective norm and perceived behavioural control and trust constructs. Thus, this result indicates that the FTDA framework is significant and sufficient for determining the intention to use tablet device among the very-old group.

Furthermore, the R^2 value for attitude is 0.915, which implies that 91.5% of the variability in the very-old group’s attitude formation can be explained by the compatibility, perceived ease of use, perceived usefulness and trust constructs. Thus, this result indicates that the FTDA framework is adequate for determining the attitude formation towards using tablet device among the very-old group.

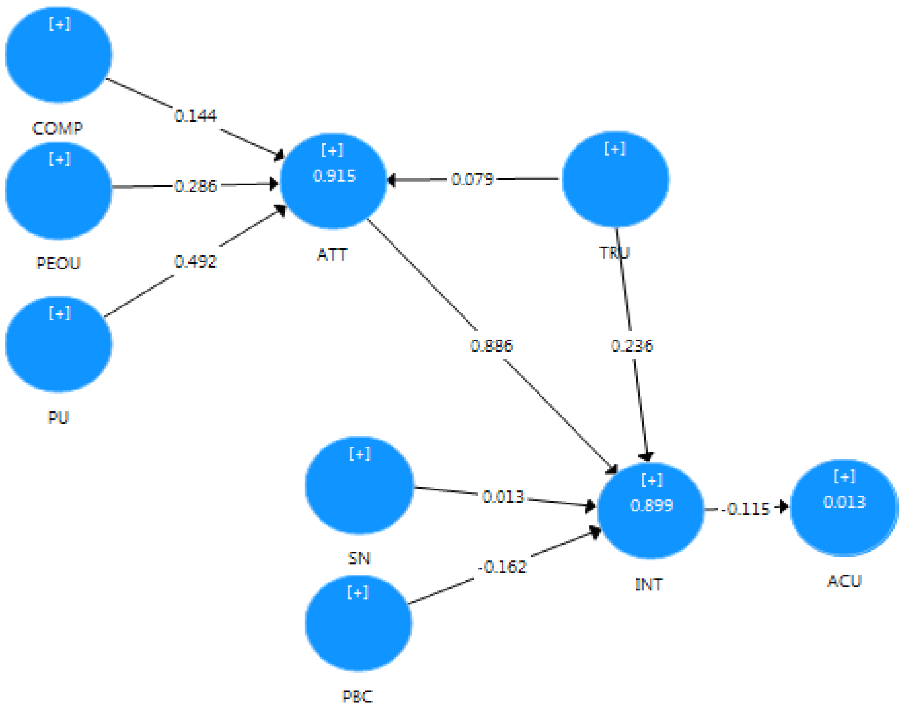

Figure 45: Path model with r-squared values for the Very-old group

SEM analysis was also performed on the very-old group (80 years old and over) to determine the conceptual relationships between the constructs. This analysis will help to understand how these constructs affects the adoption and use of tablet devices among this group. Thus, figure 45 shows the SEM analysis result derived for the old-old group. In other words, it demonstrates how the hypothesised constructs affects the adoption and use of tablet devices among the very-old group In addition, it also shows the hypothesis result derived for this age group with the inclusion of the path coefficient result. From this result, it can be observed that 5 of the hypothesis including H2, H3, H4, H5 and H6 were accepted for the very-old group. Meanwhile, 4 of the hypothesis including H1, H7, H8 and H9 were rejected for this age group.

Furthermore, the R^2 values derived for the independent variables attitude, intention to use and actual use of tablet devices are also provided in figure 45. For instance, it can be observed that the R^2 value for the independent variable attitude is 0.915.

Having discussed the details of path analysis conducted for the individual age groups, the next section provides details regarding the multi-group analysis of the age groups.

5.14 Multi-group analysis of the age groups

The four age segments were compared in pairs using multi-group analysis (MGA) to verify if there was significant difference existing between groups in relation to the hypothesised constructs. The MGA analysis generated a parametric test for each paired group and these was used to assess if there was any difference between the groups. The following provides details of the pairwise comparison conducted.

5.14.1 Pre-seniors versus young-old

Using MGA analysis, the pre-seniors group was compared with the young-old group to test for difference. The parametric test result indicated there was no significant difference between the pre-seniors and the young-old group for all the hypothesised constructs with all the derived *p*-values greater than 0.05. The result of this comparison is presented in table 38.

Table 38: Test for difference between the Pre-seniors and the Young-old group

Construct paths	Path Coefficients-diff	*t*-Value (Pre-seniors vs. Young-old group)	*p*-Value (Pre-seniors vs. Young-old group)	Significantly different (YES / NO)
ATT -> INT	0.135	1.321	0.187	NO
COMP -> ATT	0.051	0.993	0.321	NO
INT -> ACU	0.036	0.334	0.739	NO
PBC -> INT	0.071	0.707	0.480	NO
PEOU -> ATT	0.047	0.847	0.397	NO
PU -> ATT	0.022	0.357	0.721	NO
SN -> INT	0.132	1.181	0.238	NO
TRUST -> ATT	0.078	1.091	0.276	NO
TRUST -> INT	0.046	0.478	0.632	NO

Note: significance level for test is $p < 0.05$

5.14.2 Pre-seniors versus old-old group

The next pair assessed for difference is the pre-seniors group with the old-old group. Result showed that between the pre-seniors and the old-old, there was a significant difference in the way attitude impacted on the intention to use tablets with β=0.216, t=1.975 and p=0.049. This means that the behavioural intention to use tablets differs between the pre-seniors and old-old group depending on their attitude towards the device. For instance, the attitude towards a tablet device from the pre-seniors' perspective might be based on its appropriateness for conducting work activities, which in turn leads to their intention to use or not use the tablet. On the other hand, the old-old group's attitude formation might be based on the screen size of the tablet device, which in turn leads to their intention to use behaviour.

Furthermore, the other hypothesised constructs indicated no significant difference. This implies that these other factors or constructs are likely to have similar impact on both the pre-seniors and the old-old group. Table 39 shows the details of the parametric test for difference between the pre-seniors and old-old group.

Table 39: Test for difference between the Pre-seniors and the Old-old group

Construct paths	**Path Coefficients-diff**	***t*-Value (Pre-seniors vs. Young-old group)**	***p*-Value (Pre-seniors vs. Young-old group)**	**Significantly different (YES / NO)**
ATT -> INT	0.216	1.975	0.049	YES
COMP -> ATT	0.087	1.271	0.204	NO
INT -> ACU	0.160	1.088	0.277	NO
PBC -> INT	0.028	0.210	0.834	NO
PEOU -> ATT	0.008	0.102	0.918	NO
PU -> ATT	0.021	0.247	0.805	NO
SN -> INT	0.000	0.001	0.999	NO
TRUST -> ATT	0.043	0.499	0.618	NO
TRUST -> INT	0.135	1.055	0.292	NO

Note: significance level for test is $p < 0.05$

5.14.3 Pre-seniors group versus very-old group

In testing for difference between the pre-seniors group and the very-old group, result showed that three of the hypothesised constructs were significant.

Firstly, the result showed that between both groups, there was a significant difference in the impact attitude had on the intention to use with β= 0.508, t= 3.948 and p= 0.000. This implies that both groups' intention to use or not use tablets is driven by their different attitude formation.

In addition, there was a significant difference in the effect perceived behavioural control had on each of the group in relation to the intention to use tablet with β= 0.388, t= 2.662 and p= 0.008. This means that each group's intention to use tablets is driven by how much control they perceive in terms of skill, knowledge and or resources.

Furthermore, trust also showed a significant difference in determining attitude between the pre-seniors and the very-old group with β= 0.261, t= 3.016 and p= 0.003. This implies that the attitude formation towards using tablets between both groups differ depending on their individual perception of trust. The result derived from this parametric test is presented in table 40.

Table 40: Parametric test for difference between the Pre-seniors and the Very-old group

Construct paths	Path Coefficients-diff	*t*-Value (Pre-seniors vs. Young-old group)	*p*-Value (Pre-seniors vs. Young-old group)	Significantly different (YES / NO)
ATT -> INT	0.508	3.948	0.000	YES
COMP -> ATT	0.024	0.263	0.793	NO
INT -> ACU	0.179	0.809	0.419	NO
PBC -> INT	0.388	2.662	0.008	YES
PEOU -> ATT	0.065	0.675	0.500	NO
PU -> ATT	0.200	1.760	0.079	NO
SN -> INT	0.151	0.882	0.378	NO
TRUST -> ATT	0.261	3.016	0.003	YES
TRUST -> INT	0.165	1.326	0.186	NO

Note: significance level for test is $p < 0.05$

5.14.4 Young-old versus old-old group

To test for difference, the young-old group was also compared with the old-old group. The parametric test for this pair showed that there was a significant difference in the impact of intention on actual use with β= 0.196, t= 1.975 and p= 0.049. This means that the two groups had different views regarding their intention behaviour, which in turn impacted differently on their actual use of the tablet.

Further details of the parametric test for these two groups are presented in table 41.

Table 41: Parametric test for difference between the Young-old and the Old-old group

Construct paths	Path Coefficients-diff	*t*-Value (Pre-seniors vs. Young-old group)	*p*-Value (Pre-seniors vs. Young-old group)	Significantly different (YES / NO)
ATT -> INT	0.081	0.674	0.501	NO
COMP -> ATT	0.036	0.576	0.565	NO
INT -> ACU	0.196	1.975	0.049	YES
PBC -> INT	0.042	0.376	0.707	NO
PEOU -> ATT	0.054	0.717	0.473	NO
PU -> ATT	0.001	0.007	0.994	NO
SN -> INT	0.132	1.162	0.246	NO
TRUST -> ATT	0.035	0.405	0.686	NO
TRUST -> INT	0.088	0.752	0.452	NO

Note: significance level for test is $p<0.05$

5.14.5 Young-old versus very-old group

The young-old and very-old group were also compared with the aim of testing the difference between the two groups in relation to the hypothesised constructs.

Result indicated that the effect of attitude on intention to use was significantly different between both groups with $\beta = 0.373$, $t = 2.655$ and $p = 0.008$. This implies that the intention to use tablets differs between the young-old and the very-old group depending on each group's attitude towards the tablet device.

Furthermore, result showed that there is a significant difference between both groups in terms of perceived behavioural control and its impact on the intention to use tablet devices with $\beta = 0.459$, $t = 3.856$ and $p = 0.000$. This implies that the intention to use tablet devices differs between both group depending on their individual standard for control whether in terms of skills, resources or knowledge.

Furthermore, the impact of trust on attitude was also found significantly different between both groups with $\beta = 0.339$, $t = 3.726$ and $p = 0.000$. This means that the young-old and the very-old group had different perceptions of trust with regards to the tablet device, which in turn impacted differently on their attitude towards the device.

Details of the parametric test for difference between the young-old group and the very-old group can be viewed in table 42.

Table 42: Parametric test for difference between the Young-old and the Very-old group

Construct paths	Path Coefficients-diff	*t*-Value (Pre-seniors vs. Young-old group)	*p*-Value (Pre-seniors vs. Young-old group)	Significantly different (YES / NO)
ATT -> INT	0.373	2.655	0.008	YES
COMP -> ATT	0.027	0.331	0.741	NO
INT -> ACU	0.215	1.276	0.202	NO
PBC -> INT	0.459	3.856	0.000	YES
PEOU -> ATT	0.112	1.192	0.234	NO
PU -> ATT	0.178	1.709	0.088	NO
SN -> INT	0.019	0.138	0.890	NO
TRUST -> ATT	0.339	3.726	0.000	YES
TRUST -> INT	0.212	1.755	0.080	NO

Note: significance level for test is $p<0.05$

5.14.6 Old-old versus very-old

The old-old group was also compared with the very-old group to test whether there was a difference in relation to the hypothesised constructs. The result derived indicated that four of the hypotheses showed significance.

Firstly, the effect of attitude on intention was found significantly different between the old-old group and the very-old group with β= 0.291, t= 2.550 and p= 0.011. This means that old-old and the very-old group had different attitude towards tablets, which in turn impacted differently on their intention to use the device.

In addition, the effect of perceived behavioural control on intention was also significantly different between both groups with β= 0.416, t= 3.010 and p= 0.003. This implies that each group's intention to use tablet is driven by their different perception of control in terms of skills, knowledge and or resources.

The effect of trust on attitude was also significantly different between the two groups with β= 0.304, t= 3.596 and p= 0.000. This means that the attitude towards using tablets differs between the old-old and the very-old group depending on each group's perception of trust.

Furthermore, there was also a significant difference in the effect of trust on intention between the old-old group and the very-old group with β= 0.300, t= 2.124 and p= 0.035. This means each group's intention to use tablet is driven by their different perception of trust.

Further details of the parametric test for these two groups are presented in table 43.

Table 43: Parametric test for difference between the Old-old and the Very-old group

Construct paths	Path Coefficients-diff	*t*-Value (Pre-seniors vs. Young-old group)	*p*-Value (Pre-seniors vs. Young-old group)	Significantly different (YES / NO)
ATT -> INT	0.291	2.550	0.011	YES
COMP -> ATT	0.062	0.586	0.558	NO
INT -> ACU	0.019	0.085	0.933	NO
PBC -> INT	0.416	3.010	0.003	YES
PEOU -> ATT	0.057	0.442	0.658	NO
PU -> ATT	0.179	1.210	0.227	NO
SN -> INT	0.151	1.032	0.303	NO
TRUST -> ATT	0.304	3.596	0.000	YES
TRUST -> INT	0.300	2.124	0.035	YES

Note: significance level for test is $p<0.05$

Overall, it was observed that for all the paired groups, subjective norm did not show any significant difference in its impact on the intention to use tablets. This means that, the impact of subjective norm on intention is almost similar for all the age groups.

In addition, for all the paired groups, compatibility, perceived ease of use and perceived usefulness did not show significance in their impact on attitude. This implies that whatever the age group, these factors are likely to hinder or enhance the attitude towards tablet devices.

5.15 Moderating effect of the demographic variables

According to Venkatesh et al. (2003), the moderating variables such as gender, age, experience and voluntariness of use sometimes affect the relationship between the independent variables and the dependent variable. Therefore, consistent with the UTAUT model, the demographic variables age, gender, education and health status were selected in this study as moderators for attitude, perceived behavioural control, subjective norm and trust in determining the dependent variable intention to use. The selection of these moderating variables is based on the aim of this research as well as the suggestion of previous studies (Venkatesh et al., 2003; Park et al. 2007; Pheeraphuttharangkoon, 2015). The following provides the details of the test for moderating effect.

5.15.1 Age as a moderator

Consistent with the UTAUT model proposed by Venkatesh et al. (2003), age was employed as a moderator between attitude and intention, perceived behavioural control and intention, subjective norm and intention and trust and intention respectively. Result showed that age has a significant moderating effect on the relationship between ATT and INT as well as the relationship between PBC and INT.

In terms of attitude, findings indicated that age positively moderated the relationship between attitude and intention with β= 0.137, t= 3.599 and p= 0.000. For instance, result showed that the older the individual, the stronger the negative effect of attitude on the intention to use. In other words, age intensifies the relationship between attitude and intention to use.

Furthermore, in terms of perceived behavioural control and intention, age was found to have a negative moderating effect on the relationship between perceived behavioural control and intention with β= -0. 097, t= 2.229 and p= 0.026. This implies that age strengthens the effect of perceived behavioural control on the intention to use tablets. For instance, it was observed that the younger the individual, the higher the positive effect of perceived behavioural control on intention to use tablets. Table 44 presents the result of the test for the moderating effect of age.

Table 44: Testing the moderating effect of age

Paths	Coefficient	STDEV	*t*-Value	*p*-Value	Result
AGE*ATT -> INT	0.137	0.038	3.599	0.000	Supported
AGE*PBC -> INT	-0.097	0.044	2.229	0.026	Supported
AGE*SN -> INT	-0.036	0.050	0.725	0.468	Not supported
AGE*TRU -> INT	0.038	0.038	1.139	0.255	Not supported

Note: significance level for test is p<0.05

5.15.2 Gender as a moderator

Gender (GEN) was also used to moderate the relationship between ATT and INT, PBC and INT, SN and INT and TRU and INT. Result indicated that gender is not a significant moderator for the four relationships. Table 45 shows the result of this moderating analysis.

Table 45: Testing the moderating effect of gender

Paths	Coefficient	STDEV	*t*-Value	*p*-Value	Result
GEN*ATT -> INT	-0.070	0.043	1.632	0.103	Not supported
GEN*PBC -> INT	0.064	0.042	1.543	0.123	Not supported
GEN*SN -> INT	-0.027	0.044	0.602	0.547	Not supported
GEN*TRU -> INT	0.035	0.040	0.889	0.374	Not supported

Note: significance level for test is $p<0.05$

5.15.3 The moderating effect of education

As with age and gender, education (EDU) was also used as a moderator in this study. It was used to moderate the relationship between ATT -> INT, PBC -> INT, SN -> INT and TRU -> INT. Result showed that education is not a significant moderator for the four relationships. Table 46 shows the result of this moderating analysis.

Table 46: Testing the moderating effect of education

Paths	Coefficient	STDEV	*t*-Value	*p*-Value	Result
EDU*ATT -> INT	0.009	0.030	0.288	0.773	Not supported
EDU*PBC -> INT	-0.008	0.028	0.267	0.789	Not supported
EDU*SN -> INT	-0.010	0.024	0.415	0.678	Not supported
EDU*TRU -> INT	0.032	0.027	1.184	0.236	Not supported

Note: significance level for test is $p<0.05$

5.15.4 The moderating effect of health

Health (HTH) was also selected as a moderator for the relationships between ATT -> INT, PBC -> INT, SN -> INT and TRU -> INT. It was found that health was a significant positive moderator for the relationship between ATT and INT. For instance, it was observed that the lower the health status, the lower the positive attitude towards tablet device and vice versa. Table 47 shows the result of this analysis.

Table 47: Testing the moderating effect of health

Paths	Coefficient	STDEV	*t*-Value	*p*-Value	Result
HTH*ATT -> INT	0.135	0.040	3.391	0.001	Supported
HTH*PBC -> INT	-0.053	0.040	1.315	0.189	Not supported
HTH*SN -> INT	-0.007	0.053	0.133	0.894	Not supported
HTH*TRU -> INT	-0.068	0.038	1.794	0.073	Not supported

Note: significance level for test is $p<0.05$

Having discussed the details of the moderating effect analysis and identifying the significant moderators, a model indicating these moderating effects was developed and is presented in figure 46.

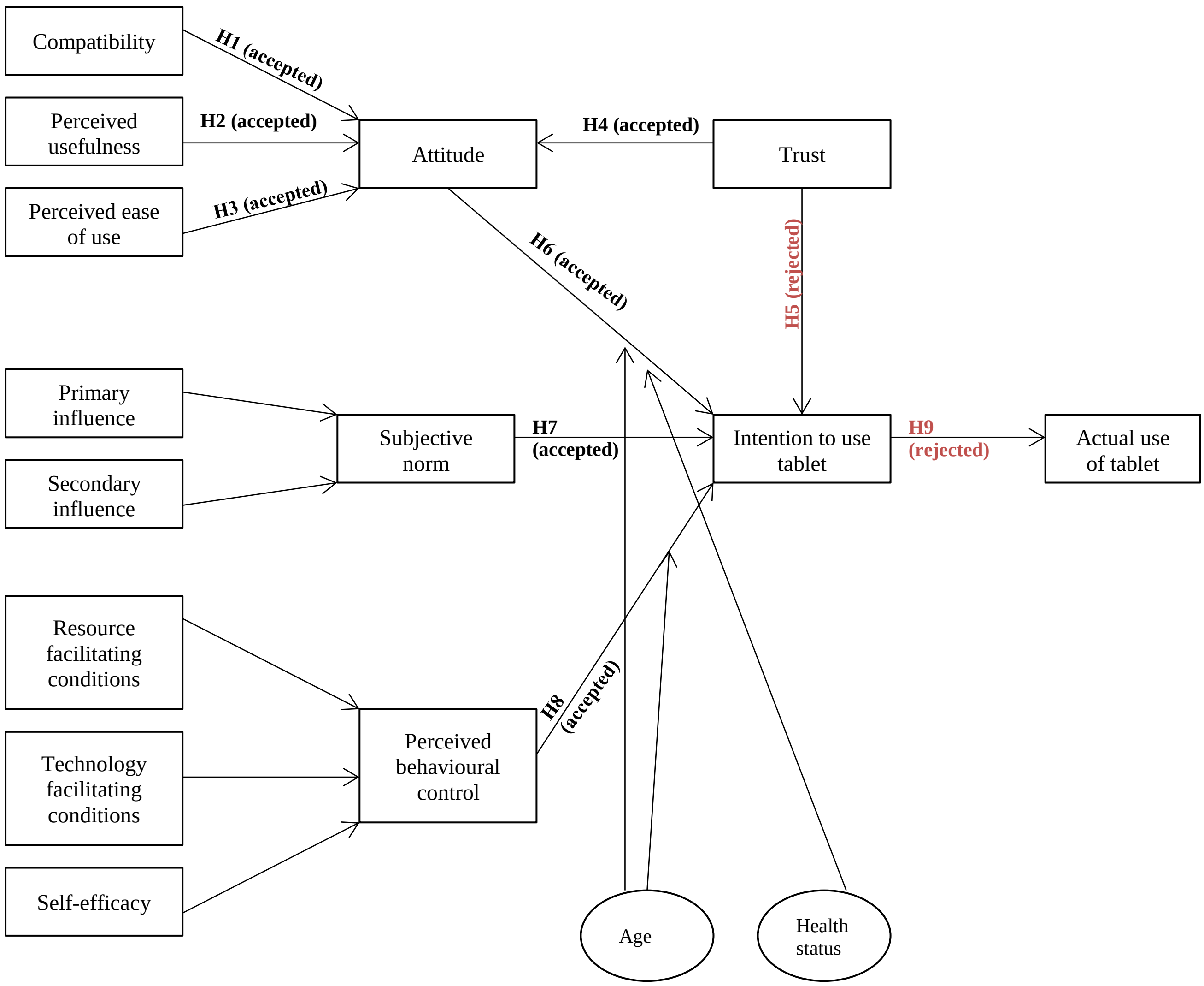

Figure 46: Revised framework with moderating factors

From figure 46, it can be observed that the research framework provided in section 2.7, (see figure 9) was revised. This revised framework was developed to demonstrate the relationship between the moderating factors. It should also be noted that only the significant moderating factors were included in the figure 46. For instance, from the figure, it can be observed that the moderating factor 'age' has a significant impact on the relationship between attitude and intention to use tablet as well as the relationship between perceived behavioural control and intention to use tablet. Meanwhile, the moderating factor 'health status' has an impact on the relationship between attitude and intention to use tablet.

Furthermore, figure 46 also provides information regarding the hypotheses accepted and those rejected. For instance, it can be observed that H8 was accepted, which means that perceived behavioural control has significance in predicting an older adult's intention to use tablet. On the other hand, it can be observed that H9 was rejected, which means that the intention to use tablet device had no significance in predicting an older adult's actual use of a tablet device.

5.16 Summary of chapter

This chapter provided the findings gathered from the final phase of the research. Following the lessons learned from the pilot study, this chapter discussed the steps taken in modifying the survey questionnaire that was then used for this final phase. In addition, the sampling technique used as well as the calculation of the response rate was also provided in this chapter. The reliability and validity of the result gathered in this phase was also presented in this chapter. The result gathered from this process indicated that all the constructs produced suitable reliability and validity values except actual use (ACU). Furthermore, the results derived from the hypothesis testing were also provided in this chapter. From the result, seven out of the nine hypothesised constructs were supported. In addition, the FTDA framework was confirmed to be significant and sufficient for determining attitude and intention towards tablet device with R^2 values of 0.841 and 0.774 respectively. Furthermore, the moderating effect of some selected demographic variable on the constructs was also discussed and findings revealed that age had a moderating effect on the relationship between attitude with intention and perceived behavioural control with intention. In addition, it was also show that health status has a moderating effect on attitude towards the intention to use tablets.

Having analysed and discussed the final findings, the next chapter evaluates and discusses these findings gathered.

Chapter 6: Evaluation and Discussion

6.0 Introduction to chapter

In chapter 5, the findings and analysis of the final data collected for the study was presented in sections 5.5, 5.6 and 5.7. However, to validate and verify these results, evaluation or assessment of these findings is required. Therefore, in this chapter, an assessment of the quantitative findings was conducted using qualitative data acquired through telephone interviews. Thus, this chapter presents the details of the qualitative method including data collection method and content analysis procedure.

This chapter will also assess and discuss the results of both the pilot study and the main study against the theoretical findings that were identified in chapter 2, sections 2.1, 2.2, 2.4, 2.5 and 2.6. It will also provide the researcher's reflection and lessons learned while conducting the research.

To summarise, this study aimed to investigate the factors that influence an older individual's adoption and use of a tablet device. In light of this, some research questions were presented in chapter 1, section 1.2.2. This evaluation and discussion aspect will help provide answers to these research questions.

6.1 Evaluating the findings of a research

Evaluation is an important aspect in a research work because it is a means for assessing the quality as well as validating the findings of the research (Punch, 2013; Panneerselvam, 2014). It also provides a basis for making generalisation of the findings gathered in the study (Punch, 2013). The evaluation of the results of a study is also necessary for reaching conclusions and obtaining information for future directions (Panneerselvam, 2014). Based on this, this study included an evaluation aspect in order to improve the credibility and validity of the findings gathered in this research.

6.1.2 Evaluation Methods

Drawing from Human-Computer Interaction (HCI) studies, an evaluation method is defined as a set of activities that help to examine a design in order to ascertain its degree of usability (Fernandez et al., 2011). In the context of this research, the design in question is the research process, which was assessed through quantitative means. Therefore, the aim of the evaluation procedure in this study is to assess the results derived from this quantitative method with regards to the FTDA framework. Generally, the methods of evaluation are classified into analytical and empirical methods (Fernandez et al., 2011).

- **Analytical method:** This is a situation whereby the design is tested by the designer(s) or evaluator(s) and is based on assessing the suitability and conformity of the design.
- **Empirical method:** This method involves testing the design through user participation.

Furthermore, other classifications for evaluation methods include the formative and summative methods (Rubin and Babbie, 2016).

- **Formative methods:** This form of evaluation is often conducted at the early stages of developing a design. It involves gathering relevant information for assessing and refining the design in an attempt to maximise its success.
- **Summative methods:** This form of evaluation is often used at the end of the process to assess the results or end product and efficiency of the design. In addition, this method provides useful insights as well as demonstrates the practicality of the end results.

Furthermore, evaluation can also be conducted using either quantitative or qualitative procedures (Rubin and Babbie, 2016).

- **Quantitative method:** This method is used to collect numerical data that will help assess certain hypothesis of the design through user participation.

- **Qualitative method:** This method involves using descriptive measurements to provide detailed insights regarding the design from the perspective of the users.

Considering the above discussion, this study employed the formative, analytic and quantitative methods in the earlier stages of the research process. For instance, the formative method employed was present in the literature review conducted in chapter two, where the FTDA framework was also developed. Furthermore, the formative method was also present in chapter three, where the appropriate methodology for evaluating the theoretical constructs was identified. Moreover, the analytical method was present in chapter four and five of this report and this involved testing the FTDA framework to assess its suitability for the research goal. This analytical phase also involved using quantitative methods for collecting and analysing data (see sections 4.3, 4.4, 5.3 and 5.5).

Thus, considering all the above, the summative, empirical and qualitative method was identified as suitable for this evaluation process. This is because, the evaluation process in this study intends to test the validity and confirm the outcome of the quantitative study through user participation (Venkatesh et al., 2013; Fernandez et al., 2011). This method was also selected because the aim of the evaluation is to gather detailed information that will help to determine the practicality and effectiveness of the quantitative findings from the older adults' perspective (Rubin and Babbie, 2016). Thus, qualitative method was used to collect data in order to validate the earlier reported quantitative results as well as discover new insights for further understanding of the hypothesised constructs.

6.1.3 Qualitative data for evaluation

Qualitative methods for gathering data include interviews for primary data and document reviews for secondary data (Saunders et al., 2009).

- **Interviews:** This is the most widely used method for collecting primary qualitative data. In other words, it is a technique that is used to probe the relevant population in order to gain an insight on the subject matter. It is also suggested that all other methods of collecting qualitative data including observation and document reviews are often dependent on the data from interviews.

- **Documents review:** This involves the use of already existing or secondary data to understand a phenomenon. The documents commonly reviewed include organisational records, personal diaries, national official reports and written responses or excerpts from open-ended surveys.

Considering that there is limited documentation specifically addressing the research context in terms of tablet adoption and older adults in UK, thus, the documents review method could not be utilised. In addition, as mentioned earlier, the aim of this evaluation process is to gain an insight on the practicality and effectiveness of the hypothesised constructs from the older adults' perspective, therefore, the interview method was identified to be suitable for achieving this purpose.

Moreover, the technique used to collect data for the evaluation process is the telephone interview technique. The telephone interview was selected because it is a cost-effective technique that also increases the participants' perception of anonymity (Punch, 2013). Although one of the drawbacks of the telephone interview technique is the assumption that everyone owns a telephone, which results in bias and subsequent exclusion of those who do not have a phone (Saunders et al., 2009). However, it is a more effective method for ensuring the inclusion of those participants who cannot be accessed face-to-face due to location, time or are reluctant to be involved in face-to-face interviews (Kothari, 2004). Therefore, given that the research site consists of several towns, telephone interview was identified as suitable for gaining maximum access to the target population.

Subsequently, to derive meaning and quality from data collected qualitatively, analysis is required (Saunders et al., 2009). A popular way of analysing qualitative is the formation of themes also known as thematic analysis (Punch, 2013). In particular, the development of themes and codes is an important aspect of analysing the textual data derived from qualitative methods. According to Fereday and Muir-Cochrane (2006), thematic analysis or coding can be either inductive or deductive.

- **Inductive thematic analysis:** This form of analysis is referred to as a data-driven method. It is a situation whereby codes or themes are generated based on the information gathered from the raw data.
- **Deductive thematic analysis:** This is referred to as a theory-driven method of analysis. In other words, in deductive thematic analysis, codes are generated from existing theories.

Overall, the use of either the inductive or deductive coding system often depends on the question the researcher seeks to answer or what is being tested (Fereday and Muir-Cochrane, 2006). In view of this, considering that the main focus of this evaluation process is to confirm the findings from the quantitative method, therefore, the theory-driven or deductive coding method was selected for assessing the qualitative data.

Moreover, content analysis is also an aspect employed in assessing qualitative data (Polit and Beck, 2006). It involves some attributes of quantitative method and is used to assess the reliability and validity of the textual data. Content analysis in qualitative research is also a systematic method for assessing the quality of the interpreted data (Punch, 2013). Moreover, it is a technique used to describe and interpret the narrative material in order to provide meaning with regards to the subject in question (Fereday and Muir-Cochrane, 2006).

Considering the above discussions, this study employed a content thematic analysis method for assessing the qualitative data. The following provides details on the step taken to conduct the evaluation process.

6.2 Evaluating the quantitative findings using qualitative data

Whilst collecting data via quantitative survey questionnaires, an aspect was created whereby interested participants were requested to provide their contact details in case further research was required. This section in the questionnaire was necessary for the recruitment of participants for the qualitative data collection aspect of this study. On assessment, 41 of the respondents indicated a willingness to be involved in further research. 26 of these participants were selected based on their age and gender to ensure a balanced representation of different age and gender classes. These participants were emailed with a request to confirm their agreement to participate in the telephone interview phase. However, only 14 confirmed their willingness to be interviewed via telephone.

6.3 Data collection method

Fourteen semi-structured telephone interviews were conducted with the selected older adults residing in Hertfordshire County. Using open-ended questions, these interviews were designed to examine certain aspects of the tablet device from the narration of the older adults. The questions asked include: what the older adults liked or disliked about the tablet device, what they used the device for, their main reason for deciding on the tablet device, how they acquired the device, whether they required assistance to use their tablet, what they feel about using the device and whether they intended using it again. These questions were intended to provide validation mainly for the supported hypothesised constructs. The constructs in question include, Compatibility, Perceived Ease of Use, Perceived usefulness, Trust, Attitude and Intention to use. Each of these telephone interviews lasted for approximately 20 minutes. In addition, the telephone interviews were recorded and transcribed (Saunders et al., 2009).

6.4 Content analysis of the qualitative data

Content analysis of the qualitative data was conducted, which involved using thematic analysis or developing a coding scheme (McHugh, 2012). The coding scheme was generated by putting the contents of the data into common themes based on the constructs of interest. Initially, two judges who were unaware of the details of the research or the results gathered from the quantitative study were selected to code or classify the transcript independently. The reason for using two judges was to improve the consistency and trustworthiness of the analysis whilst reducing the bias that might result from each judge’s ideas (Polit and Beck, 2006). Moreover, to guide these judges, details of the construct being investigated with the inclusion of each construct's definition, examples and coding systems were provided. Moreover, to reach a consensus on their agreement, the judges later compared their coding and negotiated their disagreements (Stemler, 2004). Thus, the percentage of consensus agreement finally achieved is 79%. However, to measure the reliability of the agreement between the two judges, Kappa statistics was used (McHugh, 2012). The Kappa coefficient (K) was derived using the formula below:

$$K = \frac{P\ (A) - \ P\ (E)}{1 - P\ (E)}$$

where *P (A)* is the number of times that the judges agree and *P (E)* is the expected chance agreement. Furthermore, Kappa statistics is often used to assess the agreement between two coders (Stemler, 2004). Considering that two judges or coders were employed to assess and code the textual data, Kappa statistics was therefore, identified as suitable. To interpret Kappa statistics, the value or coefficient of Kappa often ranges from -1 to 1, where 1 represents perfect agreement and -1 represents perfect disagreement other than by chance is 0 (McHugh, 2012). In light of this, the Kappa coefficient derived is 0.67 (67%). To validate the data classifications, acceptable value for consensus agreement should be 0.70 or greater while, the acceptable value for Kappa coefficient should be .60 or greater (Stemler, 2004). Based on this, the reliability and validity of the data classification was sufficient. Table 48 presents a sample of the responses and their classifications.

Table 48: Sample of responses and classifications

Responses	Judge 1	Judge 2	Consensus agreement
I like technology generally so when the Samsung tablet was released, I just got one	ATT (+) -> INT (+), O -> INT (+)	ATT (+) -> INT (+)	ATT (+) -> INT (+)
Keeping in touch, playing scrabble, read books – very useful device	PU (+) -> ATT (+), ATT -> INT (+)	COMP (+) -> ATT (+), ATT -> INT (+)	ATT -> INT (+)
Well, you know at first, I struggled to get the hang of it. But so far, I think I made a good decision (…) at least I get to stay connected with my family	PEOU (-), ATT (+) -> INT (+)	PEOU (-) -> ATT (+)	PEOU (-) -> ATT (+)
I have used my tablet for many years (…) in fact I cannot see myself without my tablet nowadays	PBC -> INT (+)	PBC -> INT (+), PEOU (+)	PBC -> INT (+)
I find it very easy to use	PEOU (+)	PEOU (+)	PEOU (+)
I use it for emailing, calendaring (…) got my address book on there, Google search…	PU (+), COMP (+)	COMP (+), PU (+)	PU (+), COMP (+)
The tablet is okay (…) especially for people like me (…) you know, as we age, we need to remain connected with the world	COMP (+) -> ATT (+/-), PU (+) -> ATT (+)	COMP (+) -> ATT (+)	COMP (+) -> ATT (+)
I got my tablet because I was curious and I had heard so much about it	O -> INT (+), ATT (?) -> INT (+), SN (+) -> INT (+)	ATT (+/-) -> INT (+), SN (+) -> INT (+)	ATT -> INT (+), SN (+) -> INT (+)
I am too ignorant of it, though I acknowledge its usefulness (…) I usually get my grandson to help me – I can only use it when I have help	PEOU (-) -> ATT (+), PBC (-) -> INT (?)	PEOU (-) -> ATT (+), PBC (-) -> INT (+/-)	PEOU (-) -> ATT (+), PBC (-) -> INT (+/-)
My tablet is really easy to use – I do not feel intimidated by it unlike when using computer – I can easily find apps such as Skype on my tablet…	PEOU (+) -> ATT (+), PBC (+), PU (+)	PEOU (+) -> ATT (+), PU (+) -> ATT	PEOU (+) -> ATT (+), PU (+)
I am an early adopter of the original iPad (…) wanted to understand use cases	PBC (+), PU (+/-)	PEOU (+), PU (+), PBC (+)	PU (+), PBC (+)
I am wary of using online banking on my tablet because my husband has drummed in a sense of security into me…I prefer conducting my banking on my computer than my tablet	Trust (-), SN (+), PU (-)	Trust (-) -> ATT (-), SN (+)	Trust (-), SN (+)
I had been using computers at work, so (…) it felt like a good idea to get a Kindle	PBC (+), ATT (+)	PBC (+), ATT (+)	PBC (+), ATT (+)
No, I do not require help (…) I have been used to blackberry phone at work, which has similar capabilities …	PEOU (+), PBC (+)	PEOU (+)	PEOU (+)

Note: ATT = attitude, INT = intention to use, O = other factor, PU = perceived usefulness, COMP = compatibility, PEOU = perceived ease of use, PBC = perceived behavioural control, SN = subjective norm, -> denotes the relationship, + denotes positive and – denotes negative.

Table 48 provides details on the content validity process and the following explains the heading of each column.

- **Responses:** This column represents the excerpts drawn from the response provided by a participant during the interview process
- **Judge 1:** For the qualitative content validity exercise, 2 experts were used to code and validate the data collected during the interview process. Thus, this column represents the code assigned by the first expert selected to assess the content of the excerpts. For instance, for the interview response *"I like technology generally so when the Samsung tablet was released, I just got one",* this expert suggested that the positive attitude (ATT (+)) of the participant led to their positive intention (INT (+)) towards the tablet device.
- **Judge 2:** This column shows details of the code assigned to the excerpts by the second expert. For instance, similar to the suggestion of the first expert, for the interview response *"I like technology generally so when the Samsung tablet was released, I just got one",* this expert also suggested that the positive attitude (ATT (+)) of the participant led to their positive intention (INT (+)) towards the tablet device.
- **Consensus agreement:** This aspect represents the common agreement between the two experts with regards to assigning codes to the individual excerpts. For instance, for the interview response *"I like technology generally so when the Samsung tablet was released, I just got one",* both of the experts shared a common agreement that ATT (+) -> INT (+).

6.5 Profile of the respondents

The age of participants used for the qualitative study ranged from 52 to 89 years old with mean age of 68 years old. The participants also consisted of nine females and five males. These participants either owned an iPad (n=8), Samsung tab (n=4) or Kindle fire (n=2). The participants were all selected from different towns in Hertfordshire including Goff's Oak (n=2), St Albans (n=4), Hatfield (n=3), Welwyn Garden City (n=1), Waltham Cross (n=1), Hemel Hampstead (n=1) and Digswell (n=2). In addition, the participants had different levels of opinion about the tablet device. To protect the privacy of these respondents, each respondent was assigned a pseudonym, which are utilised throughout the report.

6.6 Analysing the result

The following sections analyses the result gathered from the qualitative study and uses it to validate the result of the quantitative study. Generally, there was a mix of opinions in terms of the intention to continue to use the tablet in the future. For instance, respondents were asked whether they intended using their tablet again. The responses to this question include *"Definitely! I find it very useful"* while, another said, *"I would feel as if I had lost an arm without my tablet"*. On the other hand, some gave neutral answers such as *"still finding it difficult to navigate my way around so we will see"* and another who said, *"I am yet to decide".* This confirms the overall intention score of 5.015 in the quantitative study with a 7-point Likert-type scale where 5 implies 'weakly agree'.

6.6.1 Attitude and Intention to use

In terms of attitude, the result indicated that, some of the participants had positive opinions about the tablet device. For instance, Maggie 52 years old stated, *"I am not sure that I dislike anything about it really (...) I like that I can use it anywhere and for different things like reading (...)".* On the other hand, Steve 61 years old also indicated positivity in his statement, *"the tablet is smaller than a laptop and larger than a phone – this is a plus for me".*

Some others demonstrated negative perception towards using the tablet. For instance, Maya who is a 79-years-old pensioner stated, *"It was a gift – though I am often sceptical about using it (...) I believe that there is risk with using such device (...) like you hear of cybercrimes, information grabbing (...)".* This statement implies that getting the tablet was not Maya's choice but a subjective influence and she does not trust technology generally because of the security and privacy risk associated with it.

On the other hand, a few of the participants had both positive and negative opinions of their tablet device. For instance, Owen 67 years old stated, *"I like that it is a better screen than the mobile phone but it will be better if I can do the same things I do on my laptop on it – things like running windows and all…"* This suggests that even though, Owen acknowledges the superiority of the tablet device over mobile phone however, he would have preferred it more if it had some features of a laptop.

This result indicates that majority of the participants had somewhat positive attitude towards the tablet device. Thus, confirming the finding of the quantitative study which showed that the mean value for the attitude item Att1 is 5.18, which means that the participants weakly agreed that they had a positive opinion about the tablet device.

Furthermore, about 64% of the participants' responses demonstrated that attitude had an impact on intention. For instance, 56 years old Ed who is a lawyer showed a negative attitude towards the iPad and as a result decided on getting the Samsung tab instead. This was evident in his statement, *"I went and tried them – don't like the Apple iPad in court – much less responsive than Samsung".* Meanwhile, Steve stated, *"I like technology generally so when the Samsung tablet was released, I just got one".* This statement indicated that his attitude towards the tablet, which was generated from his likeness of technology, led him to purchase one.

Therefore, this validates the quantitative finding, which supported the hypothesis that attitude has an impact on intention.

6.6.2 Perceived behavioural control and intention

Participants' responses also validated the use of perceived behavioural control as a driver for intention. This was mainly evident in the display of proficiency or self-efficacy especially among those who had previous experience with computers. For instance, Liz an 85 years old lady said, *"I have been using computers for many years (…) since the 1960s (…) so graduated to the tablet really…"* This statement indicates that Liz is proficient and confident with using technology generally because of her previous experience with using computers and thus impacted on her decision to get a tablet. In contrast, Maya the 79 years old lady displayed lack of proficiency and skill in her statement, *"I am too ignorant of it, though I acknowledge its usefulness (…) I usually get my grandson to help me – I can only use it when I have help".* This implies that Maya is not so confident or proficient with using her tablet and therefore requires someone's assistance to use it.

The impact of perceived behavioural control on intention was also identified in terms of resource facilitating conditions. For instance, Gracie 63 years old purchased her tablet because she felt that she could afford it and this was deduced from her statement, *"…the price was appealing so (…) why not (…)".*

Thus, the above finding corroborates the quantitative result, which supported the impact of perceived behavioural control on intention to use.

6.6.3 Subjective norm and intention to use

In terms of subjective norm, about 79% of the participants' responses indicated the role of subjective norm on their intention behaviour. This was mainly evident in response to the question on how they acquired their tablet. In response, some said that it was a gift (n=2); some said they read reviews online about it (n=1) while some (n=4) said it was based on the recommendation of family members and the rest gave other reasons. For instance, Maggie the 52 years old lady indicated the impact of subjective norm on intention in her statement, *"I needed to have Internet access during my holiday and it felt like my best option at the time…"* This statement suggests that Maggie was subjected to get the device because she needed to be able to use the Internet for probably work purposes or to communicate with people while on holiday. On the other hand, Owen who is 67 years old said, *"I was gifted a Kindle fire for my birthday by my partner (…) I am yet to decide how much it fits my need – so far I am not sure".* This suggest that the reason Owen has a tablet currently is because his partner felt he needed one and thus, got one for him. Furthermore, Edith 64 years old said, *"I was working and they were beginning to introduce the iPad and another tablet into the work situation (…) and I realized that it would be helpful to have one, so we bought one…"* This statement suggests that Edith's purchase of her tablet was as a result of it being used at her workplace, which helped her realise the need for acquiring a personal one.

This verifies that subjective norm has an impact on intention as was shown in the quantitative study.

6.6.4 Compatibility and attitude

In this qualitative study, from the response of the participants, compatibility also surfaced as a factor impacting on attitude. For instance, compatibility was implied in the statement of Owen 67 years old when he said that he is yet to make up his mind about the tablet with regards to its meeting his needs. This statement suggests that his current attitude towards the tablet is neither positive nor negative and this attitude can only change depending on his confirmation on how the tablet is compatible with his lifestyle or daily activities. In addition, Jan the 59 years old lady said, *"I usually use my tablet to obtain technical information in support of business use, booking events and restaurant places, following hobbies and interests, blogging etc. (...) overall, I like 'it' because 'it' helps me to do everything and anything…"* This statement implies that the tablet is compatible with her work-related activities, social activities and fits her need in terms of entertainment, which had an impact on her attitude towards the tablet. Moreover, 64 years old Edith said, *"Oh yeah! It is vital (…) I use it for emailing, calendaring, got my address book on there, Google search…"* This statement suggests that the tablet is compatible with the way Edith plans her activities by serving as a memory or reminding tool, which has positively impacted on her attitude towards the tablet.

The above result therefore, agrees with the quantitative result where the relationship between compatibility and attitude was supported.

6.6.5 Perceived ease of use and attitude

In terms of ease of use, some of the participants referred to the positive or negative usability feature of the tablet in their responses. For instance, Ed 56 years old referred to the Apple iPad as *"...much less responsive in court…"* while, Liz 85 years old referred to its usability in making birthday cards. Meanwhile, Dave 89 referred to its usability attribute with regards to the touch screen in his statement, *"I used to feel anxious about technology, but after I got my tablet (...) seeing how easy it is to use, I mean, the fact that I can just touch the screen – that is all I needed to convince me"*. This statement implies that Dave's assessment of his tablet's usability is based on its touch screen feature and how this feature makes it easier to use his tablet. Other usability features of the tablet identified by the participants include connecting to family, accessing applications such as Skype, language app, blogging, entertainment such as playing scrabble etc.

Furthermore, the participants' responses also corroborated the relationship between perceived ease of use and attitude. For instance, 64 years old Edith said, *"…It is so much easier to quickly do an email than having to switch on the laptop…I definitely would not be without my tablet…"* This implies that she does not require much effort when using her tablet to write an email in comparison to her laptop probably because the tablet is handy, which subsequently lead to her positive opinion of it. However, Gracie 63 years old said, *"Well, you know at first, I struggled to get the hang of it – but so far I think I made a good decision – the screen size is suitable for my eye sight and at least I get to stay connected with my family".* This means that even though Gracie found it initially difficult to use her tablet, however, she still feels that owning a tablet was a right choice, thus demonstrating positive attitude towards the tablet device. Moreover, Esther 72 years old stated, *"I still find it difficult to navigate my way around my tablet (…) so, we will see".* This indicates that Esther has a negative opinion in terms of the tablet's ease of use but a neutral attitude towards it.

In summary, the above findings confirm that perceived ease of use is related to attitude as was shown in the quantitative study.

6.6.6 Perceived usefulness and attitude

The quantitative result showed that perceived usefulness had the strongest impact on attitude towards tablet devices. The responses from the qualitative study verified this central role of perceived usefulness in determining attitude with nearly all (*n*=11) of the respondents making reference to this aspect either positively or negatively. For instance, Anne 70 years old stated, *"I had heard so much about it and wished to use it to contact family. When I started using it, I was happy I made that choice because I could speak to my children and grandchildren who live abroad and it will feel like they were there with me".* This statement suggests that Anne perceived the tablet device as useful for remaining connected with family and as a result, her attitude towards the tablet device was happiness. Dave 89 years old also confirmed to relationship between usefulness and attitude in his statement, *"I like the tablet because I can literally use it anywhere – I do not have to worry about my back when I use it".* From this statement, Dave acknowledges the usefulness of the portability feature of the tablet in providing support for his health issues, which resulted in his likeness of the tablet, thereby, portraying a positive attitude towards the device. On the other hand, Bryan 74 years old said, *"I got the tablet from my daughter who keeps saying 'Dad, this will be good for you', but I am yet to figure out what to use it for – still finding it difficult to use…"* From Bryan's statement, it is evident that he has not yet identified the usefulness of the device and as such his feeling towards it at the moment is somewhat negative especially as he perceives his tablet as difficult to use.

To summarise, these findings verify that perceived usefulness plays an important role in determining attitude as was supported in the quantitative study.

6.6.7 Trust and attitude

Trust was confirmed as an important factor usually considered by the older adults when making decisions about ICT. For instance, Gracie the 63 years old lady said, *"had a Samsung phone at the time, hated it, went to Apple, loved it and now got an iPad".* This suggests that she did not trust Samsung brands but trusted the Apple brand so much that she got an iPad. Furthermore, trust was also evident in statements such as, *"I used to feel anxious around technology… (Dave 89 years old)"* and *"I sometimes fear that my private information could be stolen and I could get lots of abuses… (Bryan 74 years old)".*

The demonstration of trust and its impact on attitude was also evident from the qualitative data. For instance, Liz the 85 years old lady demonstrated trust in her statement, *"I will feel like I had lost an arm without my tablet (…) it is a nice, handy size to carry around"*. This statement suggests that she trusts her tablet so much that she considers it a body part and thus, has a positive attitude towards the device in terms of its portability features. In addition, Jean 61 years old also demonstrated the impact of trust on attitude in her statement *"I wanted to use a language app that allows me to listen to correct pronunciations, record my attempts and practice this way…"* she also went ahead to comment on its screen size being a good feature of the tablet. Thus, deciphering this statement, it implies that she trusted the tablet to achieve the above stated purpose and formed a positive attitude based on its screen size. On the other hand, Maya did not trust technology generally but felt she just had to go with the flow. This was evident in her statement, *"It was a gift – though I am often sceptical about using it - I believe that there is risk with using such device – like you hear of cybercrimes, information grabbing – but sometimes one has to go with the trend…"*

It was also noted that there were different levels of trust, which depended on the activity being carried out on the tablet. For instance, Edith said, *"I do a lot of shopping on my tablet but not for online banking (...) I prefer conducting my banking on my computer than* on my *tablet".* This statement suggests that she trust the tablet enough to shop with it but does not trust it for conducting her online banking.

Thus, the above findings provide support for the inclusion of trust as a factor that influences attitude, which was demonstrated in the FTDA model and was supported in the quantitative result.

6.6.8 Other identified factors

It was observed that some of the older adults (*n*=3) decided on acquiring the tablet or keeping it (in cases where it was a gift) because they had the opportunity to try it first. This 'opportunity to try it' concept is similar to the triability construct suggested in the DOI model (Rogers, 2010). For instance, Dave 89 years old said, *"My granddaughter was teaching me how to use 'it' (…) she let me try out on her iPad (…) I must say, I quite liked it - so when my daughter got me a Samsung tab2 as a birthday gift, it was a welcome present (…)".* In addition, Jan who is 59 years old who currently uses an iPad stated, *"Had an opportunity to try out an iPad for free and then found I liked it"*

Moreover, findings revealed that the appearance of the tablet was an important factor often considered with approximately 71% of the participants making reference to the appearance in terms of its portability features and screen size. For instance, Steve 61 years old referred to it as ‘a handy device’ in his statement *“It is a handy device – helps me show my portfolio to prospective clients”*. Meanwhile, Jean 61 years old referred to its screen size in her statement that *“For me, it is an improved screen size than a smartphone, which makes it better in my opinion.”*

Price was also identified as an important factor for the intention to use with 4 (29%) of the participants indicating that the cost of the tablet appealed to them. For instance, Gracie a 63 years old lady stated, *“I read reviews about ‘it’ and the price was appealing so (…) why not (…)”*. Concurring, Anne a 70-year-old who retired as a teacher said *“Its low price is cost-effective for me (…) so I went for it”*.

6.7 Summarising the evaluation process

From literature, it was noted that there is a generational divide existing among the older population with respect to technology adoption and use (Damant et al., 2017). Evidence of this divide was indicated in the results of the quantitative study in terms of adoption of tablets and the factors that influence adoption. For instance, it was observed that the 60-69 years age group used the tablet device more than the 80+ age group. However, this finding could not be confirmed in this qualitative study considering that all the participants owned a tablet and belonged to different age classes.

Furthermore, it was noted that there was a difference in the proficiency level of the respondents by age. This was based on the observation that most of the respondents who referred to their computer experience and its resultant effect on their intention towards tablets was from the pre-seniors and young-old group except Liz the 85 years old lady. This validated the finding that age moderated the impact of perceived behavioural control on intention as was demonstrated in the quantitative study. However, the moderating effect of age on the relationship between attitude and intention was not confirmed because there was no significant distinction by age. This implies that all the participants shared almost similar attitude either positive, negative or both.

Moreover, the qualitative result indicated that subjective norm impacted more on intention than attitude, which contrasted with the findings of the quantitative study where attitude was shown to have the strongest impact on intention. This might be due to the phrasing of the questions in both studies and the lack of the use of structured questions requesting participants in the qualitative study to state which of the factors impacted them more.

In summary, it was discovered that older adults acknowledged that the tablet device benefited their ageing status as well as helped them stay connected with the outside world. For instance, Esther 72 years old stated, *"…the tablet is okay, especially for people like me (…) you know (…) as we age, we need to remain connected with the world".* In addition, Liz 85 years old shared similar sentiment in her statement *"I think it is an excellent move to own a tablet, particularly for elderly people who live alone like myself because it is so easy to keep in touch with people".* This shows that the tablet has prospects of reducing social exclusion and improving the quality of life of older adults.
Some examples of excerpts from the qualitative participants are provided in appendix 10.

Having evaluated the quantitative results using qualitative methods, the next section discusses the results of the pilot study and the main study.

6.8 Discussion of the pilot results

As mentioned earlier, ICT has proliferated major parts of society, however, not all of society is benefitting from it, particularly the older adults (Warschauer, 2004). In addition, it is suggested that the older adults are less likely to use technology in comparison to the younger adults (Friemal, 2016). In this study, the ICT selected for assessing this theory is the tablet device. Particularly, this study aimed to investigate the factors that influence an older individual's adoption and use of a tablet device. However, to achieve this aim, some objectives were also highlighted and one of these objectives was to carry out a pilot study.

The intention of carrying out this pilot was to determine whether there is an age-related digital divide between young adults and older adults when adopting and using tablet devices (Warschauer, 2004; Choudrie et al., 2013). This digital divide has been known to affect the older population negatively (Selwyn, 2003). However, devices such as tablets have been suggested as a solution to encouraging the older population towards participating in the e-society (OFCOM, 2017; Tsai et al., 2015). Therefore, the pilot study aimed to verify these statements and also identify whether there was a difference in the use of the tablet device between younger adults and the older adults. The research question generated to address this is 'Is there an age difference in the adoption and use of tablet devices?' However, before attempting to answer this question, the following limitations should be noted.

6.8.1 Limitations of the pilot study

The employment of snowball sampling technique for the collection of data is a major limitation because it reduces the amount of generalisation that can be deduced from this study. In addition, the sample size is small and was limited to Hertfordshire County in UK, which limited the statistical power of the study. Considering this, future research should consider conducting a larger and more representative sample in various parts of UK in order to increase the credibility of the results.

6.8.2 Answer to research question 1 using the pilot result

With the above limitations in mind, this section attempts to answer the question regarding age difference the young adults and older adults in the adoption and use of tablet device.

In the pilot study, a comparison between the younger adults (18-49 years old) and the older adults (50+ years) was conducted. From the result, it was shown that the 60-69 years age group (31.4%) were the highest adopters of the tablet device. In addition, it was found that the older group (55.7%) adopted the tablet device more than their younger counterpart (44.3%). These findings almost agree with Magsamen-Conrad et al. (2015) who found that there was a significant generational difference in the use of tablets. However, it contrasts the finding of Barnard et al. (2013) where it was suggested that the younger adults adopt the tablet device more than the older adults. Subsequently, these findings confirm that there is an age-related digital divide (Pfeil et al., 2009; Selwyn, 2003) however, with regards to tablets, the older adults are on the positive side of the divide. Furthermore, this result provides evidence that a tablet device offers a better chance of ensuring that older adults are digitally included thus, concurring with the findings of Tsai et al. (2015).

Subsequently, in the category of those planning to adopt tablets, 44.1% of this category belongs to the 50+ years age group. This indicates a willingness on the part of older adults to use ICT, which coincides with the finding of Broady et al. (2010) that older adults are not technophobic especially with respect to the tablet device.

In terms of use, this study also identified some differences in terms of what the tablet devices are used for. For instance, from the result, it was shown that the older group use online shopping more than the younger group with 34.5% of those who do online shopping representing the older group while 21.8% of online shoppers represented the younger group. This almost agrees with a report by digital strategy consulting where it was indicated that out of 55% of online shoppers aged 60-69 years old, over a quarter indicated that they would shop online through their mobile devices (Digital Strategy Consulting, 2013). Meanwhile, it was found that the young adults use their tablets for online banking more than the older adults. One explanation for this result might be due to the older adults' perception of risk in relation to online banking, which Laukkanen et al. (2007) suggested in their finding that older adults' perception of risk towards using Internet banking was higher than their younger counterpart.

Furthermore, previous adoption and use models have identified some factors that impacted on the adoption of technologies (Ajzen and Fishbein, 1980; Taylor and Todd, 1995; Rogers, 1995). Based on these previously existing models, the conceptual framework for the research was formed to test these theories. The general result including all age group revealed that perceived behavioural control (PBC) and attitude (ATT) were significant in determining the intention to use tablet devices. This finding is consistent with previous ICT adoption and use studies that revealed that factors such as attitude and perceived behavioural control often affects an individual's intention to adopt (Wu and Chen, 2005; Hsiao, (2013); Deng et al., 2014). According to Wu and Chen (2005), PBC and ATT are the main predictors of the intention to use on-line tax with attitude having a higher explanatory power than PBC. Concurring, Hsiao (2013) found that attitude was the primary determinant for the intention to use mobile Internet services. However, in contrast, this pilot study showed that PBC has a higher explanatory power than attitude in determining the intention to use tablet devices.

Subsequently, the theories were further tested to assess whether there was a difference between the young and old in terms of the hypothesised constructs. To achieve this, a multi-group analysis (MGA) was employed in comparing both groups. It was observed that both groups shared some similarities in factors that determine attitude and subsequently, the intention to use tablets. For example, within the two groups, perceived behavioural control was significant in determining intention and trust was significant in determining attitude. This finding is similar to a study by Broady et al. (2008) who suggested that similar factors influence younger and older adults. Moreover, Teo and Liu (2007) also found that consumer trust has a significant positive impact on an individual's attitude towards a vendor, which is similar to the pilot's findings.

Furthermore, in the pilot study, it was also observed that the two groups shared some differences with regards to the hypothesised constructs. For instance, attitude was found significant in determining intention among the older adult but was not significant among the younger adults. This contrasts with the result of Morris and Venkatesh (2000) who revealed that younger workers attitude towards using technology strongly influenced usage while subjective norm and perceived behavioural control influenced the older workers usage of technology.

Furthermore, among the older group, perceived usefulness and perceived ease of use were significant in determining attitude. This finding almost agrees with the work of Hur et al.

(2014) where it was found that perceived usefulness and perceived enjoyment significantly impacted on attitude towards using tablets. On the other hand, compatibility was found significant in determining attitude among the young group but was not significant among the older group.

Furthermore, Czaja and Sharit (1998) examined the age difference in attitude towards computers between the older adults and their younger counterpart and found that there is no age difference in overall attitude towards computers. This study is similar to their work in the sense that despite identifying the differences between the young and old with regards to the hypothesised constructs, these differences were not statistically significant. Therefore, this agrees with Czaja and Sharit (1998) that there is no age-related difference in factors that influence adoption and use of tablets among the young adults and older adults. Subsequently, this implies that whether young or old factors like attitude or perceived behavioural control are likely to hinder or enhance the intention to use tablets.

6.9 Discussion of the main study

Considering the aim of the research and the research questions, this section attempts to provide answers and explain the phenomenon surrounding the study. Thus, this section discusses the results gathered from the quantitative and qualitative studies. However, the following limitations should be noted when interpreting and making generalisations about the results.

6.9.1 Limitations of the quantitative and qualitative study

The limitations of both the quantitative and qualitative study stems from the level of generalisation that can be drawn from both studies. Firstly, both studies were based on data collected from Hertfordshire County, UK, which limits the applicability of the results to one part of UK. Subsequently, it also reduces the statistical power of the results gathered. In addition, data collection for the quantitative study utilised a purposive sampling technique. This technique was used because the research was focused on a specific demographic group, thus, requiring representativeness. However, purposive sampling technique is a non-probability method, which reduces the extent of generalisation that can be drawn from the results of this study. Furthermore, in terms of the qualitative study, a small sample size was used and participants were tablet adopters. This implies that the aspect of non-adoption could not be investigated. Moreover, the use of telephone interviews for the qualitative study also limited the inclusion of those who might not own telephones. Therefore, it is recommended that an alternative method be used for future studies. Overall, considering these limitations, it is suggested that caution should be taken when interpreting the results of this study.

6.9.2 Summarising the hypothesised constructs

As mentioned earlier, nine hypotheses were proposed in this study however; seven of these hypotheses were supported. The constructs in the study were measured using Likert-type scale of one to seven where 1=Strongly disagree, 2=Disagree, 3=Weakly disagree, 4=Neither agree nor disagree / Neutral, 5=Weakly agree, 6=Agree and 7=Strongly agree. Details of these hypothesised constructs are discussed below.

Hypothesis 1: This hypothesis proposes that compatibility has a significant effect on an individual’s attitude towards adopting and using a tablet device. This was assessed in terms of the tablet device fitting with the older adult’s personal preferences or daily activities for instance, work-related purposes or fitness needs. Some studies identified that compatibility has a direct effect on adoption and use behaviour (Wu and Wang, 2005). Some other studies have assessed the relationship between compatibility and attitude (Lin, 2011; Koenig-Lewis et al., 2010). In this study, result showed that overall, compatibility was significant in determining attitude. This means that compatibility has an indirect effect on intention behaviour through attitude. Furthermore, the overall mean score derived for the compatibility construct is 4.074, which means that an average number of the participants neither agreed nor disagreed with the tablet being congruent with their lifestyle and preferences in performing certain tasks. However, by group, it was observed that for the old-old and very-old group, this hypothesis was not supported. One possible explanation is that the tablet device may be less compatible with the lifestyle and preferences of those aged 70 years and over in terms of monitoring their daily workout or for work-related purposes.

Hypothesis 2: This hypothesis posits that perceived usefulness would significantly influence an individual’s attitude towards adopting and using a tablet device. This was assessed in terms of accomplishing task quicker, monitoring health status and carry out daily task. Chau and Hu (2001) found perceived usefulness as a direct significant predictor of intention behaviour towards using telemedicine technology. In contrast, studies such as that of Hur et al. (2014); Lin (2007) identified perceived usefulness as significant in determining attitude. Consistent with such studies, the result from this study showed that out of the four predictors of attitude, perceived usefulness had the strongest significant influence on attitude. Subsequently, considering that attitude has a direct influence on intention, this implies that the influence of perceived usefulness on intention is mediated by attitude. In addition, it was also observed as a significant predictor of attitude for all age groups. This implies that in making decisions regarding adopting and using tablet devices, perceived usefulness is an important factor considered by those aged 50 years and over.

Hypothesis 3: This hypothesis states that perceived ease of use will significantly influence an individual’s attitude towards adopting and using a tablet device. This was measured in terms of the level of effort required in learning to use and using the tablet to accomplish a set of tasks. Some studies have assessed perceived ease of use as a direct determinant of intention (Venkatesh and Davis, 2000) while; other studies have assessed it as a predictor of attitude (Lin, 2011). However, result from this study indicated that perceived ease of use has a significant impact on attitude towards using tablet devices. This means that perceived ease of use indirectly impacts on intention through attitude. In addition, this result contrasts the finding of Chau and Hu (2001) who indicated that perceived ease of use was insignificant in determining attitude. Furthermore, the overall mean score derived for the perceived ease of use construct is 4.418. This implies that an average number of the participants neither agreed nor disagreed that learning to use as well as using the tablet device to accomplish task is easy. In summary, perceived ease of use is one of the factors often considered by older adults when deciding to adopt or use tablet devices.

Hypothesis 4: This hypothesis postulates that an individual's perception of trust significantly affects his/her attitude towards adopting and using a tablet device. This was assessed based on the security, privacy and risk of using the tablet device to perform certain Internet activities. It was also assessed based on its capability to provide Internet access on the go. Overall, the result of the study indicated that this hypothesis was supported. This result therefore, confirms the finding of Shin (2010) who found trust to significantly predict attitude towards using social networking websites. Furthermore, the overall mean score derived for the trust construct is 5.389. This implies that an average of the respondents weakly agreed that they believed the tablet can help them access the Internet whenever they wanted, however, they have some reservations relating to the security, privacy and risk of performing certain activities on the tablet device. This means that trust is often an important factor considered by older adults aged 50 years and over when making decisions regarding adopting and using tablet devices.

Hypothesis 5: This hypothesis posits that an individual's perception of trust significantly affects his/her intention to use a tablet device. Results from this study indicated that this hypothesis was generally not supported. However, considering that result also showed that trust significantly impacted on attitude and attitude impacted on intention behaviour. This implies that generally, trust did not directly influence older adults' intention rather was mediated by attitude. This finding contrasted the finding of Zhou (2011) who found that initial trust positively impacts on usage intention of mobile banking. In addition, it was observed that for the Very-old group, trust had a direct influence on the intention to use tablet devices. This means that trust not only affects the attitude of those aged 80+ years it also determines their intention behaviour towards tablets.

Hypothesis 6: This hypothesis states that an individual's attitude towards using a tablet device directly influences his/her intention to use the device. Attitude in this case refers to the general feelings of older adults with regards to the size of the tablet, their experience with using it as well as its appropriateness in performing certain daily routines or work purposes. Result from this study showed that this hypothesis was supported. Specifically, it was indicated that attitude has the strongest influence on intention as was indicated in previous research work such as that of Hsaio (2013) and Neves et al. (2013). In addition, consistent with DTPB model proposed by Taylor and Todd (1995), attitude was determined by compatibility, perceived usefulness, perceived ease of use and trust. Thus, to summarise, this finding means that attitude is a fundamental factor that impacts on older adults' intention behaviour and is dependent on compatibility, perceived usefulness, perceived ease of use and trust.

Hypothesis 7: This hypothesis proposes that subjective norm has a significant effect on an individual's intention to adopt and use a tablet device. Subjective norm in this case refers to the older adults' view of the tablet as defined by certain referent group or societal influence. Result showed that this hypothesis was supported generally. This result confirms the finding of Greenslade and White (2005) who showed that subjective norm was significant in impacting on older adults' intention to volunteer at an above-average rate. However, it contrasted the finding of Chau and Hu (2001) who found it insignificant in determining intention behaviour. In addition, by group, it was observed that for the pre-seniors, young-old and very-old group, this hypothesis was not supported. One possible explanation for this result is that these groups' might have had some information or experience with technology or were not easily influenced generally, thus referent groups or societal influences had less influence on their adoption and use behaviour towards the tablet device. In contrast, result indicated that subjective norm was significant in determining intention behaviour among the old-old group. Furthermore, the overall mean score derived for this construct is 5.251, which implies that an average number of the participants weakly agreed that their decision was influenced by societal norms such as the influence of family and friends' recommendations. Therefore, subjective norm is a factor considered by older adults when making decisions to adopt and use tablet devices. However, it affects some age groups especially the old-old age group more than others.

Hypothesis 8: This hypothesis postulates that perceived behavioural control has a direct effect on an individual's intention to use a tablet device. This was measure based on the facilitating conditions such as money, knowledge, opportunities and the proficiency or self-efficacy level. Result showed that generally, this hypothesis was supported, which confirms that perceived behavioural control is an important factor often considered by those aged 50 years and over. In addition, this result shares some similarities with the finding of Wu and Chen (2005) who suggested that perceived behavioural control is one of the main predictors of intention behaviour. Moreover, even though the overall result supported this hypothesis, however, it was observed that perceived behavioural control was insignificant in determining intention among the very-old group. This means that those aged 80+ years might consider themselves less proficient or lack knowledge and skills in using the tablet device or lack funds for acquiring it.

Hypothesis 9: This hypothesis states that an individual's intention to use a tablet determines their actual use the tablet. This hypothesis was found insignificant, which means that the intention to use tablet did not influence the actual use of tablet device by older adults aged 50 years and over. This contrasts the finding of Lin (2007) where it was reported that consumers' intention behaviour towards online shopping predicted their actual behaviour.

6.9.3 The moderating effect of age and health status

Adopting from the UTAUT model, this study examined the moderating effect of age, gender, education and health status on intention behaviour. This approach was adopted because the main focus of the research was on the demographic variable age and with age comes certain health ailments. In addition, education and gender have also been identified as relevant in studies that aim to examine digital divide, thus, making these variables relevant for this study (Neves et al., 2013; Hur et al., 2014). For instance, a study found that age moderated the relationship between perceived usefulness and attitude toward tablet (Hur et al., 2014). Similar to this finding, the result from this study indicated that age and health status moderated the relationship between attitude and intention. It was also shown that age moderated the effect of perceived behavioural control on intention behaviour. These findings also share some similarities with Gascon et al. (2015) who suggested that age does not necessarily impact on the perception and evaluation of new technologies directly; rather, the social context that the technology is introduced into in combination with past experience plays a vital role.

6.9.4 Diffusion of the tablet device

This section discusses how the tablet device is diffused among the older population and how their decisions with regards to purchasing or acquiring the tablet device are made.

In terms of diffusion, from the quantitative result, it was revealed that some of the older adults (45.7%) purchased their tablet devices based on the recommendation of their Internet service provider through promotions, some were influenced by what they read in the newspaper (19.1%) and some others based their decision on the recommendation of family members or friends (15.1%). Similarly, these factors were also identified in the qualitative study with some of the older adults indicating that they received their tablet as a gift from family members or friends. Meanwhile, some others indicated that the reviews they read online and '*things that they had heard about the tablet'* led them to purchase one. These findings support the suggestion that people's decisions are often influenced by secondary and primary elements (Taylor and Todd, 1995). In their explanation, primary elements refer to influences of family members and colleagues among others while secondary influence could be from media in terms of newspapers, online reviews or word of mouth (Taylor and Todd, 1995). Furthermore, these results support the findings of Tsai et al (2015) who assessed the use of tablet devices among older adults. In their work it was identified that older adults often obtained their tablets from family members or they decided to buy it because they saw others use it.

In addition, in this study, one other factor identified to promote the diffusion of the tablet device among older adults is the ‘opportunity to try’ factor. This was identified in the qualitative study and it is almost similar to the triability construct suggested in the work of Rogers (2010). This might be an angle to explore in encouraging the older adults to engage with ICT especially those who currently do not use ICT.

6.9.5 Adoption and use of tablet

This section provides answers to the research question on factors that enable or hinder the adoption and use of tablet devices. It also identifies how these older adults use their tablet devices.

Studies have shown that attitude plays a vital role in the adoption of technology. In particular, an individual’s attitude towards technology can either encourage or discourage a person from adopting and using technology. For instance, Czaja and Lee (2007) found that attitude is an important determinant of technology adoption. A study also indicated that factors impacting on technology adoption and use is to a large extent attitudinal rather than socio-demographic (Neves et al., 2013). Moreover, Wagner et al. (2010) suggested that when studying the older population, the link between age and attitude is often significantly negative. Similarly, findings from this study revealed that in the general result of all the participants, attitude was found significantly positive however, it was also indicated that the older an individual, the stronger their negative attitude in impacting on their intention behaviour.

Moreover, some studies have found that perceived behavioural control and attitude are the main predictors of intention behaviour. For instance, Wu and Chen (2005) found that perceived behavioural control and attitude are the main determinants of the intention to use on-line tax. Furthermore, some other studies have identified that perceived behavioural control has the strongest impact on intention. For instance, Morris and Venkatesh (2000) in a study found that perceived behavioural control strongly impacted on older workers technology usage decision. Concurring, this study found that perceived behavioural control significantly influenced intention. However, consistent with the findings of Hsaio (2013); Wu and Chen (2005), it was shown in this study that attitude has the strongest impact on intention. Moreover, it was found in the study that perceived usefulness primarily impacted on attitude. This is similar to the study of Hur et al. (2014) where it was shown that perceived usefulness and perceived enjoyment positively impacted on attitude.

Furthermore, a common theory is that older adults are often reluctant to use technology, however, Czaja and Lee (2007) contrasted this theory. In particular, their finding showed that older adults are interested in technology but lack confidence and are often uneasy about using technologies, which impacts on their attitude towards the technology (Czaja and Lee, 2007). In line with this argument, from the qualitative result of this study, it was shown that those who felt anxious or intimidated around technologies generally were less so with the tablet computer and this impacted on their attitude towards the tablet device. For instance, one of the participants implied this in their statement, *"I used to feel anxious about technology, but after I got my tablet (…) seeing how easy it is to use, I mean, the fact that I can just touch the screen – that is all I needed to convince me".* From this statement, this individual felt less uneasy with the tablet because they perceived it as easy to use and the touch-screen feature was an added bonus, which then lead to a positive attitude towards it.

Subsequently, some studies have suggested that some health issues that are linked to ageing prevent older adults from adopting and using technology. For instance, Neves et al. (2013) mentioned that one of the reasons for non-use of technology is due to health-related physical issues that result from ageing. Moreover, Heart and Kalderon (2013) found that health status often enhances the effect of age on technology usage. Evidence of the relationship between health status and the adoption and use of technology was indicated in the quantitative study. In particular, the result showed that health moderated the effect of attitude on intention. In other words, the lower the health status, the lower the positive attitude towards the intention to use tablets. It was also found from the quantitative result that those older adults, who do not use the Internet, indicated that ailments such as visual impairments and learning difficulties hindered them from using it. This almost agrees with the study that suggested that to a large extent, vision limitations impact on technology use (Phiriyapokanon, 2011). Furthermore, in terms of tablet adoption, it was noted that ailments such as high blood pressure, anxiety disorder, visual limitations, mobility issues and arthritis of the hand impacted on their use of the tablet device. Specifically, result shown that the non-adopters of tablet device were the group mainly affected. For instance, it was noted that the non-adopters dominated the group that indicated that high blood pressure (67.7%), anxiety disorder (58.4%) and visual impairments (60%) impacted on their use of technology. This suggests a relationship between health status and non-adoption. Moreover, from the qualitative study, it was discovered that some participants preferred the tablet device because it supported their health issues. For instance, some of the respondents indicated that the screen size of the device aided their visual impairments while others suggested that its mobility features supported issues such as back problems. Thus, these findings indicate that before the arrival of devices such as the tablet device, health issues prevented these older individuals from using devices that were less mobile such as desktop computers or devices with smaller screens than the tablet. Thus, emphasising the benefits of devices such as the tablet computer to older adults generally.

Furthermore, previous studies have suggested that the main reason older adults do not adopt technology because they lack interest (Selwyn, 2003; Heinz, 2013). Similarly, result from the quantitative study showed that over half of the non-adopters (58.5%) indicated they had no particular reason for not using the tablet but were simply uninterested. In addition, studies such as that of Roque and Boots (2016); Selwyn (2003) found that one of the factors affecting older adults use of ICT is the lack of technology proficiency or self-efficacy. Evidence of this was shown in this study with the hypothesis linking perceived behavioural control to intention behaviour being supported. One of the measures of perceived behavioural control was related to self-efficacy, thus, confirming its effect on adoption and use behaviour.

More so, with regards to the usability of tablet devices and its impact on adoption and use behaviour, it was observed that some of the older adults referred to the usability of the tablet device in terms of its design. This includes its screen size, touch-screen, mobility and portability features. This aspect was mainly demonstrated in the qualitative study. For instance, one of the participants referred to the touch-screen feature in his tablet and how he found it easier to manoeuvre his way around the device because of this feature. The screen size of the tablet was also noted to be helpful to those who have visual limitations. This finding corroborates the finding of Barnard et al. (2013), who examined how older adults learn to use new technologies. In addition, this confirms that the tablet device has many benefits to offer older adults especially those battling with certain health issues.

The usability of the tablet was also indicated in the sort of activities it was used to accomplish. Generally, from the quantitative result, it was observed that the three main activities that the older adults use their tablets for include browsing activities such as checking emails and social networking, shopping online and reading online. This is almost similar to a Nielsen report where it was suggested that the three main activities carried out on a tablet device include social networking, checking emails and watching TV/videos (Nielsen, 2011). However, it was noted that there was an age difference in how the tablet was being used. For instance, it was noted that whilst the Pre-seniors used their tablets mainly for browsing activities more than other age groups, the Very-old group used their tablets for health and wellbeing.

To summarise, it was observed that the tablet device has a range of benefits to offer older adults generally. This was deduced from the results, which indicated that older adults recognised that the tablet supported their ageing status, helped maintain social connection with people and reduced boredom. For instance, in terms of reducing boredom and maintaining social connection, a respondent from the qualitative study stated, *"…as I am* *recently widowed, I needed something to keep me busy and connected to people especially my family…"* This means that this respondent viewed the tablet as a means of overcoming depression, boredom and also remaining connected to the society. Similar to this finding, previous studies have found that ICT can help older adults remain socially connected, reduce the feeling of loneliness and depression, provide access to information and overall provide support for a better quality of life (Chen and Schulz, 2016; Narkwilai et al., 2015; Cotton et al., 2014). Thus, having older adults use devices such as tablets will not only reduce the present social issues but will also address the health issues faced by these older adults.

6.9.6 Digital divide

This section discusses the digital divide and provides answers to the research question on the age-related divide in tablet adoption and use.

As mention in the literature review, the presence of ICT has led to an issue termed the digital divide. Some studies have categorised the digital divide into first and second levels, where, first level digital divide refers to physical access and second level refers to skills and literacy of using technology (Tsai et al., 2015; Friemel, 2016; Madden et al., 2013; van Dijk, 2006). In particular, Friemel (2016) suggests that the digital divide has gone beyond having physical access to technology and its artefacts and the current divide, which is also known as the second digital divide stems from lack of skills. This implies that an improvement in the proficiency level or skills in using technology might help reduce the second digital divide. In line with this, findings from this study indicated that one of the factors that might help boost an older adult's proficiency level is the 'opportunity to try' the technology. This was also indicated in Rogers DOI model where it was referred to as triability (Rogers, 2010). In other words, proficiency or self-efficacy might be gained from trying out the technology, which in turn impacts on intention behaviour. This assumption is mainly based on the finding of the qualitative study where some of the participants indicated that the idea to use tablets stemmed from their ability to try it out first. For instance, an individual in the qualitative study indicated that she was presented with an opportunity to try an Apple iPad for free, liked using it and ended up purchasing it as a result. Considering this, the ‘opportunity to try’ might help an older adult to gain confidence and improve their skills in using technology generally and subsequently impact on intention.

Furthermore, previous studies suggest that there is a generational divide existing among the older population with the 75+ years being on the negative side of this divide (Damant et al., 2017; Friemel, 2016). In particular, in their study, it was found that the 65-74 years (‘younger’ older people) age group use the Internet, tablet devices and mobile phones more than the over 75s (Damant et al., 2017). Similarly, in this study, it was indicated that the 60-69 years age group used the tablet device more than the 75+ years. In addition, findings from this study also revealed that there is a significant age-related difference in the factors that impact on adoption decisions. Specifically, the quantitative result indicated that whilst there was no significant difference between the Pre-seniors and Young-old group with regards to impact of the hypothesised constructs on adoption and use, however, there were differences between other age categories. For instance, there was a significant difference existing between the Pre-seniors and Very-old group with regards to the impact of perceived behavioural control (PBC) on intention. This implies that the level of control in terms of knowledge, skills and resources perceived by each group determines their intention. Subsequently, findings from the qualitative study indicated that majority of the participants who had previous computer experience (indicating skill and proficiency) based this as one of their reasons for adopting tablet device, thus, validating the link between PBC and intention. On assessment, these group of participants were in their 50s and 60s except Liz the 85-year-old lady, thus confirming the age-related difference. Similarly, in the study of Damant et al. (2017), it was suggested that the ‘younger’ older people had an advantage over the 75+ years old because they were able to gain experience with using technology from their workplace, which helped boost their skills and literacy (Damant et al., 2017). This further emphasises on the connection between knowledge, skills and literacy in determining intention behaviour. Moreover, this results also concurs with the finding of Gascon et al (2015) who revealed that past experience in combination with the social context in which the technology is introduced plays a fundamental role in influencing adoption and use decisions.

To summarise, a study by Czaja and Sharit (1998) showed that there was no age difference in overall attitude towards computers. However, in contrasts, the result from this study found that age impacted on the older adults' attitude towards tablets. Considering that attitude had the strongest influence on intention and was determined by compatibility, perceived ease of use, perceived usefulness and trust. This implies that indirectly, perceived ease of use, compatibility, perceived usefulness and trust are also important predictors of intention for the older population. Subsequently, perceived behavioural intention and subjective norm are also predictors of intention.

6.10 Contribution of the research

Firstly, an intensive review of literature was conducted on the adoption, use and diffusion in the context of older adults and tablet devices. During this process, the research gap was identified and this gap suggested that studies specifically investigating the adoption, use and diffusion of tablet devices by older adults are limited. Furthermore, to address this gap, a specific conceptual framework was formed to investigate the adoption, use and diffusion of tablet devices from the perspective of older adults. Therefore, in the light of this, this study contributes conceptually to adoption, use and diffusion research in the context of older adults and tablet devices. Consequently, this framework can be applied to other older adults' adoption and diffusion studies in developed countries and in areas that have similar characteristics with the research site: Hertfordshire County. Moreover, this study also provides literature on the topic of older adults' adoption, use and diffusion of tablet device, given that there are few studies addressing this particular topic.

Consequently, to verify and validate the conceptual framework developed, empirical data was gathered. The empirical work in this study provided an avenue for demonstrating that the conceptual framework can be applied to practice. For this purpose, SEM was used to analyse the conceptual relationship between the selected constructs. This was achieved by comparing the conceptual framework of the research with the empirical data collected using quantitative method. This aspect helped to provide an understanding on how the selected constructs impact on an older adult’s adoption and use of the tablet device. Consequently, this study also contributed empirically through the quantitative data collected within the context of older adults and tablet devices.

Moreover, to verify the quantitative result of the study, an evaluation process was carried out using qualitative method (see section 6.6). This evaluation process also helped to gain in-depth understanding as well as verify the practicality and effectiveness of the hypothesised constructs from the older adults’ perspective. Thus, this study contributed qualitative information on the adoption and use of tablet devices through the evaluation exercise conducted.

6.11 Reflection on my PhD journey

My PhD journey – one of my personal development plan and an entirely new experience that started in May 2013. In fact, the decision on the research topic for this PhD project stemmed from the discovery made while completing my Masters program. Specifically, the final stage of the Masters program was completing the dissertation process and it was during this process that I was first introduced to the research subject area, which was how my interest in the subject developed. In particular, the topic researched for the dissertation at the time was ‘Examining the project success and failures of E-government in a local community: United Kingdom’. So, while researching on this dissertation topic, my discovery was that older adults are often on the negative side of the digital divide i.e. they are one of the groups not benefiting from ICT. However, as one with ageing parents, I feel that older adults stand a better chance of overcoming issues such as loneliness through the use of ICT, which is why the main goal of my PhD project was to develop an understanding on the factors that enable or hinder the adoption and use ICT from an older person’s perspective. Additionally, as someone with a background in statistics, my natural instinct is usually in favour of the quantitative method. However, this PhD thought me that to acquire in-depth understanding of a phenomenon, one often needs the qualitative method or attribute.

Now, on reflecting on my journey towards completing this PhD, it can be said with confidence that my PhD journey is one of the greatest hurdles I have ever faced in my entire life. Whilst, a part of the journey has helped me improve marginally especially in terms of my views on life generally, others were filled with so much stress and pressure. In fact, on countless occasions, I questioned myself about the benefits of this PhD. In fact, the initial challenge was how to go about achieving the research topic. Specifically, it was not an easy task to investigate the factors that influenced older adults' adoption and use of technology using primary data. This is because, in the course of carrying out this research, it was learnt that some older adults are often sceptical around strangers especially those older adults who live alone. Furthermore, some older adults are traditionally known to "fear" technology because of issues like cybercrimes and risk to their privacy. Thus, the combination of a stranger approaching them and the study being centred on technology did not go down well for both the researcher and some of the older adults approached. In addition, being an international student with not so much network of contacts especially within the age group being investigated, conducting this research was quite challenging. The lesson learnt from this is how critical it is to pre-establish networks or contacts for conducting such research in the future. In addition, from my experience during this study, it was discovered that having good communication skills is synonymous and an important aspect to achieving a successful study or succeeding in life generally.

Consequently, conducting this research study has benefitted me both personally and academically. For instance, in terms of academics, it helped to improve my skills with regards to conducting research generally. For instance, part of the requirement of this PhD is to prepare a report also known as thesis. My thesis preparation was a frustrating and stressful process because it was quite a challenge to shape my thoughts and put these thoughts in writing. Specifically, while preparing this thesis, I was able to understand true meaning of the word “information overload”. This was because it was difficult to decide what information was relevant to include in the thesis report. However, guidance and encouragements from my supervisors, colleagues, family and friends helped me overcome this hurdle. It was also learnt that the key to successfully achieving a big project like this one is to have a feasible plan, good time management, perseverance, prayer as well as knowing when to take a step back. In addition, analysing the data collected during the study helped me gain some statistical skills such as using SPSS, SMART PLS etc. It is my belief that these skills would be useful for my job hunt as well as increase my career portfolio.

On a personal level, I used to have a lot of self-doubt and had difficulties with motivating myself. However, the pressure faced during the process of this research helped me improve on these aspects. For instance, it usually is a bit difficult for me to study alone but then I realised that “PhD” is a “one man” journey, which requires a lot of self-motivation. Moreover, considering that there were deadlines to be met, some principles related to motivation were adopted to ensure the successfully completion of this PhD. For instance, I often play a lot of games on my phone and watch a lot of TV series but I had to tell myself “you need to cut down on the time you spend on these trivial things and focus on getting your research done”. Another motivating factor considered was the amount of money spent on my fees and each time I remember the loss that will be incurred if my PhD project were to be abandoned, I push myself harder. Thus, completing this thesis taught me that I could motivate myself if I put my mind to it.

To summarise, I am aware that in submitting this report, my journey has not ended, as I still need to go through the final challenge, which is the viva. This brings to mind something my dad always says, *“Uchedaddy, remember, it is not over until it is over”*. Thus, that being said, I look forward to scaling and overcoming the final hurdle – the viva.

6.12 Summary of Chapter

In this chapter, the quantitative result from the previous chapter was evaluated and validated.

This process was achieved using qualitative method that involved conducting telephone interviews with 14 selected individuals. These interviews provided more insights in explaining how the hypothesised constructs were linked. Following this, the result gathered from the pilot study was discussed after explaining the limitations that should be considered when interpreting the result of this pilot study. Furthermore, in this chapter, the results of the quantitative and qualitative studies were discussed.

To summarise the chapter, a reflective exercise of the researcher's PhD journey including lessons learnt in the process was also discussed.

Chapter 7: Conclusions

7.0 Introduction to chapter

This study assessed the factors that influenced older adults' adoption and use of ICT in the form of tablet devices. The report was split into seven chapters to give appropriate details of each step taken in the study. The following provides a summary of the contents of each chapter.

Chapter one: In this chapter, the story of the research was told, which included the reasons for the research venture. It was also in this chapter that the research gap was identified, which led to the research aim, objectives and questions. Furthermore, the contributions, scope and research approach were provided. These aspects were included to define the amount of generalisation that can be drawn from the study. Finally, an outline of the entire thesis was provided in the chapter, in order to provide readers with a step-by-step guide on the content of the thesis.

Chapter two: In this chapter, a critical review and analysis of relevant literature was conducted, to provide an understanding of the phenomenon being studied. The relevant studies were including adoption studies, ageing studies, digital divide studies and generally ICT studies. It was from this review that the rationale behind selecting the tablet device for assessing the pattern of adoption and use of technology among older adults was examined and discussed. Furthermore, from the review of literature, the theories that guided the development of the conceptual framework for the study were identified. In addition, the development of the 9 hypotheses tested was also conducted in chapter two.

Chapter three: This chapter provided detailed discussion with regards to the methodology adopted in this study. This discussion included the philosophy guiding the researcher as well as the data collection method and analysis techniques employed in this study. It was also in this chapter that the details of the research site, which is the Hertfordshire County in UK, were provided. Furthermore, considering that the research involved human participants, this chapter also discussed the ethical measures that were taken in this study.

Chapter four: In this chapter, details of the first two phases proposed in chapter three, which involved conducting content validity and pilot test were provided. This included discussion on the content validity process and how this measure helped to shape the research. Furthermore, the findings and analysis of the pilot study, which involved data from 203 participants between the ages of 18 years and over, was provided. Notably, from the result of the pilot study, the FTDA model proposed in chapter two was confirmed suitable for the study. In particular, the result showed that the R^2 values derived for intention and attitude were adequate. In conclusion, the pilot study also helped in the preparation for the final study.

Chapter five: In this chapter, the findings and analysis of the final study were presented. This chapter was the focal point of this study given that it provided the information for drawing conclusions. Specifically, this chapter helped to provide an insight on the subject in question, which involved testing the hypothesised constructs. From the results, it was indicated that seven out of the nine hypotheses proposed were supported. Furthermore, it was identified in the chapter that the FTDA model was not suitable for predicting actual use, however, it was suitable for predicting intention and attitude. In summary, it was also identified from the chapter that age and health status were linked to the intention to adopt and use technology among those aged 50 years and over.

Chapter six: In this chapter, the validation of the findings in chapter five was conducted. This was achieved by conducting an evaluation using qualitative methods. This method involved conducting telephone interviews among 14 tablet adopters. In addition, this aspect added value to the study’s findings by offering more insights for explaining the phenomenon being studied. To summarise, detailed discussion with regards to the findings from the pilot and final study, which provided answers to the research questions, were also provided in chapter 6.

Having completed these preceding chapters, this chapter will provide a general conclusion drawn from the result gathered in the course of carrying out the research work. Following this, the implications of this research work to academia, policy-makers and industry is discussed. Furthermore, the limitations of the study along with the future directions or recommendations are also discussed in this chapter.

7.1 Research conclusion

From the results of this study, the following conclusions and recommendations were obtained. Firstly, the findings of the study sufficiently demonstrated that the FTDA model proposed was appropriate in predicting intention behaviour and attitude towards adopting and using tablet devices. This was deduced from the r-squared values of 77.4% and 84.1% respectively.

Overall, result showed that attitude, perceived behavioural control and subjective norm were significant determinants of the older adults' intention behaviour towards the tablet device. On the other hand, compatibility, perceived ease of use, perceived usefulness and trust were significant predictors of attitude towards adopting and using the tablet device. Attitude was shown to have the strongest impact on the intention to use tablets among the older adults while, perceived usefulness had the strongest impact on attitude. In addition, the effect of trust on intention behaviour was shown to be significant only among the Very-old group (80+ years).

Furthermore, age, gender, education and health status were used to moderate the effect of the four key variables (ATT, PBC, SN and TRU) influencing intention behaviour. Result indicated that age and health status moderated the effect of attitude on intention to use tablets among the older adults. In addition, it was also shown that age moderated the effect of perceived behavioural controls on intention to use tablets among the older adults.

Subsequently, past studies have shown some considerable variation in the way older adults adopt and use ICT. For instance, digital divide studies such as that of Choudrie et al. (2010); van Dijk and Hacker (2003); Selwyn (2003) have provided evidence proving that there is a generational difference in the adoption and use of ICT between the older generation and the younger generation. Furthermore, Broady et al. (2010) emphasized that although older adults may not use technology as much as the younger adults however, the negative stereotypes of older adults being technophobic and incapable of using ICT is now out-dated. Evidence of this was found in this study that given the right device, this stereotyping of older adults has faded. For instance, in the pilot study, it was indicated that between the young adults and the older adults, the older adults were on the positive side of the digital divide in terms of adopting and using tablet devices. This might be because the design of the tablet device has some ageing specific features, which makes it a suitable device for the older adults. For instance, most tablet devices have large screen size, which will be suited for older adults who are visually impaired. In addition, its mobility feature will be suited for older adults who have mobile issues or back problem or basically require being comfortable while using any device as was indicated by some of the respondents in the qualitative study. Thus, emphasising on the potentials of tablets in encouraging older adults to be digitally included.

In addition, Damant et al. (2017) also identified that there is a generational difference existing within the older population. The result of this study confirmed this generational difference existing within the older population. Specifically, there was a difference in the adoption and non-adoption of the tablet device among the age groups. For instance, among the non-adopters of tablets, the 80+ years age group dominated the category of non-adopters while the least non-adopters were from the 50-59 years age group. In addition, for the adopters, it was observed that the 50-59 years age group used their devices mainly for browsing activities including checking emails and social networking while the 90+ years age group used their device for health and wellbeing.

In terms of reasons for non-adoption, majority of the participants indicated that there was no particular reason for non-adoption and simply did not see the need to adopt the tablet. This is almost similar to the suggestion of Selwyn (2003) who argued that non-adoption is mainly linked to lack of interest. More importantly, it was noted that among those who indicated the 'too old' option as their reason for non-adoption, 0% of the 50-59 years old belonged to this category. This implies that this age group generally do not consider themselves too old for technology rather have other reasons for non-adoption.

Subsequently, result indicated that the health status of these older adults plays a major role in determining the adoption and use of technology, Specifically, it was observed that the health issues, which these older adults often face might be the reason behind the non-adoption of technology. For instance, it was noted that issues such as high blood pressure, anxiety disorder and visual impairments impacted on the use of technology among the older adults. Specifically, result showed that the non-adopters dominated the group who suffered from high blood pressure, which in turn impacted on their use of technology. In relation to the finding of Riedl et al. (2012), it is likely that these non-adopters are indirectly being affected by technostress. Moreover, it was observed that the non-adopters represented a small percentage (9.2%) of those who stated that no ailment prevented them from adopting and using technology. Meanwhile, the tablet adopters (87.9%) dominated the group of participants who indicated that they had no health issues hindering them from using adopting and using technology. Therefore, these findings confirm the implications of health status on the adoption and use of technology.

Furthermore, it is common knowledge that the slow adoption of ICT especially among the 75+ years old is often due to lack of training and skills in its use (Broady et al., 2010; Choudrie et al., 2013; Damant et al., 2017). However, due to the present aging of population, older adults are currently remaining in the workforce and most organisations these days conduct daily activities online. This implies that future older adults will likely gain skills from the workplace. This connection between the workplace and being proficient with technology was indicated in the qualitative result. Specifically, it was found that participants who demonstrated proficiency or skills with using their tablets indicated that they had or currently use computers in the workplace. Therefore, there is the likelihood that over the years, future generation of older adults will gain more experience with using ICT from the workplace and perhaps the suggested generational difference due to lack of experience will disperse. In addition, given the present trend of technology uptake especially among the older group and perhaps further improvements in ICT designs such as the tablet device, it is possible that the future generation of older adults might not face some of the difficulties currently encountered by the current generation of older adults. However, like the present older adults, changes in health status due to ageing might still lead to inability in use of ICT for the future generation older adults. For instance, it was observed that majority of the participants in the main study who stated that they do not use the Internet, indicated that certain ailments such as visual impairments and learning difficulties prevented their use of it. Therefore, it is recommended that designers of technology gadgets consider these issues when developing technologies in order to ensure that everyone in society continues to gain from the benefits associated with ICT. Specifically, technologies should be designed for the older adults' market segment with consideration given to age-related changes while developing the designs.

Moreover, findings from this study revealed that the Apple iPad is the most adopted tablet among these older adults. This might be because those adopting it have observed the iPad is easy to use and does not require too much mental or physical effort. Considering that this study did not focus on one particular brand, this assumption is based on the findings of Tsai et al. (2015) who also found that most of their participants used the iPad. Furthermore, in their findings, the reason the older adults gave for using the iPad is that they find it intuitive and easy to use. Based on this, developers should explore further on the particular features in the iPad that makes these older adults view it as easy to use and then, design technologies that will serve the older adults' market segment.

Finally, from the results, it was observed that older adults mainly used their device for accessing information and social communication. For instance, in the qualitative study, majority of the participants indicated that the tablet was a way of communicating and remaining connected to family members, friends and other social connections. These findings suggest that the tablet devices play a fundamental role in keeping older adults connected to society, which in turn will reduce boredom, loneliness and overall an improved quality of life. Thus, this indicates that the tablet device might be a way of encouraging the digital and social inclusion of older adults in the e-society.

7.2 Implications of research

The findings from this study have numerous implications for academia, industry and policy-makers. Therefore, the following 3 sections (7.2.1, 7.2.2 and 7.2.3) provide details on the implications of the study to the three categories mentioned.

7.2.1 Implication to academia

This study contributes to the theoretical and empirical research on older adults and the adoption and use of technology. In particular, this study offers an insight into the adoption and use of tablet devices from the perspective of older adults residing in UK. Thus, this study offers knowledge from the perspective of an important demographic group. Theoretically, this study presents a relatively novel model to explain the variation in tablet adoption and usage by integrating the DTPB model with a trust construct. In other words, the FTDA model was founded on DTPB with the inclusion of trust to ensure that the aspect of apprehension usually associated with the adoption of technology was considered. Moreover, there has been little research on DTPB with the inclusion of moderating factors. This implies that the FTDA model, which included certain moderating factors, adds a unique perspective to ageing studies.

Result also showed that perceived behavioural control significantly impacted on intention behaviour and was moderated by age. In particular, it was observed that the younger the individual, the higher the positive effect of perceived behavioural control on intention to use tablets. This might be because the younger group (50-69 years) of older adults are more proficient with technology than the older group (70+ years). More so, the study gathered information through quantitative methods and evaluated the results of the quantitative study using qualitative methods. Data from the qualitative study provided more insight and an explanation on how the hypothesised constructs in this study linked with each other, therefore, increasing the robustness of the findings.

7.2.2 Implications for industry

The result of this study also has some implications for the developers of ICT artefacts for designing suitable technology for older adults. For instance, the result of this study indicated that attitude has the strongest influence on intention behaviour and was moderated by age and health status. In addition, this study provides evidence of the role of perceived ease of use and its influence on attitude towards technology especially among the Old-old and Very-old group. Specifically, the result indicated that the older the individual, the stronger the negative impact of attitude on intention. One possible explanation for this might be that these age groups need more effort to learn new technologies and subsequently, this situation negatively impacts on their attitude towards the technology. Moreover, it was noted that age-related changes in health impacts negatively on the adoption of technology. Thus, developers and marketers should focus on designing and promoting ageing-friendly devices that will be suitable for this group of population. Specifically, attention should be focused on the usability features of the technology in order to encourage the market segment of the 70+ years age group.

7.2.3 Implications for policy-makers

Furthermore, the result from this study also has some implications for policy-makers. As mentioned earlier, ICT has infiltrated many aspects of society and at the same time, UK like many other nations is currently facing a geriatric explosion, which means that sooner or later, the growth of the economy will depend on older adults and their involvement in the information society. This implies that digitally including older adults will be beneficial to UK society in the long run. However, certain factors prevent the older adults from being digitally engaged. Specifically, result showed that the adoption and use of technology is related to the health status of older adults. For instance, in this study, it was observed that ailments such as high blood pressure, anxiety disorder, visual impairments and learning difficulties impact on the adoption and use of technology. Concurring with studies such as that of Delello and McWhorter (2017), result also indicated that tablet devices are capable of supporting older adults in managing certain age-related health risks such as loneliness and boredom. Moreover, findings also indicated that the mobility features and screen size of the tablet also supports those who have ageing issues such as back problems and visual impairments. It was also noted that the Very-old group (80+ years) used their tablets mainly for health and wellbeing. More importantly, the tablet device can serve as a calendaring and reminding tool as was highlighted by one of the participants in the qualitative study. This feature of the tablet can be beneficial to older adults in terms of adhering to medications as well as keeping records of activities going on around them. In summary, these findings emphasise the potential of devices such as tablets in helping older adults remain independent and socially included, which in turn might lead to an improvement in their quality of life. Thus, considering that policymakers often look for cost-effective strategies that will help provide support to older adults without compromising their safety. For instance, some of these strategies include strategies that will encourage older adults remain independent as well as remain in their homes because it is more cost-effective than putting them in institutional care homes. In other words, policy-makers are often interested in options that will ensure older adults receive effective and efficient healthcare while maintaining their independence. Therefore, these findings will be useful to policy-makers because it provides information that policymakers might manipulate to facilitate citizens adoption and use of ICT, which in turn will see to its successful diffusion in the UK.

7.3 Limitations and future directions

This study provided some key findings in terms of tablet devices and older adults adoption pattern. However, care should be taken when interpreting and making generalisation about the results. For instance, in ensuring the feasibility of completing the study within the required timeframe, data was collected from a specific area in UK, which is considered to be just a fraction of the Country. Thus, the older adults used in this study may be different from other older adults residing in other parts of the Country. Therefore, future research should consider assessing the adoption of tablet devices in other parts of the Country.

Subsequently, this study focused on adoption of use of tablet devices generally and it was found that the Apple iPad was the most utilised tablet device, which concurred with studies such as that of Tsai et al. (2015). In addition, it was observed that studies that have investigated the adoption of tablet device in terms of brands have often selected the Apple iPad (Dellelo and McWhorter, 2017). Presently, there are different brands of tablet devices and each one has its own uniqueness. Based on the uniqueness of each brand, the adoption and use by brand might show different patterns. However, the impact on users' adoption of a particular brand of tablet is limited especially for other brands aside from the iPad. Therefore, for future studies, it is recommended that the adoption and use of a particular tablet device such as Samsung Galaxy, Barnes Nook etc. should be researched.

Furthermore, due to time and resource constraint involved in observing actual behaviour, this study employed a survey-based technique to examine the actual use of tablet. However, an experimental design will likely provide more credible result for assessing the relationship between intention behaviour and actual behaviour. Considering this, a longitudinal study will help to improve the findings from this study especially as tablets are increasing older adults use of the Internet. Therefore, future research should consider using a longitudinal study for assessing the actual use of tablet and how the other variables in the FTDA framework affect it over time.

Moreover, it was mentioned earlier that non-probability sampling method was employed in collecting data for the research. Although, bootstrapping and weight adjustments were applied to the data in order to make up for the sampling variances. However, using this sampling method usually does not give individuals equal chances of participating. In addition, even though a qualitative aspect was included in this research for evaluating the quantitative result. However, the sample size was small and data was collected via telephone interviews, which is biased in its own self. Therefore, this also reduced the level of generalisation that can be drawn from the qualitative result. Therefore, future research should explore alternative sampling method such as the probability sampling technique for improving the extent of generalisation to other counties in UK.

Finally, it should be noted that this study could be generalised to other counties/countries that share similar attributes with the research site or the demographic group from which data was drawn. For instance, an attribute to consider when making generalisations could be similar level of Internet, tablet and mobile device penetration.

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Appendices

Appendix 1: Literature related to older adults and ICT

Literature related to Age/Older adults and ICT			
Author(s)/Year	**Journal/Article/Conference**	**Title**	**Key findings**
Czaja and Sharit (1998)	The Journals of Gerontology	Age difference in attitude towards computers	This study investigated the age difference in attitude towards computers using a sample of 348 respondents aged between 20-75 years. Result indicated that there was no age difference in overall attitude. However, age had an impact on comfort, efficacy and control. In addition, computer experience has a positive impact on attitude
Hawley-Hague et al. (2014)	International Journal of Medical Informatics	Older adults' perceptions of technologies aimed at falls prevention, detection or monitoring: a systematic review.	This study aimed to provide an overview of older adults' perception in terms of falls technologies. Systematically reviewing 76 relevant literature, result showed that factors such as usability, feedback gained and cost are significant in supporting attitudes or perception
Coelho et al. (2017)	International Journal of Human-Computer Studies	"You, me & TV"—Fighting social isolation of older adults with Facebook, TV and multimodality.	This research carried out a longitudinal study to assess the usability and functionality of a TV enhanced Facebook prototype for older adults. Result showed that the use of this new gadget, increased the online and offline interactions of previous Facebook non-users with family
Cotton et al. (2012)	Computers in Human Behaviour	Internet use and depression among older adults	The aim of their research was to examine the correlation between internet use and depression among retired Americans within age 50 and over. Findings showed that internet usage by older adults had the potential of reducing depression categorisation by roughly 20-28%.
Green and Rosall (2013)	Age UK report	Digital inclusion evidence report	The report measured the number of those that are digitally excluded in the UK. This measurement was done by adding together the estimates provided by office for national statistics (ONS) for those who had never used the internet with the estimates of former users. It was found that over two-third (66.79%) and over 82% of the digitally excluded belonged to the population of those aged 65+ years and 55+ years respectively
Delello and McWhorter (2017)	Journal of Applied Gerontology	Reducing the digital divide: Connecting older adults to	The study aimed to determine whether the use of ICT in the form of iPad could improve the lives of older adults in terms of knowledge, family ties and generally, social connections. Employing a mixed method, data was

Literature related to Age/Older adults and ICT			
Author(s)/Year	**Journal/Article/Conference**	**Title**	**Key findings**
		iPad technology.	collected from 135 participants whose were between 61-99 years of age. Findings revealed that the use of iPads by the older adults provided a means for learning and thus, increased their knowledge and impacted positively on their social interaction.
Tsai et al. (2016)	PLOS One	Perceptions of a specific family communication application among grandparents and grandchildren: An extension of the technology acceptance model.	The study examined the acceptance of a system called Memotree, which was designed to encourage intergenerational family communication. Using TAM model, data was collected from 39 grandchildren and 39 grandparents. It was found that the affordance of technology and the perceived ease of use have a significant positive influence on perceived usefulness.
Neves et al (2013)	Sociological Research Online	Coming of (old) age in the digital age: ICT usage and non-usage among older adults.	The study examined the adoption, usage and non-usage of ICT in the form of mobile phones, computers and Internet among older adults in Portuguese. A sample of 500 respondents within the age of 64 years and over was used for the survey while 10 qualitative interviews were also conducted. Findings showed that generally, non-usage were mainly linked to attitudinal and functional variables rather than physical or ageing in itself. However, the use of mobile phones and computer were influenced by age and education
Chen and Chan (2014)	Technovation	Predictors of gerontechnology acceptance by older Hong Kong Chinese	Data was collected from 1,012 respondents aged 55+ years. The intention was to evaluate the factors that influence the acceptance of gerontechnology by older adults in Hong Kong. Result showed that technology self-efficacy, facilitating conditions and anxiety had more predictive power than perceived benefits with regards to determining the older adults' behaviour in using gerontechnology.
Wood et al. (2005)	Journal of Applied Gerontology	Use of computer input devices by older adults	Data was collected from 85 older adults with the intention of addressing the effect that four different input devices have on the ability of older adults to navigate computer tasks effectively and efficiently. Findings revealed that past experience with computers had a significant effect on the type of device that produced the highest speed and accuracy in terms of performance.
Kania-Lundholm and Torres (2015)	Journal of Aging Studies	The divide within: Older active ICT users position themselves against different others.	Data was collected from 30 older users aged between 66-86 years old through the focus group method. The aim was to explore how older adults understand and engage with digital technologies. Result indicated that older adults informally create the divide between themselves and other (non)-users.

Literature related to Age/Older adults and ICT			
Author(s)/Year	**Journal/Article/Conference**	**Title**	**Key findings**
Coughlin et al., 2007	Engineering in Medicine and Biology Science	Older adult perceptions of smart home technologies: implication for research, policy and market innovations in healthcare	The aim of the study was to understand technology adoption by older adults as well as identify the role of public policy and market innovations in promoting the availability and diffusion of effective technology. Using a workshop and focus group method, data was gathered from 30 aging service leaders and aging policy advocates. Findings revealed a variety of concerns including usability, reliability, trust, privacy, accessibility and affordability. The findings also revealed that there was inadequate awareness in the aging community in terms of what technology exists and what the capabilities might be or how any of the capabilities could truly improve a person's life.
Pfeil et al. (2009)	Computers in Human Behavior	Age differences in online social networking – A study of user profiles and the social capital divide among teenagers and older users in MySpace	This study aimed to examine the age disparity and similarities in the use of MySpace. Data was gathered using web crawlers and it was found that younger users (aged 13 to 19 years) use MySpace more compared to older users (aged 60 years and over) thereby confirming the age-related digital divide
Deng et al. (2014)	International Journal of Medical Informatics	Comparison of the middle-aged and older users' adoption of mobile health services in China	With the aim of examining how older and middle-aged people adopt mobile health services (MHS) in China, the study developed a research model based on TPB, value attitude behaviour model and four aging characteristics constructs. Result showed that perceived value, attitude, PBC and resistance to change were dominant in predicting usage of MHS among the middle-aged group. While, among the older group, attitude, PBC, technology anxiety, perceived values and the need for self-actualization were dominant in predicting usage of MHS.
Luijkx et al. (2015)	International Journal of Environment Research and Public Health.	"Grandma, You Should Do It—It's Cool" Older Adults and the Role of Family Members in Their Acceptance of Technology.	This study investigated the influence family members have on the use of ICT by older adults. Data was collected from 53 older adults through interviews. Findings revealed that the influence of each family member has its own uniqueness. Thus, it is important to include all family members when implementing and maintaining the use of technology in the lives of older adults.
Wagner et al. (2014)	Computers in Human Behavior	The impact of age on website usability	In this study, the effects age has on website usability was assessed through cognitive antecedents. A laboratory experiment involving both young and old participants was used to collect data. It was found that age has a

Literature related to Age/Older adults and ICT			
Author(s)/Year	**Journal/Article/Conference**	**Title**	**Key findings**
			significant impact on performance both directly and as a mediator.

Appendix 2: Literature related to older adults and mobile technology/ tablet devices / ubiquitous computing

Literature related to Older Adults and Mobile technology / Tablet devices / Ubiquitous computing			
Author(s)/Year	**Journal/Article/Conference**	**Title**	**Key findings**
Mang and Wardley (2012)	Journal of Information Technology Education	Effective adoption of tablets in post-secondary education: Recommendation based on a trial of iPads in university classes.	The aim was to examine the use of Apple iPads in enhancing the academic experience of students. Using 47 students for the trial, it was found that including Internet based activities would encourage the students to use the device for information sharing and collaboration with one another, which in turn will enrich their learning experience.
Sclafani et al. (2013)	Journal of Medical Systems	Mobile tablet use among academic physicians and trainees.	In an attempt to quantify the pattern of using mobile technologies for clinical care, an online survey was administered via email to all ACGME training programs. Findings revealed that 40% of respondents were tablet owners and nearly half of this number used their tablets in clinical settings for accessing electronic medical records
Barnard et al. (2013)	Computers in Human Behaviour	Learning to use new technologies by older adults: Perceived difficulties, experimentation behaviour and usability	This study assessed the factors and theoretical frameworks for the adoption of technology in the context of older adults and tablet devices. Findings gathered from a case study of 13 older people aged 65 and over indicated that facilitating conditions plays a major role during initial adoption and use of digital technologies by the older adult group
Andone et al. (2016)	Proceedings of the 2016 ACM International Joint Conference on Pervasive and Ubiquitous Computing	How age and gender affect smartphone usage.	The study assessed the differences in the use of smartphones in terms of gender and age. In terms of gender, it was found that females use smartphones longer than males. In terms of age, older adults use their smartphones mainly for gathering information while younger ones use it mainly for entertainment and social interaction.
Magsamen-Conrad	Computers in Human Behavior	Bridging the divide: Using	Using 899 respondents who are aged between 19-99 years old to assess the behavioural intention to use tablet

Literature related to Older Adults and Mobile technology / Tablet devices / Ubiquitous computing			
Author(s)/Year	**Journal/Article/Conference**	**Title**	**Key findings**
et al. (2015)		UTAUT to predict multigenerational tablet adoption practice	devices across multiple generations. It was found that there was significant generational difference in the use of tablet devices precisely between the oldest and youngest generations
Courtois and D'heer (2012)	Proceedings of the 10th European Conference on Interactive TV and video. ACM.	Second screen applications and tablet users: constellation, awareness, experience and interest.	The aim was to investigate how tablet users integrate multiple media in their experience of viewing television. A sample of 260 respondents from Northern Belgium produced results that indicated the that most of the tablet users use their tablets in the living room and incorporate it with the experience of watching TV.
Chan et al. (2014)	The Gerontologist	Training older adults to use tablet computers: Does it enhance cognitive function?	54 people aged between 60-90 years old were used to assess whether training older adults to use tablet devices (iPads) and associated software applications will help improve cognition and enhance their everyday function through the acquisition of useful skills. Result showed a significant enhancement in episodic memory and processing speed among the tablet users.
Lim et al. (2013)	Gerontology	Usability of tablet computers by people with early-stage dementia	Assessed the usability of tablet device as a source of leisure for individuals with early-stage dementia. 21 individuals with dementia along with their carers were used for the study. It was found that 50% of the dementia participants could use a tablet device without supervision
Jayroe and Wolfram (2012)	Proceedings of the Association for Information Science and Technology	Internet searching, tablet technology and older adults.	With the intention of understanding how older adults interact with different technologies, a comparison between the use of iPad tablet and desktop computers among this group was conducted. Data from 10 computer literate older adults was analysed qualitatively. Result indicated that even though participants found some of the features of the iPad challenging, but overall, they confirmed that they had a positive experience with using it.
Hsiao (2013)	Library Hi Tech	Android smartphone adoption and intention to pay for mobile internet: Perspectives from software, hardware, design and value.	The identification and evaluation of the factors that impact the adoption of android smartphones and the intention to pay for mobile internet services was conducted in this study. The study focused on android smartphone consumers in Taiwan with data collected from 81 valid respondents. Results showed that the intention to use mobile internet services was primarily determined by the user's attitude
Parker et al. (2013)	BMC Geriatrics	Older adults are mobile too! Identifying the barriers and facilitators to older adults' use of m-Health for pain	A sample of 41 over 60-year-old participants was used to examine older adults' attitudes and perception towards using m-Health tools for managing chronic pain. It was found that 42% of the participants indicated cost as a barrier to using the mobile device while 61% indicated training prior to device use as a facilitator for using the mobile device

Literature related to Older Adults and Mobile technology / Tablet devices / Ubiquitous computing			
Author(s)/Year	**Journal/Article/Conference**	**Title**	**Key findings**
		management	
Leung (2015)	Computers in Human Behaviour	Using tablets in solitude for stress reduction: an examination of desire for aloneness, leisure boredom, tablet activities and location of use.	The study aimed to examine how the desire for aloneness and leisure boredom played a role in influencing various activities when using tablets as well as how the location of tablet use and tablet activities impact on the perception of stress. It was found that heavy users of social and fun seeking tablet activities significantly predicted the perceived stress reduction in using tablets.
Ozok et al. (2008)	International Journal of Human-Computer Interaction	A comparative study between tablet and laptop PCs: User satisfaction preferences	The study employed 34 college students in investigating users' satisfaction and preference aspects of tablet devices in comparison to laptops and pen-and-paper environments. Result indicated that the participants were impressed with the computing capabilities and portability of the tablet device. However, majority preferred the laptops to the tablets in terms of their everyday computing needs.
Van Deursen et al. (2015)	Computers in Human Behavior	Modeling habitual and addictive smartphone behaviour: The role of smartphone usage types, emotional intelligence, social stress, self-regulation, age, and gender.	The study surveyed 386 respondents with the intention of determining the indicators of addictive and habitual smartphone behaviour. Result showed that consistent use of smartphone is a significant contributor to addictive smartphone behaviour. It was also found that age has a negative impact on process, social usage and social stress but has a positive impact on self-regulation. Therefore, it is less likely that older adults develop addictive smartphone behaviours.
Tsai et al. (2017)	Journal of Applied Gerontology	Social Support and "Playing Around" An Examination of How Older Adults Acquire Digital Literacy with Tablet Computers.	This study examined how older adults learn to use tablet computers. Data was collected from interviewing 21 tablet owners and results indicated that older adults require social support in other to learn to use tablets. Also, expertise with using the technology is acquired through 'playing around' with the tablets.
Hur et al. (2014)	Cyberpsychology, Behavior and Social Networking	The moderating role of gender and age in tablet computer adoption.	Using TAM and moderating with gender and age, this study examined the factors that influence a consumer's intention to use a tablet device. A sample from 482 participants in South Korea was analysed using partial least squares (PLS) analysis. Result indicated that perceived usefulness and enjoyment had a positive impact on attitude towards using tablets while the attitude towards using tablets had a positive impact on the intention to

Literature related to Older Adults and Mobile technology / Tablet devices / Ubiquitous computing			
Author(s)/Year	**Journal/Article/Conference**	**Title**	**Key findings**
			use tablets.
Shaikh and Karjaluotu (2015)	Telematics and Informatics	Mobile banking adoption: A literature review	The study reviewed 33 journals on mobile banking adoption from the IS, marketing and business administration field as well as articles from conference proceedings. The main focus was on the model, theory and constructs used in the various studies selected. Findings revealed that in terms of mobile banking, compatibility (with lifestyle and device), perceived usefulness and attitude are the most significant determinants of intention.
Wu and Wang (2005)	Information and Management	What drives mobile commerce?: An empirical evaluation of the revised technology acceptance model.	The study aimed to examine what influences user mobile commerce acceptance. Structural equation modelling was used to analyse the data. Findings revealed that compatibility had the strongest influence on behaviour intention. In addition, perceived risk had a significant positive impact on behaviour intention. However, perceived ease of use was found insignificant in determining behaviour intentions.
Zhong (2013)	Computers in human behavior	From smartphones to iPad: Power users' disposition toward mobile media devices.	This study focused on understanding the diffusion of mobile media technology and its influence on individual interaction. Findings showed that out of the number of people using mobile media devices, 98.3% used mostly smartphones compared to 27.2% who used tablet computers. Results further indicated that the personality traits of individuals were fundamental drivers for their usage behaviour
Mehrad and Mohammadi (2017)	Telematics and Informatics	Word of mouth impact on the adoption of mobile banking in Iran	The study investigated the impact of 'word of mouth' on the adoption of mobile banking in Iran. Using SEM to analyse data, it was found than 'word of mouth' had a strong influence on attitude towards using mobile banking. It also had an effect on trust, perceived ease of use and intention to continue using mobile banking.
Müller et al. (2012)	Proceedings of the 14th International Conference on Human-Computer Interaction with Mobile Devices and Services	Understanding tablet use: A multi-method exploration	With the purpose of understanding why and how people decide to use their tablet devices, the study sampled a total of 33 respondents of different age groups across US. Findings indicated that most individuals use their tablet devices repeatedly for the same activities including checking emails, browsing the internet and shopping
OFCOM (2017)	OFCOM's Annual "Adult's Media Use and Attitude report ".	Rise of the social senior	The results of this study are based on a national representative dataset collected from UK's population. The findings revealed that there is an increase in older adults use of technology between the year 2015 and 2016. Specifically, the result shows a striking increase in the use of tablets by the over 75s, from 15% in 2015 to 27% in 2016.

Appendix 3: Literature related to the digital divide and older adults

Literature related to the digital divide and older adults			
Author(s)/Year	**Journal/Article/Conference**	**Title**	**Key findings**
Townsend et al. (2013)	Local Economy	Enhanced broadband access as a solution to the social and economic problems of the rural digital divide.	This study assesses the issues associated with providing broadband in rural parts of Britain with the intention of addressing the digital divide. It was highlighted that there is a digital divide existing between the rural and urban parts of Britain with the rural communities being on the negative part of this divide. One of the barriers suggested to hinder the delivery of broadband services to rural areas is cost.
Nishijima et al. (2017)	Telecommunications Policy	Evolution and determinants of digital divide in Brazil (2005-2013)	Using national data from year 2005-2013, this study analysed the evolution and determinants of the digital divide in Brazil. Findings revealed that between year 2005 and 2013, the digital divide among citizens in Brazil has reduced. However, digital literacy is still a challenge for older citizens.
Kauffman and Techatassanasoontorn (2005)	Journal of the Association for Information Systems	Is there a global digital divide for digital wireless phone technologies?	Collecting data from 43 countries, the study examined the global divide in relation to digital wireless phone adoption and diffusion growth. It was found that the growth of digital wireless phones was faster in countries that had more well-developed telecommunication infrastructure and lower costing wireless network fees.
Okunola et al. (2017)	Government Information Quarterly	The multi-dimensional digital divide: Perspectives from an e-government portal in Nigeria.	This study investigated the effects of the digital divide on Nigerian citizens in using the Nigeria Immigration Service (NIS) website. An online survey was used to collect data from 351 participants. Result showed the existence of a multi-dimensional digital divide in terms of demography, location and socio-economic factors.
Vicente and López (2011)	Telecommunications Policy	Assessing the regional digital divide across the European Union-27.	This study aimed to examine the digital divide across European regions precisely within Dutch, Greece and Bulgaria. Using data collected by the national statistical ministries of each member state via face-to-face or telephone interviews. Results indicated that the regional digital divide reflects to a degree the income gap.
Peral-Peral et al. (2015)	Comunicar	From Digital Divide to Psycho-digital Divide: Elders and Online Social Networks	This research investigated the evolution to the digital divide from the perspective of the elderly with regards to the use of social networks as a communication tool. It was found that psychological variables such as cognitive age, technology anxiety and level of venturousness are more significant in predicting and explain an older

Literature related to the digital divide and older adults			
Author(s)/Year	**Journal/Article/Conference**	**Title**	**Key findings**
			person's behaviour in terms of using online social networks in comparison to the socio-demographic variables.
Peng (2010)	Journal of Computer Information Systems	Critical mass, diffusion channels and digital divide	In this study, the effect of critical mass and the diffusion channels on the adoption of household computer applications was examined. Using secondary data collected by United State Census consisting of a sample of 45272 households. Result indicated that critical mass has stronger impact on general applications and subsequently, exerts stronger impact on specialised applications in late stages of the diffusion process.

Appendix 4: Literature on the theoretical framework of the adoption and use of ICT

Literature on the theoretical framework of the adoption and use of ICT			
Author(s)/Year	**Journal/Article/Conference**	**Title**	**Key findings**
Lu et al. (2008)	Information & Management	Determinants of accepting wireless mobile data services in China	With the intention of identifying factors that influence the adoption of wireless mobile data services (WMDS) in China, a research model was developed through the combination of constructs from UTAUT and TAM with the inclusion of mobile trust. The findings revealed that the intention to adopt WMDS was driven mainly by perceived ease of use and perceived usefulness.
Morris and Venkatesh (2000)	Personal Psychology	Age difference in technology adoption decisions: implications for a changing workforce.	Using the theory of planned behaviour, this study examined the age difference in individual adoption and sustained usage of ICT in the workplace. A sample of 118 workers was used to gather data. It was found that compared to the older workers, the younger workers attitude towards using technology strongly impacted on their usage decision. While, subjective norm and behavioural control strongly impacted on the older workers in comparison to the younger ones.
Teo and Liu (2007)	Omega	Consumer trust in e-commerce in the United States, Singapore and China.	This study investigated the determinants and impacts of consumer trust using data from three countries including, United states, Singapore and China. Findings revealed that reputation, system assurance of an Internet vendor and propensity to trust positively influenced the formation of consumers' trust. Additionally, consumers' trust has a significant positive impact on attitude and a significant negative impact on perceived risk.

Literature on the theoretical framework of the adoption and use of ICT			
Author(s)/Year	**Journal/Article/Conference**	**Title**	**Key findings**
Morris et al. (2005)	IEEE Transactions on Engineering Management	Gender and age difference in employee decisions about new technology: an extension of the theory of planned behaviour	This study extended TPB by including gender and age as moderating factor in investigating technology adoption and use in an organisational context. Data was collected from 342 workers and It was found that age was a key moderating factor impacting on attitude and behaviour towards using technologies. Gender difference was more defined among the older workers.
Gupta et al. (2008)	The Journal of Strategic Information System	Adoption of ICT in a government organisation in a developing country: An empirical study	With the aim of investigating the adoption of ICT by employees in a government organisation, UTAUT was utilized in this study. Result revealed that the four major constructs of UTAUT all positively impacted on the use of ICT. However, the moderating factor gender showed no significance.
Wangpipatwong et al. (2008)	Electronic Journal of e-Government	Understanding citizen's continuance intention to use e-Government website: a composite view of technology acceptance model and computer self-efficacy.	This study aimed to understand the key factors that influence the continuance intention of Thailand citizens towards using the e-Government website. The research model was based on TAM with the addition of computer self-efficacy construct. Data was collected from 614 participants and result indicated that perceived ease of use, perceived usefulness and computer self-efficacy directly impacted on citizen's continuance intention to use e-Government websites.
Kim et al. (2008)	Decision Support Systems	A trust-based consumer decision-making model in electronic commerce: the role of trust, perceived risk and their antecedents	A trust-based model with constructs like perceived risk, consumer trust and perceived benefits was used to assess intention to purchase behaviour. Findings from this study revealed that consumers' trust and perceived risk have strong significant impact on their purchasing decisions. It was also found that consumer's disposition to trust, company's reputation and information quality of the website had a significant impact on online consumers' trust in the website.
Wu and Chen (2005)	International Journal of Human-Computer Studies	An extension of trust and TAM with TPB in the initial adoption of on-line tax: an empirical study.	In their study the research model was based on an extension of trust and Tam model with TPB with the aim of understanding the behavioural intention to use on-line tax. Data was collected from 1032 respondents. The result revealed that attitude towards using on-line tax and perceived behavioural control (PBC) were the main predictors of the intention to use on-line tax by individuals. However, attitude showed a higher explanatory power than PBC.
Macedo (2017)	Computers in Human Behavior.	Predicting the acceptance	Using the updated UTAUT2, the study assessed older users' intention and usage behaviour towards ICT. 278

Literature on the theoretical framework of the adoption and use of ICT			
Author(s)/Year	**Journal/Article/Conference**	**Title**	**Key findings**
		and use of information and communication technology by older adults: An empirical examination of the revised UTAUT2.	older adults between ages 55-94 years participated in the study. Findings revealed that performance expectancy was more dominant in determining older adults' intention to use ICT. While, intention behaviour strongly impacted on actual use of ICT.

Appendix 5: Ethics approval

University of Hertfordshire UH

UNIVERSITY OF HERTFORDSHIRE

SOCIAL SCIENCES, ARTS AND HUMANITIES

ETHICS APPROVAL NOTIFICATION

TO: Uchenna Valentina Nwanekezie

FROM: Dr Timothy H Parke, Social Sciences, Arts and Humanities ECDA Chairman

DATE: 09/06/14

Protocol number: **BUS/PG/UH/00648**

Your application for ethical approval has been accepted and approved by the ECDA for your school.

Appendix 6: Sample of leaflet or flier used for recruiting participants

A Tablet Device

(Ipad, Samsung Galaxy, Acer, Amazon Kindle) Survey

THE UNIVERSITY OF HERTFORDSHIRE KINDLY ASKS YOU

>>>> AGED 50 YEARS AND OVER <<<<

TO SPARE 10-15 MINUTES TO TAKE PART IN THIS RESEARCH. YOU DO NOT HAVE TO BE A CURRENT TABLET DEVICE OR INTERNET USER TO TAKE PART.

The reason for this research is that recently, mobile technologies have become a part of everyday activities. These mobile devices, in this case, tablet devices such as Ipad, Samsung Galaxy, and Amazon Kindle are now considered to be beneficial to both individuals and organisations. However, there have been some concerns regarding the tablet devices acceptance (adoption), purchase and continued usage especially amongst the population aged 50 and above. We believe that this tablet device will be beneficial for those within this identified population of 50 years and above due to its features, which include a large screen, font size and flexibility.

Given that UK's population of those within 50+ is increasing, studies are being carried out to investigate how older people can be assisted and involved in the fast moving technological world. With the findings, strategies can be developed to ensure that the needs of all age groups, especially the older population are met and their quality of life improved. Therefore, we kindly request you and your household members aged 50 and over to PLEASE give 15 minutes of your time for this research project. We would like to take this opportunity to thank you in advance for your time and patience in completing this questionnaire.

If you are satisfied with this information and are happy to continue, please go through the link below:

https://www.surveymonkey.com/r/V8QXPS2

****PLEASE NOTE: If you do not have the Internet or cannot access the Internet, or you do not know how to use a computer, please contact us on the number 07486520134 or 01707551222** (Lines are open for 7 days a week). **When you call, please state your age, gender, occupation, education and place where you are calling from e.g St. Albans. Please, also state whether you are calling because you cannot access the questionnaire due to: knowing how to use a computer, but not having a computer to complete the questionnaire; or do not use the internet and have no intention of using the internet. Thank you****

If you have any questions about this study, please contact the researchers: Mrs Uchenna Ojiako, Research student (u.nwanekezie@herts.ac.uk) or Prof. Jyoti Choudrie (j.choudrie@herts.ac.uk). Address: University of Hertfordshire, Business School, De Havilland campus, Hatfield, Herts. AL10 9EU. Please note that your contributions to this survey are confidential and for academic research purposes only. All responses are anonymous. The results will only be reported in aggregate terms and in codes, without any individual identifying information. This work has been approved by UH Ethics Committee with the Protocol Number: BUS/PG/UH/00648). We would like to take this opportunity to thank you in advance for your time and patience in completing this questionnaire.

Appendix 7: Sample of content validity form

<u>Content Validity - Instructions</u>

A link to the survey questionnaire questions is below.

https://www.surveymonkey.com/s/X8F238Z

Before completing the online survey please consider the following:

How long (minutes) did it take you to complete the survey?

Can you suggest any changes that can be made to improve this survey in order to make it easier and more straightforward for a participant to follow and complete. This includes spelling or grammar errors.

Are there any questions that you found too intrusive or you thought may discourage people from taking part in this survey?

Also, for each individual question we would like your opinion on whether you believe that question is:

Essential to aims of this research.

Useful, but not essential to the aims of this research.

Not necessary to the aims of this research

Please select one box for EACH question according to the statement you think is applicable from the three options given above. Please indicate with a Y for Yes and an N for No

Finally, after checking for accuracy and correctness, please complete the questionnaire and answer the following three questions on the feedback page below.

Once you have done this please save the document, then attach your response to an email back. Thank you.

Please enter your name here (if you want to) >

SURVEY QUESTIONS

Section A – Demographics

	Essential	Useful, but not essential	Not necessary
Question 1			
Question 2			
Question 3			
Question 4			
Question 5			
Question 6			
Question 7			
Question 8			
Question 9			

Section B – You and your Internet

	Essential	Useful, but not essential	Not necessary
Question 10			
Question 11			
Question 12			
Question 13			
Question 14			

Section C – Tablet Adoption

	Essential	Useful, but not essential	Not necessary
Question 15			

Section D - Tablet Adopters

Question 16			
Question 17			
Question 18			
Question 19			
Question 20			
Question 21			

Section E – Currently not using a Tablet

	Essential	Useful, but not essential	Not necessary
Question 22	☐	☐	☐
Question 23	☐	☐	☐

Section F – Intention to Purchase tablet devices

	Essential	Useful, but not essential	Not necessary
Question 24	☐	☐	☐
Question 25	☐	☐	☐
Question 26	☐	☐	☐

Section F – Behavioural Intentions towards using a tablet device

	Essential	Useful, but not essential	Not necessary
Question 27	☐	☐	☐

Section K – Thank you page

	Essential	Useful, but not essential	Not necessary
Question 28	☐	☐	☐

FEEDBACK

(1) How long (minutes) did it take you to complete the survey?

(2) Can you please suggest any changes that can be made to improve this survey in order to make it easier and more straightforward for a participant to follow and complete? This includes spelling and grammar errors.

(3) Are there any questions that you found too intrusive or you thought may discourage people from taking part in this survey?

Appendix 8: Sample of survey questionnaire

A Survey Investigating the Decision to Adopt and Use Tablet devices

Consent Letter: For individuals within the age of 50 and over. We need your help please

Dear Sir/Madam,

We would like to seek your assistance in completing this survey, which is part of a research project being conducted at the University of Hertfordshire's Business School by Uchenna Ojiako, Research Student and Professor Jyoti Choudrie, Professor of Information Systems.

Currently, mobile technology is the new form of Information and Communication Technologies (ICT). Mobile technologies are being used by individuals and organizations via handheld devices such as smartphones, tablets; wireless laptops, or Mobile commerce (m-commerce). For the successful diffusion of these mobile technologies, decisions regarding the purchase, or continuing with the adoption of the mobile device, in this case, a tablet device are required. Some examples of tablet devices include the Ipad, Samsung galaxy, or Amazon Kindle fire.
Tablet devices appear to be a preferred mobile device within older adults due to their offering of a large screen, font size and flexibility. Thus, the aim of this research is to identify and understand the factors that may influence UK residents decision-making intentions when adopting and continuing to use a tablet device . By understanding these factors, strategies can be developed to ensure that the needs of various age groups are met as well as to encourage the further spread of ICT.

We request UK residents within the age of 50 years and over living in the Hertfordshire County of England to spare 15 minutes to participate in this research. Please note that you do not have to currently own a tablet or to be an Internet user to take part in this research.
Please check (tick) all appropriate answers. If your answer(s) is not displayed, could you please state your answer in the "Other" option provided.
Please note that your contributions to this survey are confidential and for academic research purposes only. All responses are anonymous. The results will only be reported in aggregate terms and in codes, without any individual identifying information. This work has been approved by UH Ethics Committee with the Protocol Number: BUS/PG/UH/00648).

If you have any questions about this study, please contact the researchers: Ms Uchenna Ojiako, Research student (u.nwanekezie@herts.ac.uk) & Prof. Jyoti Choudrie (j.choudrie@herts.ac.uk).
Address: University of Hertfordshire, Business School, De Havilland campus, Hatfield, Herts. AL10 9EU.
We would like to take this opportunity to thank you in advance for your time and patience in completing this questionnaire.

Thank You For Your Time. Just click NEXT below to begin!

A Survey Investigating the Decision to Adopt and Use Tablet devices

Demographics

* 1. Which of the following age groups do you belong to?

- 50 - 59 years
- 60 - 69 years
- 70 - 79 years
- 80 - 89 years
- 90 years +

* 2. Please state your gender.

- Female
- Male

* 3. Please state your highest academic qualification?

- Postgraduate degree (PhD., MA, MD, MSc, MBA...)
- Bachelors degree (BA, BSc, BEng...)
- HND, HNC, Teaching
- A Levels
- BTEC / College Diploma
- GCSE / OLevel
- Other (please specify)

* 4. Please state your current employment status.

- ◯ Employed full time
- ◯ Employed part time
- ◯ Self - employed
- ◯ Student (unemployed)
- ◯ Student (part time employment)
- ◯ Student (full time employment)
- ◯ Unemployed
- ◯ Redundant
- ◯ Retired (Under 65 +)
- ◯ Pensioner (65+)
- ◯ Other (please specify)

* 5. Please state your current occupation. If you are retired or a pensioner, please select the occupation you held for the majority of your working life.

- ◯ Student
- ◯ Legislators/Managers
- ◯ Academics/Teachers
- ◯ Doctors/Lawyers/Engineers
- ◯ Crafts/Trades
- ◯ Clerks
- ◯ Services/Sales
- ◯ Agricultural/Forestry/Fishery
- ◯ Plant/Machine Operators
- ◯ Freelance
- ◯ Other (please specify)

* 6. Please state your current health status.

- ◯ Excellent
- ◯ Good
- ◯ Fair
- ◯ Poor

* 7. Please select the area of Hertfordshire County that you live in

- ◯ Abbot Langley
- ◯ Clothall
- ◯ London Colney

- Albury
- Aldbury
- Aldenham
- Allen's Green
- Anstey
- Apsley
- Ardeley
- Ashwell
- Aspenden
- Aston
- Aston End
- Ayot St Lawrence
- Ayot St Peter
- Baker's End
- Baldock
- Barkway
- Barley
- Barleycroft End
- Batchworth
- Batchworth Heath
- Bayford
- Bayfordbury
- Bedmond
- Bell bar
- Bendish
- Bengeo
- Benington
- Berkhamsted
- Bishops Stortford
- Blackmore End
- Borehamwood
- Cockernhoe
- Codicote
- Cole Green
- Collier's End
- Colney Heath
- Colney Street
- Cottered
- Cromer
- Cromer Hyde
- Croxley Green
- Cuffley
- Dane End
- Datchworth
- Datchworth Green
- Digswell
- East End
- Eastbury
- Eastwick
- Elstree
- Enfield
- Epping Green
- Essendon
- Felden
- Flamstead
- Flamstead End
- Flaunden
- Frogmore
- Furneux Pelham
- Gaddesden Row
- Garston
- Gilston Park
- Long Marston
- Markyate
- Much Hadham
- New Barnet
- Old Knebworth
- Oxhey
- Perry Green
- Pirton
- Potters Bar
- Potters Crouch
- Preston
- Puckeridge
- Puttenham
- Radlett
- Redbourn
- Rickmansworth
- Roe Green
- Royston
- Sandridge
- Sawbridgeworth
- Sheering
- Shenley
- Shillington
- South Mimms
- St Albans
- Spitalbrook
- Stanborough
- Standon
- Stanstead Abbots
- Stansted
- Stansted Airport

- Bourne End
- Bovingdon
- Boxmoor
- Bragbury End
- Bramfield
- Braughing
- Breachwood Green
- Brent Pelham
- Brickendon
- Bricket Wood
- Broadwater
- Brookmans Park
- Broxbourne
- Buckland
- Bucks Hill
- Bull's Green
- Buntingford
- Burnham Green
- Bury Green
- Bushey
- Bushey Heath
- Bygrave
- Caldecote
- Chandler's Cross
- Chapmore End
- Charlton
- Chestnut
- Cheverell's Green
- Childwick Green
- Chipperfield
- Chipping
- Goff's Oak
- Gosmore
- Graveley
- Great Amwell
- Great Gaddesden
- Great Hadham
- Great Hallingbury
- Great Hormead
- Great Offley
- Great Wymondley
- Green End
- Green Street
- Green Tye
- Harpenden
- Hatfield
- Hemel Hempstead
- Henham
- Hertford
- Hertford Heath
- Hertingfordbury
- Hexton
- Hinxworth
- Hitchin
- Hoddesdon
- Hunsdon
- Ickleford
- Ippolyts
- Kimpton
- Kings Langley
- Knebworth
- Letchworth Garden City
- Stapleford
- Stevenage
- Stocking Pelham
- Stotfold
- Takeley
- Tea Green
- Tewin
- The Folly
- Tonwell
- Tring
- Turnford
- Ugley
- Walkern
- Waltham Cross
- Ware
- Watford
- Watton At Stone
- Welham Green
- Wellpond Green
- Welwyn
- Welwyn Garden City
- Westmill
- Weston
- Wheathampstead
- Whitwell
- Wigginton
- Willian
- Wilstone
- Wood End
- Woodside
- Wolmer Green

- ◯ Chiswell Green
- ◯ Chorleywood
- ◯ Church End
- ◯ Churchgate
- ◯ Little Gaddesden
- ◯ Little Hadham
- ◯ Little Hallingbury
- ◯ Little Wymondley
- ◯ Wormley
- ◯ Wotham Park
- ◯ Wyddial
- ◯ Other (please specify)

* 8. Please state your ethnicity.

- ◯ White British
- ◯ Other White Background
- ◯ Black African / British African
- ◯ Other Black Backgrounds
- ◯ Asian / British Asian
- ◯ Mixed white & Black African
- ◯ Mixed white & Asian
- ◯ Other mixed Backgrounds
- ◯ Other (please specify)

* 9. Which of the following best describes your current relationship status?

- ◯ Married
- ◯ Widowed
- ◯ Divorced
- ◯ Separated
- ◯ In a domestic partnership or civil union
- ◯ Single, but cohabiting with a significant other
- ◯ Single, never married
- ◯ Other (please specify)

A Survey Investigating the Decision to Adopt and Use Tablet devices

Internet Usage

Each question in this section refers to measuring the use of internet usage

10. Do you currently use the internet?

- ◯ Yes
- ◯ No
- ◯ I do not currently use the internet but I intend to start using it

11. How often do you connect to the internet?

- ◯ Monthly
- ◯ Several times in a week (more than three times in a week)
- ◯ Weekly (less than three times a week)
- ◯ Daily (Less than 2 hours)
- ◯ Daily (More than 2 hours)
- ◯ I do not use the internet
- ◯ Other (please specify)

12. What are your reasons for using the internet? (You may chose more than one option)

- ☐ I do not use the internet
- ☐ To book appointments
- ☐ For searching for information on search engines (e.g Google, Bing, Ask, Yahoo...)
- ☐ For banking (e.g viewing bank statements online, transferring funds...)
- ☐ For social networking (e.g Facebook, MySpace, Twitter, Video calling (Skype, Viber, Tango...), Checking Emails)
- ☐ For online shopping
- ☐ For checking information on government websites
- ☐ For voting online
- ☐ For paying bills (council tax, rent, electricity bills...)
- ☐ For taking or posting surveys
- ☐ For searching or applying for jobs
- ☐ For getting directions (e.g. google map)
- ☐ For checking the weather forecast on websites (e.g bbc weather)
- ☐ For making travelling arrangements
- ☐ For entertainment (watching movies, playing games, listening to music...)
- ☐ For reading (e.g online magazines, newspapers, research articles)
- ☐ For seeking health information
- ☐ Other (please specify)

13. Which of the following is your primary Internet Service Provider?

- BT
- Vodafone
- Virgin Media
- EE
- O2
- Sky
- Talk Talk
- Orange
- AOL
- Plus Net
- I do not use any of these internet service providers
- Other (please specify)

14. Does any of the following ailment(s) affect your use of the internet? (You may choose more than one answer)

- Loss of memory
- Neck fracture
- Anxiety disorder
- Dementia
- Learning difficulties (e.g inability to see the words correctly or colours on screen)
- Vision impairment (e.g difficulty with seeing screens, difficulty with text or colours on screen)
- Heart disease
- Alzheimer
- Arthritis of the hand
- Arthritis of the finger
- Ear disorders
- Deafness
- Mobility problems
- Fracture of the neck
- High blood pressure
- None of the above
- Other (please specify)

A Survey Investigating the Decision to Adopt and Use Tablet devices

Tablet Usage

Examples of tablet devices include ipad, amazon kindle, samsung tablets, asus tablets among others.
You do not have to use a tablet device to answer the following questions

* 15. Do you own a tablet device?

- Yes
- No, I do not own a tablet and I do not intend to own one
- I do not currently own a tablet but I intend to buy a tablet

A Survey Investigating the Decision to Adopt and Use Tablet devices

Those who currently use tablet devices

16. Which of the following tablet devices do you currently use? (Check all that apply)

- [ ] Amazon Kindle Fire
- [ ] Asus Transformer Pad
- [ ] Barnes & Noble Nook HD+
- [ ] Dell Latitude
- [ ] Google Nexus
- [ ] iPad
- [ ] Microsoft Surface
- [ ] Samsung Galaxy Tab
- [ ] Other (please specify)

17. What influenced your decision to use a tablet device?

- ○ Family/ Friends recommendation
- ○ TV advertisement
- ○ Colleagues at work
- ○ Newspaper advertisement
- ○ Influence of your internet service provider
- ○ Other (please specify)

18. Why do you use your tablet device? Please select all that apply

- [ ] For reading offline
- [ ] For reading online
- [ ] For browsing (for instance emails, facebook, linkedin...)
- [ ] For shopping online
- [ ] To interact with the central Government
- [ ] To interact with the local Government
- [ ] For watching movies offline
- [ ] For banking online
- [ ] For watching movies online
- [ ] For playing games offline
- [ ] For playing games online
- [ ] For health and well being
- [ ] Other (please specify)

19. How often do you use your tablet device?

- ◯ Monthly
- ◯ Several times in a week (more than three times in a week)
- ◯ Weekly (less than three times a week)
- ◯ Daily (Less than 2 hours)
- ◯ Daily (More than 2 hours)
- ◯ Other (please specify)

20. How long have you been using your tablet device?

- ◯ Less than a year
- ◯ Between a year and 3 years
- ◯ Between 3 years and 6 years
- ◯ More than 6 years
- ◯ I do not currently use a tablet

21. Do you use the Internet with your tablet device?

- ◯ Yes
- ◯ No, I do not use the internet with my tablet
- ◯ No, I do not currently use the internet with my tablet but I intend to

A Survey Investigating the Decision to Adopt and Use Tablet devices

This section is for those who do not use and do not intend to use a tablet device

22. Why do you not want to purchase a tablet device? (Select all that apply.)

- [ ] The design of tablet devices
- [ ] The prices of tablet devices
- [ ] The availability of tablet devices in my area
- [ ] Competing products such as laptops, desktops are better
- [ ] The weight and size of tablet devices
- [ ] The battery life of tablet devices
- [ ] I am too old to use a tablet device
- [ ] I do not know how to operate a tablet device
- [ ] Health reasons prevent me from using a tablet device
- [ ] Owning a tablet device does not fit my daily needs
- [ ] No particular reason, I simply do not see the need of owning a tablet device
- [ ] Other (please specify)

23. What reason(s) could encourage you to purchase a tablet device?

- [ ] Reduction in the cost of a tablet device
- [ ] Reduction in the cost of an internet subscription for using the tablet device
- [ ] The provision of training on how to use a tablet device
- [ ] Nothing will make me use a tablet device in the future
- [ ] Other (please specify)

A Survey Investigating the Decision to Adopt and Use Tablet devices

Those with the intention to purchase a tablet devices

* 24. Are you likely to purchase a tablet device in the next 6 months?

- ( ) Yes
- ( ) No, but maybe later

25. Which of the following tablet devices do you intend to purchase? (Check all that apply)

- [ ] Amazon Kindle Fire
- [ ] Asus Transformer Pad
- [ ] Barnes & Noble Nook HD+
- [ ] Dell Latitude
- [ ] Google Nexus
- [ ] iPad
- [ ] Microsoft Surface
- [ ] Samsung Galaxy Tab
- [ ] Not applicable
- [ ] Other (please specify)

26. Why do you intend to purchase a tablet device? Please select all that apply

- [ ] For reading offline
- [ ] For reading online
- [ ] For browsing (for instance emails, facebook, linkedin...)
- [ ] For shopping online
- [ ] To interact with the central Government
- [ ] To interact with the local Government
- [ ] For banking online
- [ ] For watching movies offline
- [ ] For watching movies online
- [ ] For playing games offline
- [ ] For playing games online
- [ ] For health and well being
- [ ] Other (please specify)

A Survey Investigating the Decision to Adopt and Use Tablet devices

What are your intentions towards adopting and using a tablet device

* 27. The following statement is assessing individual behavioural intentions towards using a Tablet Computer. Please evaluate the following statements where 1 implies that you strongly disagree with the statement and 7 implies that you strongly agree with the statement. Also, the option N/A implies that the question is not applicable to you.

	Strongly Disagree	Disagree	Weakly disagree	Neutral	Weakly Agree	Agree	Strongly Agree
Using a tablet device fits with my personal needs and preferences (E.g measuring my workout session, chatting with friends)	○	○	○	○	○	○	○
Using a tablet device fits with my lifestyle or work (e.g style of entertaining self, working from home)	○	○	○	○	○	○	○
Learning how to use a tablet device is easy	○	○	○	○	○	○	○
I find it easy to get a tablet device to do what I want it to do	○	○	○	○	○	○	○
Overall, I find tablet devices easy to use	○	○	○	○	○	○	○
Use of a tablet device can significantly improve the quality of my life (E.g monitoring my weight, blood pressure)	○	○	○	○	○	○	○
Using a tablet device is useful for my daily activities and preferences	○	○	○	○	○	○	○
Using a tablet device helps me accomplish things more quickly (E.g quicker response to emails, facebook messages...)	○	○	○	○	○	○	○
I have a positive opinion of tablet devices (E.g based on its size, my experience of it...)	○	○	○	○	○	○	○

	Strongly Disagree	Disagree	Weakly disagree	Neutral	Weakly Agree	Agree	Strongly Agree
Using a tablet device is a good idea							
I think using a tablet device is appropriate for me (E.g for work, daily routine...)							
I believe that a tablet device will help me access the internet whenever I want							
I worry that using tablet devices to complete certain internet activities (such as internet banking, online shopping) is not secure							
Using tablet devices has me concerned about the privacy of my personal information							
Using tablet devices could lead to my personal information being used without my knowledge							
People who influence my behaviour think I should use a tablet device (E.g family, friends, colleagues)							
Using a tablet device makes me look trendy, knowledgeable and wealthy							
Using a tablet device also reflects my intelligence and level of knowledge among my friends and colleagues							
I can afford to pay for and use a tablet device							
I can use a tablet device without help from friends, family or colleagues							
I have the knowledge and skills to use a tablet device on my own							

	Strongly Disagree	Disagree	Weakly disagree	Neutral	Weakly Agree	Agree	Strongly Agree
I will consider continuing to use a tablet device in the next few months							
I intend using a tablet device in the next few months							
I think I will continue to use a tablet device in the next few months							

A Survey Investigating the Decision to Adopt and Use Tablet devices

Thank you page

This is the end of the questionnaire. Thank you for completing our survey! Having completed this research, would you be happy to share your contact details with us in case of further research. If so, please enter your details below.

28. If you are happy to do so, please state your contact details here.

Telephone:

Email:

Appendix 9: Results from the pilot study

Education, health status, occupation and marital status

Category		Count	Total (%)
Education	Postgraduate degree (PhD, MA, MD, MSc, MBA...)	47	23.2
	Bachelor's degree (BA, BSc, BEng...)	58	28.6
	HND, HNC, Teaching	12	5.9
	A levels	32	15.8
	BTEC/College Diploma	24	11.8
	GCSE/O level	24	11.8
	C & G	2	1.0
	Certificate in education	4	2.0
	Total	**203**	**100.0**
Health status	Excellent	101	49.8
	Good	84	41.4
	Fair	15	7.4
	Poor	3	1.5
	Total	**203**	**100.0**
Occupation	Student	24	11.8
	Legislators/Managers	22	10.8
	Academics/Teachers	27	13.3

Category		Count	Total (%)
	Doctors/Lawyers/Engineers	9	4.4
	Crafts/Trades	13	6.4
	Clerks	18	8.9
	Services/Sales	36	17.7
	Agricultural/Forestry/Fishery	4	2.0
	Plant/Machine operators	0	0.0
	Freelance	5	2.5
	Housewife	3	1.5
	Weekend viewing assistant & mortgage & life administrator	2	1.0
	Personal support worker	3	1.5
	Actuary	3	1.5
	Other	10	1.0
	Retired	10	4.9
	Nurse	5	2.5
	Child-minder	1	0.5
	Specialist business advisor	1	0.5
	Finance	1	0.5
	Marketing	1	0.5
	Programme office manager	1	0.5
	Invigilator	1	0.5
	IT consultant	1	0.5
	Media personnel	1	0.5
	Unemployed	4	2.0

Category		**Count**	**Total (%)**
	Midwife	2	1.0
	Technical manager/Technical management/Lab manager	3	1.5
	Total	**203**	**100.0**
Marital Status	Married	100	49.5
	Widowed	17	8.4
	Divorced	11	5.4
	Separated	9	4.5
	In domestic partnership or civil union	10	5.0
	Single but cohabiting with significant other	17	8.4
	Single, never married	38	18.8
	Total	**202**	**100.0**

The towns in Hertfordshire County

Category		Count	Percent (%)
Towns	Abbot langley	2	1.0
	Apsley	3	1.5
	Baldock	3	1.5
	Barley	3	1.5
	Bedmond	1	0.5
	Berkhamsted	1	0.5
	Bishops Stortford	1	0.5
	Borehamwood	2	1.0
	Great Hadham	1	0.5
	Harpenden	2	1.0
	Hatfield	63	31.0
	Hemel Hempstead	4	2.0
	Henham	2	1.0
	Hertford	5	2.5
	Hertford Heath	2	1.0
	Hertingfordbury	2	1.0
	Hexton	2	1.0
	Hitchin	3	1.5
	Rickmansworth	2	1.0
	Sawbridgeworth	7	3.4
	South Mimms	2	1.0

Category		Count	Percent (%)
	St Albans	22	10.8
	Bovingdon	1	0.5
	Brookmans Park	6	3.0
	Broxbourne	1	0.5
	Bushey	3	1.5
	Codicote	1	0.5
	Colney Heath	2	1.0
	Elstree	2	1.0
	Enfield	2	1.0
	Hoddesdon	1	0.5
	Knebworth	3	1.5
	Letchworth Garden City	5	2.5
	London Colney	2	1.0
	Old Knebworth	1	0.5
	Potters Bar	4	2.0
	Potters Crouch	1	0.5
	Stevenage	9	4.4
	Tring	1	0.5
	Turnford	1	0.5
	Waltham Cross	1	0.5
	Watford	5	2.5
	Welwyn	2	1.0
	Welwyn Garden City	8	3.9

Category		Count	Percent (%)
	Wheathampstead	1	0.5
	Welham Green	5	2.5
	Total	**203**	**100.0**

Comparative analysis of marital status, occupation with tablet adoption

Classification		Tablet adoption			
		Adopters (%)	**Non-adopters (%)**	**Planning to adopt (%)**	**Total (%)**
Marital Status	Married	60.9	35.8	32.4	49.5
	Widowed	7.0	15.1	2.9	8.4
	Divorced	5.2	7.5	2.9	5.4
	Separated	2.6	3.8	11.8	4.5
	In domestic partnership or civil union	0.9	15.1	2.9	5.0
	Single but cohabiting with significant other	8.7	7.5	8.8	8.4
	Single, never married	14.8	15.1	38.2	18.8
	Total	**100.0**	**100.0**	**100.0**	**100.0**
Occupation	Student	9.7	9.3	23.5	11.9
	Legislators/Managers	10.6	13.0	8.8	10.9

	Academics/Teachers	12.4	13.0	17.6	13.4
	Doctors/Lawyers/Engineers	3.5	3.7	8.8	4.5
	Crafts/Trades	6.2	7.4	5.9	6.5
	Clerks	9.7	11.1	2.9	9.0
	Services/Sales	17.7	16.7	20.6	17.9
	Agricultural/Forestry/Fishery	0.9	5.6	0.0	2.0
	Plant/Machine operators	0.0	0.0	0.0	0.0
	Freelance	1.8	3.7	2.9	2.5
	Housewife	1.8	0.0	2.9	1.5
	Weekend viewing assistant & mortgage & life administrator	1.8	0.0	0.0	1.0
	Personal support worker	2.7	0.0	0.0	1.5
	Actuary	2.7	0.0	0.0	1.5
	Retired	3.5	9.3	2.9	5.0
	Nurse	3.5	1.9	0.0	2.5
	Child minder	0.9	0.0	0.0	0.5
	Specialist business advisor	0.9	0.0	0.0	0.5
	Finance	0.9	0.0	0.0	0.5

	Marketing	0.9	0.0	0.0	0.5
	Programme office manager	0.9	0.0	0.0	0.5
	Invigilator	0.9	0.0	0.0	0.5
	IT consultant	0.9	0.0	0.0	0.5
	Media personnel	0.0	0.0	2.9	0.5
	Unemployed	0.9	5.6	0.0	2.0
	Midwife	1.8	0.0	0.0	1.0
	Technical manager/Technical management/Lab manager	2.7	0.0	0.0	1.5
	Total	**100.0**	**100.0**	**100.0**	**100.0**

Appendix 10: Raw Excerpts from the Participants

Researcher: What do you like or dislike about the tablet device?

Comment 1: What I like about my iPad is ready access to information, the flexibility, the freedom, the vast range of things you could do. For instance, I was using it to read a book before you called. But I dislike that it runs out of battery and Wi-Fi signal is not as freely available in this country as I would like.

Comment 2: I do not really dislike anything about it – I like the fact that I can have access to family all over the world, I can play scrabble with it, I can print things, I can make birthday cards among other things.

Researcher: What do you use for device for mainly?

Comment 1: I use it to keep in touch, play scrabble with people all over the world including places like New Zealand, Spain, USA, UK and so many other places. I also read books with it - you see, I belong to a book club and it is so much easy to grab my tablet with me – so it is a very useful device.

Comment 2: I use it to send a lot of emails, especially as I belong to a Safeguarding group in church and so it saves me a lot of time using my tablet rather than switching on a computer and waiting for it to boot. Also, I use it for calendaring, I have also got my address book on there, do a lot of Google search.

Researcher: Why did you decide on the tablet?

Comment 1: I have been using computers for so many years – since the 60s – at work. I had a desktop first and then when the laptops came out, I got one as well. So, I just graduated to the tablet really. It is a nice, handy size to carry around so I just bought one of those instead.

Comment 2: I was working and they were beginning to introduce the iPad and another tablet into the work situation and I realised that it would be helpful to have one, so we got one. So, I used it work-related initially but also had a home calendar as well. I previously had one of them palm-tops, so basically, the iPad replaced that.

Researcher: How do you feel about owning your tablet?

Comment 1: I think it is an excellent move to own a tablet, particularly for elderly people who live alone like myself because it is so easy to keep in touch with people. In fact, if my tablet were down, I would feel like I have lost an arm – I couldn't imagine being without it.

Comment 2: Oh yeah! It is vital. I would not be without my tablet – it is possible, I mean, you have got ready access to so much information - it's so much easier to quickly do an email on there than having to switch on the laptop.

Researcher: Do you require assistance to use your tablet device?

Comment 1: No, I do not. I have been used to a blackberry phone at work - which has similar capabilities and we did go to a couple of workshops at the Apple store, Watford branch to learn more about what it could do. But, I think like with most technologies, we do not exhaust the full capabilities – we just get to a level of use that we are comfortable with and we do not do more with it.

Comment 2: I am too ignorant of it, so I often get my grandson to help me when he is around – I can only use it when I have help.

Researcher: How much do you trust the tablet device?

Comment 1: I find it easier to carry around and it is an improved screen size. However, I am unsure about using technology generally – although my Kindle was a gift. I believe there is a risk with using such devices. Don't get me wrong, yeah, I know there are advantages to it but I sometimes fear that my private information could be stolen and I could get lots of abuse.

Comment 2: Using my tablet makes life so much easier – it helps me accomplish a lot of things, emailing, searching for information; you name it. I also do a lot of shopping with it – you can literally take it anywhere. I am wary of using online banking on it though- I prefer conducting banking transactions on my computer. I guess it is because my husband has drummed in a sense of security into me really.